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Johannes Würfl BSc

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Assoz. Prof. Mag. Dr. Paul Pichler Privatdoz.

Mitbetreut von | Co-Supervisor:

Dr. David Pothier

Abstract

The global financial crisis of the late 2000s had a significant impact on the banking sector, thereby highlighting the importance of bank capital in maintaining financial stability and sustaining lending activity. This thesis examines the influence of bank capital on the lending behaviour of Austrian banks from 2007 to 2017 – a period marked by regulatory reforms, economic fluctuations, and changing market dynamics. Using empirical data from the largest Austrian bank groups, the study employs econometric models to analyse the relationship between bank capitalisation and credit growth. The findings indicate that while capital requirements imposed under Basel III were intended to enhance financial stability, their direct impact on lending behaviour was found to be insignificant. Instead, interest rates and macroeconomic conditions played were identified as playing a more substantial role in influencing credit supply. The results suggest that enhanced capital buffers did not significantly constrain lending in the long run but rather contributed to a more resilient banking sector.

Kurzfassung

Die globale Finanzkrise der späten 2000er Jahre hatte erhebliche Auswirkungen auf den Bankensektor und verdeutlichte die zentrale Rolle des Eigenkapitals zur Sicherstellung der finanziellen Stabilität und der Kreditvergabe. Diese Masterarbeit untersucht den Einfluss des Eigenkapitals auf die Neukreditvergabe österreichischer Banken im Zeitraum 2007 bis 2017 – ein Zeitraum, der von regulatorischen Reformen, wirtschaftlichen Schwankungen und veränderten Marktbedingungen geprägt war. Anhand empirischer Daten österreichischer Banken werden mittels ökonometrischer Modelle die Zusammenhänge zwischen Kapitalausstattung und Kreditwachstum analysiert. Die Ergebnisse zeigen, dass die im Rahmen von Basel III verschärften Eigenkapitalanforderungen die Finanzstabilität stärkten, jedoch nur begrenzte direkte Auswirkungen auf das Kreditwachstum hatten. Stattdessen spielten Zinssätze und makroökonomische Bedingungen eine größere Rolle bei der Kreditvergabe. Die Resultate deuten darauf hin, dass höhere Kapitalpuffer die Kreditvergabe langfristig nicht wesentlich einschränkten, sondern eher zu einer widerstandsfähigeren Bankenlandschaft beitrugen.

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1. Introduction

The global financial crisis of the late 2000's has brought the resilience of banking systems into sharp focus, with profound implications for banks' lending behaviour and their role in supporting economic activity. In this context, the capital structure of banks has emerged as a critical determinant of their ability to absorb shocks and sustain lending during periods of economic stress. This thesis explores the impact of bank capital on the lending behaviour of Austrian banks during the decade following the onset of the global financial crisis, from 2007 to 2017. This period was marked by regulatory reforms, economic crises and recoveries, and evolving market dynamics in the Austrian banking sector and worldwide.

Bank capital serves as a cushion against potential losses and is a key signal of financial health, directly influencing the risk-taking behaviour and lending capacity of banks. In the aftermath of the global financial crisis, regulatory frameworks such as Basel III introduced more stringent capital requirements to enhance financial stability. These regulatory changes, when viewed in conjunction with adverse economic conditions, presented significant challenges to banks' traditional lending practices. Austrian banks, as part of a highly interconnected European financial system, navigated these changes while contending with the characteristics of the Austrian banking landscape.

Following the approaches of numerous empirical analyses, the purpose of this thesis is to examine how changes in bank capital influenced the lending behaviour of Austrian banks during this transformative decade. It specifically investigates whether higher capital levels constrained or supported lending activity and how these dynamics varied across the major banking groups operating in Austria. By analysing the interplay between capital adequacy and lending behaviour, this study aims to indicate the effectiveness of post-crisis regulatory measures and their implications for economic recovery and growth in Austria.

The analysis draws on empirical data from Austrian banks, employing econometric models to assess the relationship between capital ratios and lending growth rates. It also considers external factors, such as macroeconomic conditions, that may have shaped lending trends during the period under review. Through this investigation, the thesis aims to contribute to the broader understanding of bank capital's role in promoting financial stability while balancing the need for sustainable credit growth.

To this end, a fixed-effects regression model is estimated to assess whether changes in the equity ratio of a bank had a significant impact on the lending behaviour. The approach adopted in this paper follows research by Hahn (2002) as underlying assumptions hold correspondingly and the research design has proved adequate in numerous studies conducted ever since (cf. Hahn, 2002).

The data has been sourced from the Austrian National Bank (OeNB) and grouped into the major bank groups operating in Austria: joint-stock banks and private banks, the savings banks sector, the Raiffeisen sector and the Volksbanken sector. In contrast to other empirical research, the impact of bank capitalisation on credit growth is not measured using individual bank's balance sheet data, but rather consolidated data, i.e. the consolidated balance sheets of all banks within a given group. Despite the potential limitation of predictive power arising from the aggregation of the data, it may be possible to draw conclusions about distinct business models across groups in the Austrian banking industry. The introduction of a tightened bank regulatory framework might exhibit institutional peculiarities.

In the following chapters, the thesis first gives an overview of the economic developments that occurred during and following the financial crisis of 2007, which exerted severe repercussions on the Austrian economy and its banking system. Subsequent to outlining the economic background, the new Basel III rules are depicted before a detailed description of the developments in profitability, credit growth and capitalisation in the Austrian banking sector. The description of these three central aspects of the Austrian banking industry provides insight into the data used. The paper then reviews the theoretical underpinnings and empirical literature on bank capital and lending behaviour. Following the theoretical and empirical background, the data sources and the methodological approaches of this research will be outlined. The results are described in the context of both Austrian banking and the broader European financial landscape.

2. Developments in the Austrian banking sector from 2007 to 2017

The decade commencing in 2007 was characterised by crisis management and adaptation to a continually shifting landscape within international financial markets the banking sectors. The subsequent section gives an overview of the economic background and the capital requirements that were introduced for banks in the aftermath of the financial crisis. Thereafter, the developments of profitability, credit growth and capitalisation are delineated.

2.1 Economic background

The subprime mortgage crisis in the U.S. banking market that started in 2007 brought about a series of events that resulted in significant turbulences and a considerable loss of trust in international financial markets. This crisis ultimately led to a global financial crisis, which precipitated the most severe global recession since the Great Depression of the 1930s (Blanchard, 2008). Nevertheless, conventional and unconventional macroeconomic policies implemented by central banks worldwide were effective in preventing an even worse economic downturn. Yet, following the bailout of the European banking industry, the Euro area encountered a sovereign debt crisis, necessitating monetary policy and fiscal interventions in numerous countries. Austerity measures restrained economic growth, and particularly low oil prices, lead to deflationary pressures in the Euro area. In response, the European Central Bank (ECB) initiated large-scale asset purchase programmes for government bonds, aiming at an alleviation of deflationary pressures. Subsequent years witnessed a return to a more stable fiscal and monetary policy environment in the Euro area (European Central Bank, 2018). The ensuing discussion will address the economic backdrop of this decade and its repercussions on the Austrian economy and its banking sector.

The period preceding the global financial crisis was characterised by robust economic growth in the global economy. From 2003 to 2007, the annual average growth rate of global economic output exceeded 5% (International Monetary Fund, 2007). This growth, which was fuelled by lax financial regulations and standards in numerous developed economies, culminated in the formation of real estate price bubbles in the USA and Europe. The combination of lax lending policies, complex financial products and rising real estate prices

exerted significant pressure on banks, particularly in the USA, as default rates increased and credit quality deteriorated. This led to a decline in trust between financial institutions due to the inability of banks to accurately value a substantial portion of their portfolios, resulting in a contraction of interbank markets in numerous countries. However, in the initial phases of the crisis, the Austrian banking system exhibited limited vulnerability to the surge in market confidence, primarily due to the predominance of retail-focused business strategies and funding structures within the banking sector. These strategies enabled sustained growth in retail banking activities in Austria and Central and Eastern Europe up to 2008 (Oesterreichische Nationalbank, 2008a). However, the bankruptcy of the U.S. bank Lehman Brothers in September 2008 triggered significant turbulence in global financial markets, ultimately leading to economic downturns worldwide. Despite the fact that the majority of Austrian banks did not hold substantial quantities of problematic structured products on their balance sheets, the repercussions on the Austrian economy and its banking sector became evident. In 2009 nominal GDP contracted by 4,3% in the European Union and by 3,6% in Austria (Ebner, Silgoner, & Vondra, 2018).

