The Impact of Non-Performing Exposures on Ireland's Economic Growth

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Abstract

The financial crisis of 2008 saw non-performing exposures rise exponentially in Irish banks. It is well documented that there was insufficient regulatory framework in place both at a national and European level to provide resolution guidance, which resulted in the accumulation of NPEs in the years after the crisis. New regulation and capital requirements proposed in 2012 resulted in banks being forced to address their NPEs. In the last number of years Ireland's banks have been reducing their NPEs to comply with the new guidelines and release their capital held against the NPEs for new business to stimulate economic growth. The aim of this research is to determine to what extent NPEs impact on the economy.

This study examined the relationship between NPEs as a predictor of economic growth in Ireland, using GNI as a proxy. The total NPE includes data from four of Ireland's "home grown" banks. The quantitative design is cross-sectional, and data collected spans from 2000 – 2019. The results showed a strong negative correlation between NPEs and economic growth. Regression analysis showed that 73.4% of the variation in GNI growth can be explained by NPE growth. The conclusion of this study is that NPEs are seen as a vulnerability to the banking system. Removing NPEs from the banks' balance sheets will prevent them from impeding on economic growth.

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Table of Contents

List of Tables **Page**

List of Figures **Page**

List of Abbreviations

AGM	Annual General Meeting
AIB	Allied Irish Bank
BOI	Bank of Ireland
CBI	Central Bank of Ireland
CEO	Chief Executive Officer
ECB	European Central Bank
EU	European Union
GDP	Gross Domestic Product
GNI	Gross National Income
NPE	Non-Performing Exposure
NPL	Non-Performing Loan
OECD	The Organisation for Economic Co-operation and Development
PTSB	Permanent TSB
UB	Ulster Bank
EBA	European Banking Authority
UR	Unemployment Rate
SSM	Single Supervisory Mechanism
IFSC	International Financial Services Centre

Chapter 1: Introduction

Pick up any Irish newspaper published in the last number of years and skip to the finance section. Month after month you will be guaranteed to cast your eyes on at least one combination of the following words when reading about Irish banks' operations; "non-performing", "loan sale", and/or "vulture fund".

The articles may vary in content: like how Irish homeowners expressed their opposition to the proposed billion euro "problem loan" sales to vulture funds, also known as asset management companies, out of fear their home would be included (Conlon, 2019). Similarly, the CBIs Deputy Governor, Ed Sibley, criticized the banks in Ireland for being too quick to sell rather than resolve their bad loans (Central Bank of Ireland, 2019). More dramatically, journalists reported how Irish farmers brought the streets of Dublin 4 to a standstill on the morning of AIBs AGM and demanded sit downs with the C-Suite (RTÉ, 2019). The CEO of the same bank, with a doctorate in economics, then addressing the Oireachtas Joint Committee on Finance about how NPLs prohibit banks from lending to new customers and confronting the reality of the knock-on effect this has on the economy (RTÉ, 2019; Weston, 2019).

Regardless of the content, the overarching conclusion to be made by reading the articles remains the same – Irish banks are eager to get rid of NPLs, despite the bad publicity and criticism from citizens, business owners, the government and the CBI, with what appears to be the underlying ambition of creating new business and stimulating economic growth.

In the remainder of this chapter the researcher will provide the reader with a background to the research area; beginning with a detailed, yet concise, introduction to the economy and what they describe as its dependent relationship with the financial services industry, in particular the banking (credit) sector. Next, the researcher will provide a brief overview of what occurred in Irish banks in the lead up to and the aftermath of the financial and economic crisis of 2007/2008 with regard to lending practices and procedures. Finally, the researcher will identify that the regulatory framework imposed by the ECB is the reason behind Irish banks' hurried tactics at reducing NPLs in recent years.