In response to the global financial crisis, central banks around the world adopted a range of measures to support their respective financial systems. In the USA and the UK, interest rates were reduced in 2007, the ECB followed suit in late 2008. To address the liquidity challenges faced by European banks, the ECB introduced a policy of unlimited liquidity provision at a fixed interest rate, known as “fixed rate full allotment” (Cour-Thirrmann & Winkler, 2013). In addition to these monetary policy measures, numerous EU countries enacted banking acts to ensure the stability of their national financial systems. The Austrian government, for instance, was willing to provide up to 100 billion Euros to support Austrian banks if required (Austrian Parliament, 2008). While these measures prevented a collapse of the European banking industry, economic recovery was not immediately evident.

The years 2010 to 2012 were characterised by a sovereign debt crisis in the Eurozone. In an effort to stimulate economic growth in the aftermath of the crisis, EU countries implemented economic stimulus packages. However, these measures resulted in a substantial increase in public debt, leading to concerns about the potential default of some EU countries. Within a few years, Austria’s public debt ratio increased from 65% pre-crisis to nearly 83% in 2012 (Statistik Austria, 2025). The direct repercussions of these developments on Austrian banks were probably limited compared to banks in other countries, as their portfolios of debt claims to crisis countries like Greece and Spain were relatively small (Ebner et al., 2018).

On a European level, the European Financial Stability Facility (EFSF) was established in June 2010 as a temporary crisis resolution mechanism to provide financial assistance, which was subsequently transformed into a permanent institution in July 2013 – the European Stability Mechanism (ESM). However, government bond yields remained high (37% in Greece, 16% in Portugal in early 2012) and only began to decrease as the ECB launched its Outright Monetary Transactions Programme (OMT) in October 2012. The purpose of the OMT was to buy government bonds on a large scale to prevent a collapse of the monetary union (Ebner et al., 2018).

In the aftermath of the financial crisis, the need for enhanced bank regulation and supervision became evident, acknowledging the deficiencies in existing regulatory frameworks. The new Basel III framework aimed at improving banks' resilience and capacities to absorb losses through the implementation of more robust capital requirements and liquidity buffers. In Europe, the establishment of four new institutions was decisive in ensuring financial stability: the European Systemic Risk Board (ESRB), the European Banking Authority (EBA), the European Insurance Authority (EIOPA), and the European Securities and Markets Authority (ESMA). In order to reduce dependencies on the European banking market, further measures were taken by the ECB in 2012. These included the introduction of a uniform supervisory mechanism (Single Supervisory Mechanism – SSM), a uniform resolution mechanism (Single Resolution Mechanism – SRM) and a harmonised deposit insurance scheme (Ebner et al., 2018; Szczepanski, 2019).

Following the mitigation of the sovereign debt crisis, the Eurozone experienced a period of subdued economic growth in the years 2012 to 2015, when compared to the United States and the United Kingdom. This was due to the implementation of restrictive fiscal policies and deleveraging in the banking sector, which resulted in a recession in the Eurozone. In response to these economic challenges, the European Central Bank made several significant announcements and implemented policy changes in 2014. Notably, it introduced a negative interest rate on its deposit facility, a strategy that has not been adopted by any other major central bank before. Furthermore, it initiated an asset-backed securities purchase programme and targeted longer-term refinancing operations (TLTROs) for banks, offering long-term loans to banks at favourable rates until 2018 (European Central Bank, 2014).

Following a period of two years of recession, the Euro area finally exhibited signs of economic recovery in 2014. However, inflation rates remained below the target of 2% set by

the ECB, thereby indicating a limited scope for monetary policy manoeuvring. At the end of 2014, the harmonised consumer price index in the Eurozone was negative, and average inflation stood at 0,0% in 2015. In an effort to mitigate the deflationary pressures that were prevalent at the time, the ECB initiated a large-scale Asset Purchase Programme (APP), under which it committed to buying European government bonds amounting to a maximum of 60 billion Euros on a monthly basis¹ (Andrade, Breckenfelder, De Fiore, Karadi, & Tristan, 2016; Ebner et al., 2018).

From 2015 to 2017, the Euro area experienced average annual GDP growth of 2%, indicating that the economic downturn had been overcome. At the beginning of 2017, deflationary pressures eased also in Austria, despite inflation not reaching the European Central Bank's target level. The asset purchase programme of the ECB was still active, with net acquisitions amounting to 60 billion Euros per month in early 2017. The main refinancing operations rate of the ECB was at 0,0% at the end of 2017, and the deposit facility rate at -0,4%. (Ebner et al., 2018; European Central Bank, 2018).

Following an examination of the economic developments that Austrian banks were compelled to confront during this decade, the subsequent regulatory measures implemented in response to the financial crisis will now be analysed.

2.2 Cornerstones of the Basel III framework

The Basel framework of bank regulation, which was first established in 1988, has been implemented, at least in part, in numerous countries worldwide. By 1999, approximately 160 jurisdictions around the globe had adopted bank regulatory measures proposed by the Basel Committee on Banking Supervision (BCBS). Within the Euro area, the majority of the regulatory framework is implemented through the Capital Requirements Regulation (CRR) and the Capital Requirements Directive (CRD) (Ferreira, Jenkinson, & Wilson, 2019).

In response to the global financial crisis the BCBS presented a first consultation paper in December 2009 with the aim of improving the existing Basel II framework. Following a period of revision, the final Basel III framework was published in December 2010, incorporating more stringent regulations on bank capitalisation and liquidity buffers. The new

¹ This amount was subsequently increased to €80 billion in April 2016 (European Central Bank, 2018).

rules aimed to ensure the long-term stability of the financial markets, increase the ability of financial institutions to withstand crises, and to restore investor confidence in international financial markets (Basel Committee on Banking Supervision, 2011).

The primary objective of the Basel III accord is to enhance the capital adequacy of banking institutions. The requirements for Tier-1 capital have undergone a substantial revision, with the minimum ratio being elevated from 4% to 6%. Within the composition of Tier-1 capital, the minimum share of common equity (CET1-capital), which is predominantly comprised of common shares and retained earnings, has been increased from 2% to 4,5%. In addition, banks are required to establish a capital conservation buffer amounting to 2,5% of common equity. Together with other buffer requirements, the minimum total capital ratio increases to 10,5% (Basel Committee on Banking Supervision, 2011). These measures are intended to ensure that banks have sufficient capital reserves during crises and can absorb losses without jeopardising the stability of the financial system, as was seen during 2007 and 2008.

In addition to strengthening the capital base, the Basel III framework was developed to address liquidity risks that became evident during the global financial crisis. The new regulatory framework introduced the Liquidity Coverage Ratio (LCR), a requirement for banks to maintain sufficient high-quality liquid assets to cover their short-term obligations for a 30-day period under stressed scenarios. Furthermore, via the Net Stable Funding Ratio (NSFR) aims to ensure stable funding over a one-year timeframe. The overarching objective of these measures is twofold: to mitigate short-term refinancing risks and to promote long-term stability within the banking system (Basel Committee on Banking Supervision, 2011).

Another significant element of the Basel III accord is the implementation of a debt limit, formalised as the Leverage Ratio. This ratio represents an absolute cap on the leverage of banking institutions, based on a non-risk-weighted assessment of their balance sheet positions. This leverage ratio serves to prevent banks from amplifying their balance sheets through excessive debt, even if the indications of risk-weighted measures would imply a low minimum capital requirement. Furthermore, the rules for calculating risk-weighted assets (RWA) have been revised with a view to improving risk assessment accuracy and comparability among banking institutions. Concurrently, the Tier-3 capital permitted under Basel II – which could only be used to cover specific risks – has been eliminated to improve the quality of capital components (Basel Committee on Banking Supervision, 2011).

In order to enhance the resilience of the banking sector, the Basel III accords introduce regular stress tests. The purpose of these tests is to simulate various crisis scenarios and assess the ability of banks to remain stable under extreme economic conditions. The results of these stress tests provide valuable insights into potential vulnerabilities for both regulators and banks, and contribute to the early mitigation of risk (Ahmed & Calice, 2024).

To assess the quantitative impact of the new regulations, the BCBS, in collaboration with the Committee of European Banking Supervisors (CEBS; now: EBA), conducted quantitative impact studies on 263 banks in 23 countries (of which 230 banks from 21 European countries). Eighteen Austrian banks participated in the study, and it was found that an additional 15 to 18 billion Euros capital would need to be raised in the Austrian banking sector to comply with the new standards (Gromova-Schneider & Niziolek, 2011).

The implementation of Basel III is being phased in gradually, to allow banks sufficient time to adjust. Transitional rules have been designed to cushion the economic impact of the stricter regulations and to ensure a smooth integration into existing systems (European Commission, 2024). At the beginning of 2025, the EU is taking final steps to integrate the remaining standards into European law. The primary components of the regulatory framework that are the focus of this study, namely the enhanced capital regulation, were incorporated into Austrian legislation in 2013 (Austrian Ministry of Finance, 2025).

2.3 The evolution of profitability, credit growth and capitalisation in the Austrian banking industry

In the following section, the developments of profitability, credit growth and bank capitalisation in the Austrian banking sector will be discussed, with reference to the economic circumstances and regulatory changes described in the preceding sections. The data reveal significant changes closely linked to the events described in the previous sections. Prior to the presentation of the empirical literature on this topic and the regression model of this paper, this section will provide an overview of the data used in this research and offer an analysis of the condition of the Austrian banking industry in the aftermath of the financial crisis.

2.3.1 Development of profitability

The profitability of the Austrian banking sector exhibited significant fluctuations during the period under review. The majority of Austrian banks are commercial banks with a robust retail segment, with the predominant source of profits in the Austrian banking industry being interest income. The years preceding the financial crisis were characterised by substantial profitability, with consolidated profits reaching €6,8 billion in 2007, reflecting robust overall economic performance. This is evidenced by the significant growth rates of lending during that period. In addition, credit quality remained at high levels, with non-performing loans accounting for a mere 2,1% of total loan volume in 2006 (Oesterreichische Nationalbank, 2007).

During the global financial crisis of 2008, the consolidated profitability of the Austrian banking industry decreased to €0,6 billion (Oesterreichische Nationalbank, 2009b). This decline was driven by a contraction in lending (see section 2.3.2) and increased credit provision costs, resulting in significant profit depression. The banking sector experienced only an uneven recovery in the subsequent years. In 2009, a modest recovery to €1,5 billion indicated some stabilization efforts but still underlined the ongoing economic challenges – Austrian GDP declined by 3,2% that year. Additionally, the ECB started to cut prime interest rates in 2008 and continued throughout 2009, which put pressure on banks' profit margins (European Central Bank, 2008).

The period between 2010 and 2013 saw no recovery in the profitability of Austrian banks. After reaching €4,6 billion in 2010, profits fluctuated, dropping to €0,7 billion in 2011 and turning negative in 2013 (- €1,0 billion). In late 2009, the Austrian government intervened to purchase the failing state mortgage bank Hypo Alpe Adria in order to prevent its bankruptcy. This was followed by a period of stagnant profits, with the consolidated profits of the Austrian banking sector being dampened by associated write-offs in subsequent years (Oesterreichische Nationalbank, 2014a). The contraction in economic activity and the prevailing low yield environment in the Euro Area exerted further pressure on bank profits, thereby highlighting the challenges faced by the banking industry.

Following 2013 there was stabilisation in profitability, which then underwent a marked increase from 2015 onwards, reaching €6.6 billion in 2017. This growth in the banking industry is indicative of the recovery of the Austrian economy following the financial crisis and the return of financial markets to a state of greater stability after the sovereign debt crisis.

The correlation between economic growth and increases in bank lending generally indicates a more favourable environment for bank profits (Oesterreichische Nationalbank, 2014a).

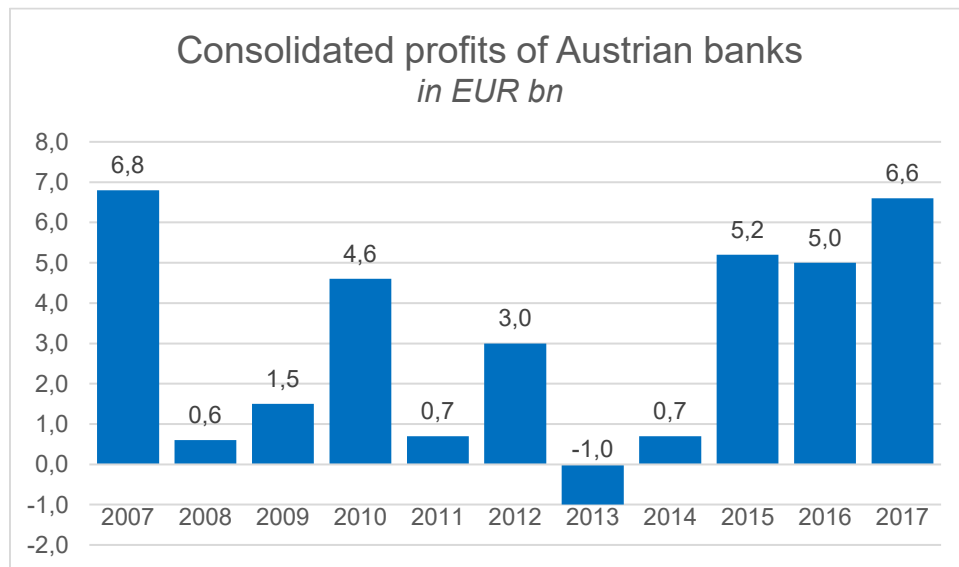


Figure 1 Consolidated profitability in the Austrian banking industry (Oesterreichische Nationalbank, 2017)

2.3.2 Credit growth development

Credit growth, measured as the annual rate of change in loan volume to non-financial institutions, exhibited a highly volatile pattern throughout the period, with fluctuations closely related to developments in profitability described in the previous section.

Prior to the financial crisis, relatively high annual growth rates of 5,6% (2007) and 4,6% (2008) reflected a period of economic expansion and robust lending activity for several years. However, in 2006 already, there was a modest decline in lending growth, which was further exacerbated in 2007 by the rise in loan interest rates. Average mortgage lending rates increased from 4,28% in December 2006 to 5,27% in December 2007 (Oesterreichische Nationalbank, 2008b).

In 2009, the overall credit growth rate in Austria turned negative with a figure of -0,4%. This can be attributed to a combination of factors, including widespread economic uncertainty, more stringent credit conditions, and weaker demand due to concerns about developments in the financial markets (Oesterreichische Nationalbank, 2010). To stimulate lending, the ECB reduced interest rates by 325 basis points between October 2008 and May 2009, which

represented the most significant reduction ever implemented over such a brief period in the Eurozone (Trichet, 2009). Nevertheless, these accommodating monetary policies did not result in a lasting expansion of credit in the immediate aftermath. In Austria, lending growth remained weak and inconsistent, even though the interest rate environment in the Eurozone was reaching a historical low until 2012 (European Central Bank, 2012).

A brief period of modest recovery in lending growth was observed in 2010 (+0,5%) and 2011 (+2,3%), followed by a period of almost stagnation in 2012 (+0,4%) and another slight contraction in 2013 (-0,4%). This decline was driven by reduced lending to non-bank financial institutions and to the public sector, whereas credit increased to households and corporates (Oesterreichische Nationalbank, 2014c). Even though average interest rates for loans were significantly lower compared to crisis levels, loose monetary policy could not incentivise the credit demand to pick up soon after the crisis (Verband österreichischer Banken & Bankiers, 2013). Austrian banks experienced a decline in credit quality since the onset of the financial crisis, with a consolidated non-performing loan ratio in the sector of 8,9% in June 2014 (Oesterreichische Nationalbank, 2014b).

Following a period of stagnation, credit growth in Austria finally demonstrated signs of recovery from 2014 onwards, albeit at a moderate pace. Initially, in 2014, only at 0,7%, credit growth increased on an annual basis thereafter until reaching 2,9% by 2017. This period of positive growth can be attributed to the implementation of a loose monetary policy, which resulted in reduced refinancing costs for financial institutions.

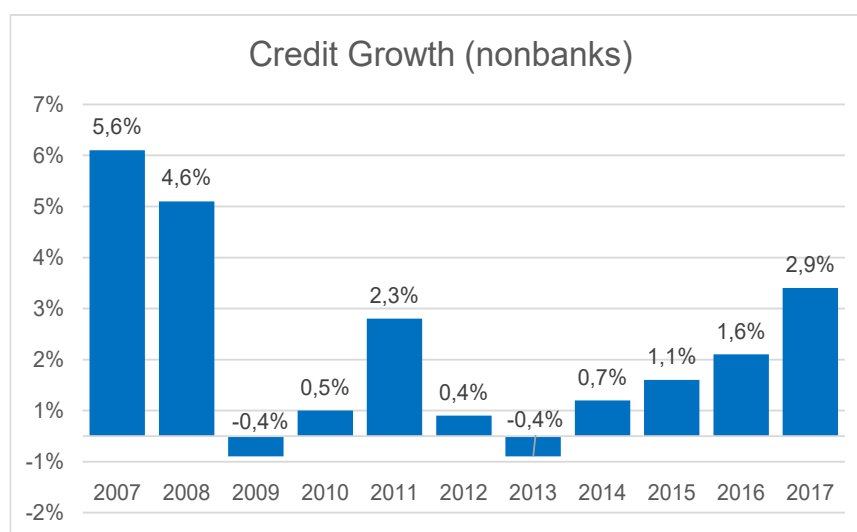


Figure 2 Annual change in credit to nonbanks (Oesterreichische Nationalbank, 2017)

This, in turn, exerted a favourable influence on both the supply and demand for credit (Verband österreichischer Banken & Bankiers, 2017).

2.3.3 Development of capitalisation

During the global financial crisis, the public focus on bank capital intensified as it serves as an indicator of the risk-bearing capacities of a bank during crises. Capital adequacy is measured as either the equity ratio or the core capital ratio, which puts banks' equity positions in relation to a bank's (risk-weighted) assets. Prior to 2008, Austrian banks were permitted to calculate their capital base in accordance with either Basel I rules or the standard approach of Basel II, which remained the sole eligible approach commencing in 2008 (Oesterreichische Nationalbank, 2008a).

The consolidated capitalisation of the Austrian banking sector stood at 10,8% in June 2008, marking a 1,4 percentage points decrease compared to the preceding year. This decline can be attributed to the implementation of the Basel II capital rules, which came into effect in 2008. Aggregate core capital in the Austrian banking sector stood at 7,4% in June 2008, representing a 1,1 percentage points decrease compared to June 2007. Even though Austrian banks complied with the recently implemented Basel II rules, market expectations regarding capitalisation in the banking sector were revised upwards due to prevailing uncertainty surrounding the financial and economic outlook. Within the international context, the average capitalisation in the Austrian banking sector lagged behind its global counterparts. Moreover, due to the turbulence in the financial markets, it was highly questionable whether past profitability which contributed positively to equity ratios, could be sustained in the upcoming years. In October 2008, in a manner consistent with other Eurozone countries, the Austrian government implemented a series of overarching measures (a bank stabilisation package) with the aim of strengthening the interbank market and enhancing financial stability, with a budget of 100 billion Euros (Austrian Parliament, 2008; Oesterreichische Nationalbank, 2008a).

Despite deteriorating credit quality during the financial crisis and the challenging economic conditions that made it difficult to raise new capital, the consolidated capital ratio (and core capital ratio) of the Austrian banking sector increased to 12,07% (8,71%) until June 2009. This increase can be attributed to state participation capital injections (totalling €4,9 billion) and private capital injections (€1,3 billion). The Erste Group, Austria's largest banking group,

received €2,7 billion in capital injections from the Austrian state in 2008 (Erste Group Bank AG, 2008). Additionally, a private placement of the Erste Group on the stock exchange resulted in a capital base increase of €1,74 billion in the subsequent year (Erste Group Bank AG, 2009). In 2009, the Raiffeisen Zentralbank Group (RZB, since 2017: Raiffeisenbank International), the BAWAG P.S.K., the Volksbanken and the Hypo Group Alpe Adria received state aid in the form of participation capital, meaning that all major Austrian bank groups were in need of financial assistance (Fiscal Advisory Council, 2016). The augmentation of capital ratios came from two primary sources: since the conclusion of 2008, there has been a reduction in risk-weighted assets (RWAs) in absolute and relative terms for the biggest banks (cf. Raiffeisen Zentralbank Group, 2010). However, the majority of the increase in capitalisation ratios was attributed to increases in eligible own funds (capital injections), whereas a smaller portion was attributed to the reduction in RWAs (Oesterreichische Nationalbank, 2009a).

The trend of increasing capitalisation in the Austrian banking sector continued in the subsequent years, with the consolidated equity ratio of the Austrian banking sector increasing from 13,2% in 2010 to 14,2% in 2012 and to 15,4% in 2013 (Finanzmarktaufsichtsbehörde, 2013). However, Austrian banks' capitalisation remained below that of their European peer groups. The gaps between Austria's three largest bank groups (Erste Group, RZB, UniCredit Bank Austria) and their European and Central and Southeastern European (CESEE)

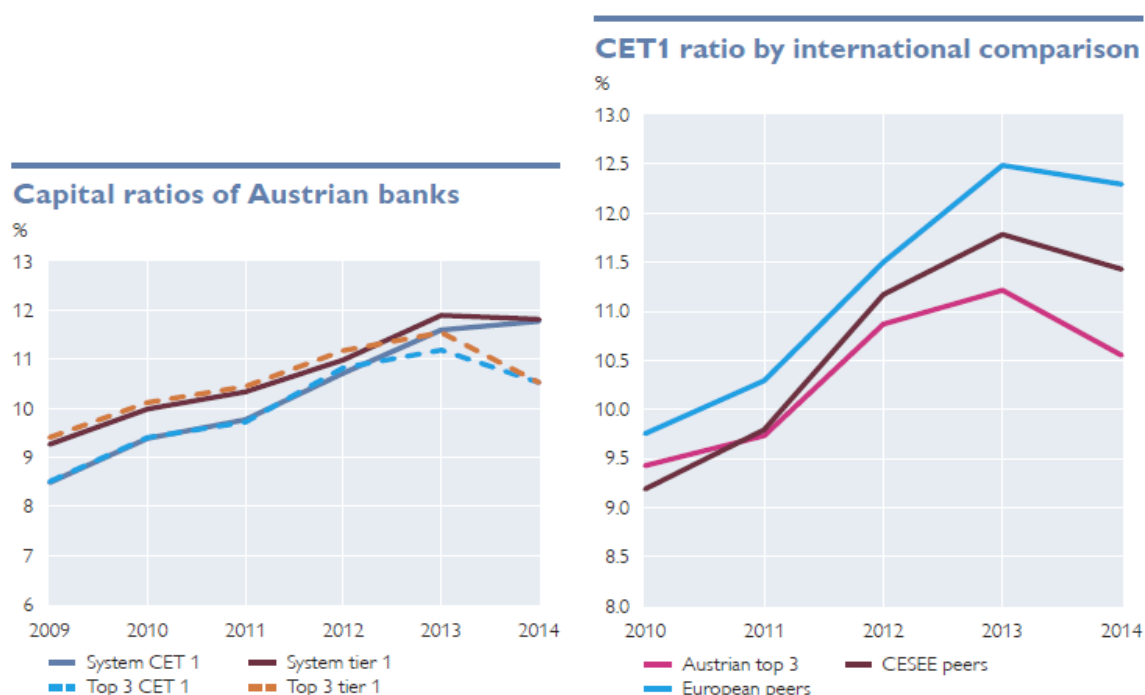


Figure 3 International comparison of bank capitalisation (Oesterreichische Nationalbank, 2015)

counterparts were pronounced. In addition, given the imminent implementation of even more stringent capital requirements under the Basel III accord and the exposure of Austrian banks to the CESEE region, further improvements were expected by the markets (Oesterreichische Nationalbank, 2014c; Verband österreichischer Banken & Bankiers, 2015).

Until 2014, the majority of participation capital injections by the Austrian government were reimbursed by the banking sector. The Erste Group repaid all outstanding debt in 2013, while the BAWAG P.S.K. and RZB did so in 2014 (Fiscal Advisory Council, 2016). This has resulted in Austrian banks having a consolidated average capitalisation of 15,6% at the end of 2014, although this was still below that of their European peers. The gap between the average CET1 ratio of Austria's top three banks (10,6%) and that of their European (12,3%) and CESEE peers (11,4%) remained substantial (Oesterreichische Nationalbank, 2015).

The upward trend in capitalisation within the Austrian banking sector temporarily paused in 2013, with the three largest banks experiencing a decline in their capital ratios, as illustrated in Figure 3 (cf. Erste Group Bank AG, 2015; cf. Raiffeisen Zentralbank Group, 2015). These reductions can be attributed to a decrease in share premiums and transitional adjustments under Basel III. While strategies to enhance capital ratios varied among banks, the predominant approach – apart from the top three banks – involved a shift from reducing risk-weighted assets to steer capital ratios via increased retained earnings (Oesterreichische Nationalbank, 2015).

The solvency of Austrian banks saw a continued improvement in 2015 and 2016, driven primarily by an increase in common equity (CET1) capital. Also, a restructuring of UniCredit Bank Austria AG led to a significant reduction in banks' risk-weighted assets in 2016², with a comparatively smaller decline in capital (UniCredit Bank Austria AG, 2016). When this one-off effect is excluded, Austrian banks enhanced their common equity tier 1 capital by retaining profits, which notably increased the consolidated CET1 ratio to 14,8%, up from 12,8% at the end of 2015. This system-wide figure nearly matches the European average of 15,0%. However, it is noteworthy that the three largest banking groups in Austria remained below this level, with an average CET1 ratio of 12,9% as of the end of 2016. This observation underscores the necessity for further capitalisation, particularly in light of their systemic importance. From a macroeconomic perspective, higher capital levels did not impede lending

² In October 2016, Unicredit Bank Austria transferred its CESEE business to its Italian parent company Unicredit S.p.A. (UniCredit Bank Austria AG, 2016).

activities. In 2016, domestic loan growth in Austria reached 1,5%, which surpassed the average growth rates of the previous three years. (Oesterreichische Nationalbank, 2017).

By the third quarter of 2017, Austrian banks had continued to strengthen their capital positions, with the average CET1 ratio rising to 14,6%. This increase was driven by both growth in capital and a reduction in total risk exposure, primarily related to credit risk. During the course of 2017, Austrian banks augmented their CET1 capital by more than 4% compared to 2016, reaching a total of €68 billion, equivalent to 15,1% of their total consolidated risk-weighted assets. Nevertheless, this development marks only a marginal year-on-year enhancement, despite the presence of high post-crisis profits, suggesting a deceleration in the rate of capitalisation improvements in comparison to preceding years. Consequently, the CET1 ratio of the biggest bank groups in Austria lagged further behind the Euro area average in 2017 (13,3% compared to 14,6%) (Oesterreichische Nationalbank, 2018).

It is evident that the modifications to banking regulations in the aftermath of the global financial crisis, accompanied by the implementation of Basel III, have led to an augmentation in the proportion of common equity tier 1 capital. This encompasses paid-in capital instruments and disclosed reserves. From 2007 to 2017, the proportion of CET1 capital relative to total capital has increased from 66% to 82% within the Austrian banking sector (see Figure 4, right-hand scale).

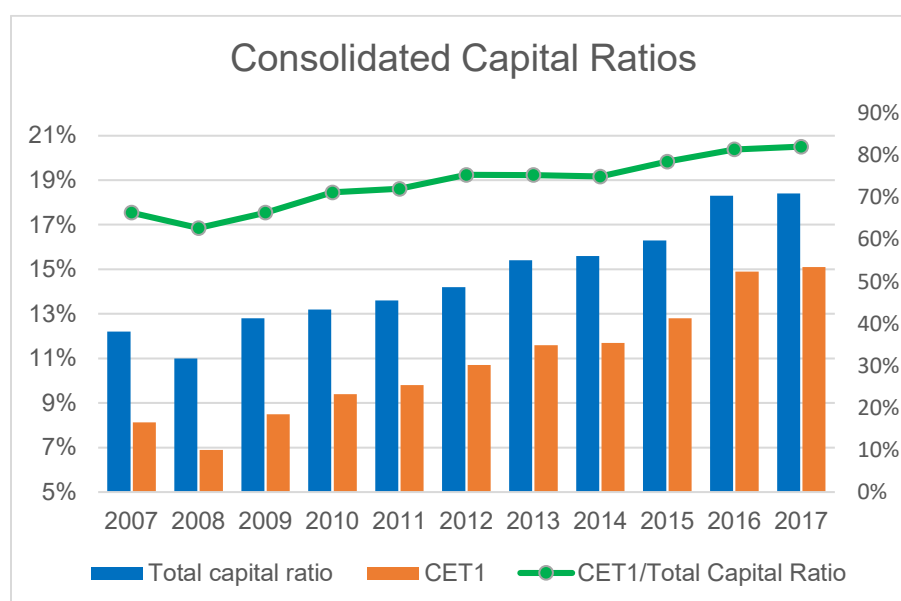


Figure 4 Consolidated capital ratios in the Austrian banking industry (Oesterreichische Nationalbank, 2017)

The general upward trend in bank capitalisation reflects the change in bank regulation, which placed a greater emphasis on the strengthening of financial buffers and the fostering of long-term stability. Rising capitalisation ratios indicate a shift toward risk aversion and compliance with stricter regulations, which may have had a constraining effect on credit growth in the short term. However, this trend contributed to the strengthening of financial resilience and sustainable credit expansion in the subsequent years.

The development of Austrian banks' profits, credit growth and capitalisation during this period provides insight into the impact of economic and regulatory conditions on the sector. The 2008 financial crisis and its aftermath marked a significant shift in the structure and behaviour of Austrian banks. While profits remained volatile, the sustained increase in capitalisation ratios indicated a marked improvement in overall stability. The moderate increase in credit volumes suggests that banks have adapted to new reality characterised by more conservative business practices and stricter regulations. Many observers believe that enhanced capitalisation ratios have contributed to the stability in the financial sector after the global financial crisis, but further investigation is required to determine whether this has impacted immediate credit recovery. The question of whether bank capital has had an impact on lending behaviour at the bank group level in Austria will be discussed after the following literature review.

3. Literature review

The question of how to optimally achieve and maintain financial stability through the regulation of banks has become a popular research question in recent years, but not only since the global financial crisis of 2007 to 2009, which revealed the systemic importance of banks and the vulnerabilities of global economies to failing banking systems. Across the world, various reforms in bank regulation have been introduced since the Basel accords were first published in the late 1980s. These reforms have encompassed minimum reserve requirements, deposit insurance systems, entry barriers, and capital and liquidity requirements, among others. The implementation of these policies has given rise to concerns regarding the efficacy of intervention in banking systems and its impact on banks' prudence and lending practices. The extant literature does not provide a consensus on whether specific bank regulatory measures promote or hinder the effective functioning of banking systems. The subsequent section provides an overview of the extant theoretical literature, which offers conflicting predictions about the consequences of bank regulation, and the empirical research, which often cannot offer clear-cut solutions.

3.1 Theoretical literature

Theoretical considerations on different forms of bank regulation comprise measures of minimum reserve requirements, entry barriers, restrictions on the mixing of banking and trading activities, capital and liquidity minimum requirements as well as macroprudential policies.

Minimum reserve requirements are, by design, considered to affect lending negatively because the reserve funds cannot be used for lending or other ways of earning interest and hence reduce profitability and limit lending growth (Spong, 2000). In the context of customer protection, lender of last resort policies, public guarantees, and deposit insurance systems – measures implemented during the global financial crisis, including Austria – can be regarded as alternatives to reserve requirements. However, these measures may encourage banks to engage in excessive risk-taking due to the absence of internalized costs of bankruptcy (Barth, Caprio, & Levine, 2004).

The presence of entry barriers within the banking sector is widely recognised as a regulatory mechanism aimed at safeguarding the integrity of the financial system. Imposing limits to market entry is often considered to impede competition which enables banks to enjoy market power and to operate with higher profit margins. The retention of these profits can subsequently serve as a financial cushion to offset potential losses. It has been argued by some that this regulatory framework leads banks with fewer incentives to take on excessive risks, thereby ensuring more cautious lending practices (Keeley, 1990). Conversely, limited competition may lead to adverse effects of bank lending as banks increase the cost of their services, thereby reducing the demand for lending (Barth et al., 2004; Spong, 2000).

In the period following the global financial crisis, restrictions on the combination of lending and trading activities of banks were a prominent topic of discussion. The most compelling rationale for this type of intervention is the limitation of a bank's risk-taking behaviour to encourage prudent lending (Barth et al., 2004). This measure alleviates conflicts of interest, as banks might otherwise exploit the risk-taking of their depositors. Additionally, the absence of restrictions on banking activities complicates the monitoring and supervision of financial institutions (Claessens & Klingebiel, 2001).

The impact of capital regulation and liquidity requirements on bank lending is not a clear-cut matter in theoretical research. A primary argument for minimum capital requirements is that they serve as a safety net during times of losses. This can, in fact, increase incentives for banks to engage in prudent lending as a larger portion of their capital is at risk (Aiyar, Calomiris, & Wieladek, 2015). Conversely, it is argued by others that the monitoring and screening of financial institutions may be reduced as the costs for bank equity increase (Sharpe, 1995). Moreover, the limitation of profitability could further deteriorate the ability to raise capital which could lead to excessive risk-taking behaviour by banks (Martynova, 2015). The impact of liquidity requirements, as evidenced by the Basel III accords, is expected to be negative on bank lending, primarily due to the increase in costs associated with liquidity transformation, at least in the short and medium term (Martynova, 2015). However, in order to minimise risks from elevated deposit withdrawals or even bank runs, these regulatory requirements might even contribute to more prudent lending in the long run (Rochet, 2008; Thamae & Odhiambo, 2022).

3.2 Empirical evidence

The findings of empirical research on the impact of bank regulation on bank lending don't present a uniform picture. While the majority of studies appear to find a negative impact of bank regulation on lending, there is also evidence to suggest that regulatory measures indeed promote bank lending. A number of studies, however, yield inconclusive results.

Research by Mésonnier and Monks (2015) on European banks between 2011 and 2012 found a negative impact of the European Banking Authority's capital exercise on lending. The study found that banking groups which were obliged to increase their CET1 ratio by 1 percent exhibited an annualised loan growth which was 1,2 percentage points lower than that of unconstrained groups (Mésonnier & Monks, 2015). Research by Behn et al. (2016) posits that German banks reduced lending of certain types of loans in response to increased capital charges, with micro-prudential capital regulation in particular being identified as a significant factor in this response (Behn, Haselmann, & Wachtel, 2016). In Austria, evidence exists on the impact of Basel I regulation on credit creation. Hahn (2002) found a negative impact of minimum capital holdings on banks' lending activities, examining a sample of 750 Austrian banks in the period from 1996 to 2000 (Hahn, 2002).

In considering alternative forms of bank regulatory measures, Merrouche and Nier (2017) establish that entry barriers have a detrimental effect on bank credit creation in 22 countries of the Organisation for Economic Cooperation and Development (OECD) from 1999 to 2007 (Merrouche & Nier, 2017). Evidence from the US comes from Berrospide and Edge (2019) who find that banks which needed to increase their capital buffers during stress tests showed significantly reduced growth rates of lending (Berrospide & Edge, 2019).

The majority of studies seems to point in the direction that certain bank regulatory measures negatively impact lending. Nevertheless, there are numerous findings suggesting that capital or liquidity requirements may, in fact, stimulate bank lending, albeit only in the medium or long term. Berrospide and Edge (2010) as well as Cornett et al. (2011) have established a positive relationship between adjustments in a bank's capital ratio and bank lending in the USA during the periods 1992 to 2009 and 2006 to 2009, respectively (Berrospide & Edge, 2010; Cornett, McNutt, Strahan, & Tehranian, 2011). Consistent findings were obtained by Behn et al. (2019) in Europe from 2014 to 2016, albeit only in the medium to long term, and by Thornton and Di Tommaso (2020) in 21 European countries from 2007 to 2017 (Behn, Daminato, & Salleo, 2019; Thornton & Di Tommaso, 2020). Furthermore, Gambacorta and

Marques-Ibanez (2011) found that banking institutions which strengthened their core capital ratios exhibited increased growth rates of lending. This phenomenon has been shown to account for developments during the financial crisis and the introduction of the Basel III reforms. The research sample consists of more than 1000 banks from 15 countries over the period 1999 to 2009 (Gambacorta & Marques-Ibanez, 2011).

Turning the focus to other regulatory measures than capital regulation, Sum (2016) found that restricting bank activities had a positive impact on loan growth in EU countries between 2005 and 2014 (Sum, 2016). Concerning the implications of liquidity regulation, as it was introduced with the Basel III reforms, Polizzi et al. (2020) demonstrate that the introduction of liquidity coverage, net stable funding and tier-1 capital ratios impacted lending positively in over 100 countries worldwide during 2000 to 2016 (Polizzi, Scannella, & Suárez, 2020). Roulet (2018) reached a similar conclusion, finding a positive relationship between liquidity regulation and the growth rates of lending in more than 20 European countries from 2008 to 2015 (Roulet, 2018).

The extant research on the impact of bank regulation on lending does not yield clear-cut findings. Indeed, as bank regulation becomes more complex, research findings require cautious interpretation. It has become apparent that there are no uniform policy recommendations that fit every country or economy. Furthermore, when introducing certain bank regulatory measures, consideration must be given to the prevailing economic circumstances.

4. Empirical model

The following section delineates the methodological approach employed in the analysis of the impact of bank regulation on lending. The study utilises panel data econometric techniques to estimate the relationship between loan growth and key explanatory variables for Austria's four largest bank groups over the period 2007-2017. Two primary econometric approaches are employed:

- (i) A fixed-effects regression model, compared with a least squares dummy variable (LSDV) approach, and
- (ii) separate ordinary least squares (OLS) regressions for each bank group.

4.1 Data

The data for this analysis is sourced from the Austrian National Bank (OeNB) and covers the period from the first quarter of 2007 to the third quarter of 2017³. The dataset encompasses quarterly balance sheet data from the four largest bank groups operating in Austria: joint-stock banks and private banks (most notably Unicredit Bank Austria AG and BAWAG P.S.K.), the savings banks sector (i.e. Erste Group), the Raiffeisen sector and the Volksbanken sector. The balance sheet data only consists of the Austrian part of the bank groups, subsidiaries in other countries and foreign loan growth developments are not considered in this analysis.

The three biggest bank groups in Austria hold together more than 50% of Austrian banks' total assets, which accumulated to €1,2 trillion in 2023. Approximately a quarter of these assets are attributable to subsidiaries operating in Central, Eastern and Southern Europe (Oesterreichische Nationalbank, 2023). Hence, the focus on the four largest bank groups makes the dataset both comprehensive and representative of prevailing trends in the Austrian banking sector. The consolidation of balance sheet data occurs at the bank group level, encompassing over 500 banking institutions, including both main institutes and local branches. Collectively, these entities represent more than 75% of all Austrian banks and branches, thereby ensuring the dataset's representativeness and comprehensive nature (Oesterreichische Nationalbank, 2025).

³ A structural break in the data in the fourth quarter of 2017 prevents further comparability after this point.

The balance sheet data is used to calculate two primary variables: the growth rates of lending to non-financial institutions of each banking group and the total capital ratio of each banking group. Contrary to other research designs, this study does not employ disaggregated data from individual financial institutions; rather, it uses aggregate balance sheet information to draw conclusions at the level of the bank group (cf. Gambacorta & Mistrulli, 2004; Hahn, 2002). The aggregation of the data must be kept in mind when interpreting results.

The key explanatory variable of interest, bank capital, represents the bank group's total capital ratio, i.e. the ratio of bank capital to total assets. It was not possible to deduce more disaggregated data on bank capital, which could allow for the making of predictions for different kinds of capital increases (see Mésonnier and Monks (2015), for a discussion of tier 1 core capital). Conclusions about changes in lending behaviour will be inferred from the total capital ratio, as per other research (cf. Mésonnier & Monks, 2015; Thornton & Di Tommaso, 2020).

The data employed for the control variables has also been sourced from the Austrian national bank's database. In accordance with the research conducted by Hahn (2002), macroeconomic shocks to loan growth are controlled for by incorporating Austria's nominal GDP growth in the regressions. General economic trends are found to be highly reflected in credit growth (Kelly, McQuinn, & Stuart, 2013), thus necessitating the inclusion of this variable. Additionally, the average quarterly inflation rate aims to control for other macroeconomic developments.

Another key determinant of loan demand and, hence, aggregate loan growth is the interest rate charged by banks to its customers. By including the average nominal interest rate for newly granted loans, we control for shocks to loan pricing in the models. During the period of investigation, loan interest rates have dropped significantly following the central bank's rate cuts in 2008 and 2009. In the following years, average interest rates were relatively stable at low levels.

4.2 Methodology

4.2.1 Fixed-effects regression

The fixed-effects model controls for time-invariant characteristics of each bank that might influence lending behaviour but are not explicitly included as explanatory variables (cf. Hahn, 2002). The model is specified as follows:

$$LoanGrowth_{it} = \beta_1 equity_{it} + \beta_2 interest_t + \beta_3 gdp_t + \beta_4 inflation_t + \sum_{i=1}^4 \alpha_i + \varepsilon_{it} \quad (1)$$

where:

- (i) i indexes the bank group⁴,
- (ii) t indexes time (quarter),
- (iii) α_i represents bank group-specific fixed effects and
- (iv) ε_{it} is the error term.

The bank group-specific effects α_i capture unobserved heterogeneity across bank groups, which could include factors such as risk appetite, management quality, or internal lending policies. These fixed effects are extracted manually after estimating the model.

To confirm the validity of the fixed-effects estimates, the model is re-estimated using the LSDV approach, which explicitly includes dummy variables (d_i)⁵ for each bank group instead of treating them as fixed effects (cf. Wooldridge, 2010):

$$LoanGrowth_{it} = \beta_1 equity_{it} + \beta_2 interest_t + \beta_3 gdp_t + \beta_4 inflation_t + \sum_{i=1}^4 d_i + \varepsilon_{it} \quad (2)$$

The LSDV regression is estimated without intercept to avoid the dummy variable trap. Moreover, this allows to interpret each dummy coefficient analogously to the fixed effects obtained in (1). The outputs of these two regression approaches are shown in table 1.

⁴ The bank groups are ordered as follows:

- Group 1: Joint stock banks and private banks
- Group 2: Savings banks
- Group 3: Raiffeisen banks
- Group 4: Volksbanken banks

⁵ The dummy variables follow the same ordering of bank groups as the fixed-effects regression.

4.2.2 Separate OLS regressions

To further investigate heterogeneity in bank behaviour, separate OLS regressions are estimated for each bank group individually:

$$LoanGrowth_t = \beta_0 + \beta_1 equity_t + \beta_2 interest_t + \beta_3 gdp_t + \beta_4 inflation_t + \varepsilon_{it} \quad (3)$$

Since each regression pertains to a single banking group, fixed effects are unnecessary, as any time-invariant differences between banks are inherently accounted for by estimating a separate regression for each institution. This approach allows for comparison of how regulatory factors and macroeconomic conditions affect loan growth across different banks. The outputs are presented in table 2.

4.3 Regression results

All regressions are estimated using robust standard errors to account for potential heteroskedasticity. The results are interpreted by comparing the magnitude and statistical significance of these coefficients across different models.

4.3.1 Fixed effects regression and least squares dummy variables

The regression results from models (1) and (2) are as follows:

Dependent variable:		
	Loan Growth	
	panel linear (1)	OLS (2)
Capital Ratio	0.024 (0.051)	0.024 (0.045)
Interest Rate	0.955*** (0.203)	0.955*** (0.161)
GDP Growth	0.203*** (0.042)	0.203*** (0.059)
Inflation	-0.167 (0.171)	-0.167 (0.127)
Group 1		-0.036*** (0.012)
Group 2		-0.031*** (0.010)
Group 3		-0.030*** (0.010)
Group 4		-0.043*** (0.009)
Observations	160	160
R2	0.343	0.422
Adjusted R2	0.313	0.392
Residual Std. Error		0.013 (df = 152)
F Statistic	19.878*** (df = 4; 152)	13.876*** (df = 8; 152)
Note: *p<0.1; **p<0.05; ***p<0.01		

Table 1 Fixed effects and LSDV regressions with heteroskedasticity-robust standard errors

The fixed effects when extracted manually equal the coefficients for each banking group in the least squares dummy variable (LSDV) regression:

1	2	3	4
-0.035537	-0.031404	-0.029721	-0.042776

These fixed effects represent the average loan growth for each bank group after controlling for the independent variables. They capture unobserved, time-invariant characteristics of the bank groups (e.g. structural differences in bank policies, operational peculiarities) that influence loan growth and are not explicitly included as explanatory variables in the model. Analogously, in the LSDV approach, each dummy variable coefficient corresponds to the average loan growth for each bank group. To avoid the dummy variable trap and for comparability of results, LSDV regression is estimated without intercept. In the fixed-effects model, the fixed effects are estimated by removing the group-specific means from the dependent variable (demeaning) which leads to the same results as LSDV (cf. Wooldridge, 2010).

The regression results show that joint-stock banks and private banks (group 1) exhibit an average loan growth of -0,036% after controlling for equity, interest rate and GDP growth. Loan growth in the savings banks sector (group 2) decreased by 0,031% after adjusting for the independent variables. For the Raiffeisen (group 3) and Volksbank (group 4) sectors, the average loan growth decreased by 0,030% and 0,043%, respectively. The coefficients for all bank groups are statistically significant on a 1%-level.

When looking at the explanatory variables, the picture is as follows: changes in the equity ratios influence loan growth across sectors positively, yet, only to a small extent and not significantly from a statistical point of view. An increase in the bank's capital ratio of 1% leads to an increase in loan growth across bank groups by 0,024%.

The average interest rate for newly granted loans positively impacts loan growth for each bank group. The relationship is positive and significant: a 1% increase in average interest rate increases loan growth across bank groups by 0,955%, statistically significant on a 1%-level. The interest rate variable included in the model is not group-specific and therefore does not

display in the fixed effects but as a separate explanatory variable. For group-specific interest rates, the fixed effects would be expected to be of greater magnitude.

GDP growth positively influences loan growth across bank groups. A 1% increase in Austria's nominal GDP corresponds to a 0,203% increase in loan growth (significant at the 1%-level). This effect, as expected ex-ante, represents general credit supply increases during times of economic growth. A 1% increase in inflation rate is associated with a decrease in loan growth of 0,167%, however, not statistically significant.

It is to be concluded that these models do not show a significant relationship between bank groups' equity ratios and their corresponding growth rates in lending. For the simplicity of the model and following argumentation of Hahn (2002), few but strong explanatory variables are included in the model which leaves room for further independent variables that explain loan growth in the Austrian banking industry. Changes in the capitalization might influence loan supply but these effects may not happen directly and concurrently. It is more likely, on the other hand, that other factors influence loan growth in the short term by a greater extent, as is shown in the fixed effects model. Interest rates and economic growth stimulate lending significantly.

4.3.2 Separate OLS regressions per bank group

To support the results obtained in the main regression, additional estimations are performed on a bank group level. The setups, analogously to the LSDV approach, are standard OLS regressions including an intercept. The fixed-effects panel approach can now be left aside since the unobserved, time-invariant bank-specifics are now captured in the error term of each regression and do not need to be controlled for anymore.

As sample size is decreased to a quarter compared to before, the results in general become more unclear and statistical significance vanishes. As in the main models, capitalisation does not have a significant effect on bank lending for either bank group. All estimates are of small magnitude and have varying signs.

On the other hand, the coefficients for interest rate are still significant from a statistical point of view, supporting the assumption that interest rate has a significant effect on loan growth. A 1% increase in the average interest rate on new loans is associated with a 0,609% increase in

loan growth for joint stock banks and private banks and a 0,792% increase in loan growth for savings banks. These coefficients are statistically different from zero at least on the 10%-significance level. Interest rate estimates for the Raiffeisen sector (0,678%) and the Volksbank sector (1,491%) are both large and statistically significant at the 1%-level.

The growth rate of nominal GDP becomes statistically insignificant for the bank groups joint-stock banks and private banks, and the Raiffeisen sector. For savings banks and Volksbanken the estimate remains significant at the 5% significance level and the 1% level, respectively. Yet, all coefficients are positive, giving cautious proof of the findings of the main regression which indicates that economic growth positively impacts lending in the Austrian banking industry. Inflation, as shown analogously in the main regression models, seems to negatively impact loan growth. A 1% increase in inflation is associated with a -0,488% decrease in loan growth for savings banks, and a -0,558% decrease in loan growth for the Volksbanken sector. For the other groups, inflation does not exhibit a statistically significant impact.

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	Dependent variable:			

	Loan Growth			
	Group 1	Group 2	Group 3	Group 4
	(1)	(2)	(3)	(4)

Capital Ratio	0.061 (0.079)	-0.074 (0.104)	-0.064 (0.082)	0.132 (0.162)
Interest Rate	0.609*** (0.228)	0.792* (0.453)	0.678*** (0.260)	1.491*** (0.284)
GDP Growth	0.161 (0.118)	0.266** (0.129)	0.152 (0.109)	0.336*** (0.101)
Inflation	-0.019 (0.308)	-0.488** (0.220)	0.193 (0.198)	-0.558** (0.255)
Constant	-0.033* (0.017)	-0.005 (0.025)	-0.013 (0.020)	-0.071*** (0.017)

Observations	40	40	40	40
R2	0.262	0.232	0.481	0.553
Adjusted R2	0.177	0.145	0.422	0.502
Residual Std. Error (df = 35)	0.013	0.014	0.011	0.014
F Statistic (df = 4; 35)	3.104**	2.648**	8.113***	10.819***
=====				
Note:	*p<0.1; **p<0.05; ***p<0.01			

Table 2 OLS regressions per bank group with heteroskedasticity-robust standard errors

5. Conclusion

The findings of this research provide valuable insights into the relationship between bank capital and lending behaviour in the Austrian banking sector from 2007 to 2017. This period was marked by significant economic disruptions, regulatory transformations, and the subsequent recovery efforts that shaped the financial landscape. The study aims to provide evidence on whether enhanced capital requirements, primarily influenced by Basel III regulations, constrained or supported the lending activities of Austrian banks.

One of the key conclusions drawn from this research is that while higher capital levels were imposed to ensure greater financial stability, their immediate impact on lending behaviour remained negligible, at least in this model setup on a bank group level. Empirical findings indicate that although capitalization levels rose significantly in the post-crisis years, lending growth did not experience a proportional decline. In the aftermath of the global financial crisis, a contraction in credit growth was observed, yet this was followed by a moderate and sustained recovery, suggesting that higher capital buffers did not impede credit expansion in the medium to long term.

It appears more likely, on the other hand, that other factors resulting from external economic conditions exerted a more substantial influence on lending growth during the reviewed period. The analysis also highlights that interest rates and GDP growth had a more pronounced impact on lending behaviour compared to changes in capitalisation levels alone. The findings of the fixed-effects regression analysis indicate that fluctuations in loan growth were significantly influenced by macroeconomic factors, such as economic activity and borrowing costs rather than by changes in capital adequacy.

Moreover, the study identified minor variations in lending behaviour across the different banking groups. Joint-stock and private banks, savings banks, Raiffeisen banks, and Volksbanken exhibited analogous fixed effects in terms of signs and magnitude.

A further finding relates to the function of regulatory measures in promoting financial stability. The increased capitalisation of Austrian banking institutions, in accordance with Basel III, has contributed to a more resilient banking sector, capable of absorbing economic shocks without jeopardizing financial stability. Nevertheless, concerns may remain regarding the possible trade-offs between regulatory compliance and the capacities to extend credit, particularly during periods of economic volatility. This is attributable to the fact that the

majority of empirical research reveals a negative relationship between bank regulation and lending.

Nevertheless, it is important to acknowledge the limitations of this study. The aggregation of data at the banking group level, rather than individual institutions, may prevent the observation of nuanced differences in lending strategies and risk appetites. Additionally, while the study controls for macroeconomic variables, other factors such as regulatory arbitrage, risk appetite, and market competition could further influence lending behaviour and warrant deeper investigation.

Within forthcoming research, the long-term ramifications of capital regulations on lending dynamics subsequent to 2017 could be investigated, with particular consideration for the evolution of financial technologies, shifts in monetary policy, and geopolitical uncertainties. Moreover, an expansion of the sample and a comparative analysis with other European banking systems could yield additional insights into the broader applicability of these findings.

In conclusion, this thesis emphasises the complex relationship between bank capital, regulation, and lending behaviour. While initially regarded as restrictive, heightened capital requirements have contributed to a more stable and resilient banking sector without hindering credit growth over time. The findings support the notion that regulatory frameworks must strike a balance between ensuring financial stability and maintaining sufficient lending activity to support economic growth. As banking regulations continue to evolve, policymakers must consider the diverse impacts on different banking institutions to foster a robust and adaptable financial system.

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