1.1 Banks – the Largest Cog in the "Economic Machine"

There are many forces that drive the economy and whether you are discussing microeconomics or macroeconomics, it ultimately boils down to supply and demand. Ray Dalio (2017), New York Times best-selling author and founder of hedge fund company Bridgewater Associates, believes that when it comes to understanding the "economic machine" it is best to keep it simple. Dalio asserts that all his business decisions are centred around what he describes as the three main forces driving the economy; productivity growth, the short-term debt cycle and the long-term debt cycle. Most economists and economic organisations agree that productivity growth is an imperative indicator when analysing economic growth (OECD, 2001).

The spending of money by individuals, businesses and governments keeps the economic machine powered on; this is because money spent by one person is income received by another person which improves the over-all standard of living. When productivity is low, the only way one can increase spending and in turn keep the economy growing, is by using credit. As banks are the primary source of credit and given that lending is their primary source of income, it becomes apparent that there is a co-dependent relationship between banks and the economy.

For example, when a bank extends credit to an individual to buy a house, a series of transactions take place in the economy; the person selling the house receives income, surveyors, solicitors and insurance providers are paid for their services, and the new homeowner will likely continue to spend money decorating and landscaping their new property. This chain reaction of transactions as a result of one sanctioned loan illustrates how the banks' inability to lend prohibits productivity and ultimately economic growth.

1.2 The Economic and Financial Crises of 2007-2008 and the Aftermath

It is well documented that there were many contributing factors as to why the recession experienced in Ireland and globally was so severe, however for the purposes of this dissertation the researcher will focus on the behaviour of Irish banks in the lead up to the crash with regard to their lending practices and the regulatory framework introduced as a result.

Financial services in Ireland, dubbed the "wild west of European financing" (Lavery and O'Brien, 2005), had grown by around 60% between the years 2000 and 2008 according to the annual employment survey published in 2009 by the CSO. The sector was also adapting to globalisation and the accessibility of funding through wholesale markets along with the new single European currency, the euro.

The introduction of foreign banks in the financial services sector increased competition in an already market share hungry industry. The Joint Committees inquiry into the banking crisis found that this competition lead to aggressive lending products and "far from prudent" lending procedures which exacerbated risks. Banks were lending to generate new business and maintain market share; this lending was financed by the banks through wholesale markets. The banks were excessively borrowing short-term from the wholesale market and lending long-term to Irish consumers, this was ultimately cause of the banking crisis in Ireland (Honohan, 2009).

In the years following the crises, with unemployment rates raising and property valuations plummeting, the loans advanced to customers vesting in Irish banks turned bad exponentially.

1.3 Regulations Introduced in Response to the Financial Crisis

The EU were criticized in the years after the financial crisis for not having the adequate regulatory framework in place for euro area countries. Regling and Watson's (2010) report on the financial crisis in Ireland repeatedly noted the rapid pace of financial and market integration across the euro area and the EU, however never referred to policy integration. In the absence of a unified approach to banking regulation in the euro area, it was up to national policy makers and supervisors to keep up with this rapidly evolving industry.

By 2012, the European Commission had proposed the Banking Union to the European Parliament as they sought to implement a unified regulatory framework across the euro area. The proposal, among other things, stressed the need for stronger prudential requirements with specific reference to capital requirements along with amendments to provisions of the EBA regulation. An important development in the "road towards a banking union" was the proposal for setting up the SSM, effectively encompassing the ECB and each euro areas' respective national banking supervisor into one supervisory entity.

These developments have had a major impact on how banks operating in Europe, and Ireland, report on NPLs. Prior to the EBAs regulation amendments and the introduction of the Single Rulebook, banks

across Europe used different criteria to define NPLs which lead to vast discrepancies across the EU and inefficiency when it came to determine which banks required recovery assistance. In a March 2017 guidance document issued by the ECB they clarified that NPLs will now be referred to as NPEs and outlined the specific criteria that determines if the loan is to be deemed an NPE.

While this may seem insignificant it resulted in the banks being forced to address their NPEs – which has caused the great deal of conversation and debate seen in Ireland over the last number of years. As a result of the regulatory framework proposed by the European Commission, banks are required to have capital held against their total NPEs. The level of capital required has been increased due to the introduction of BASEL III, in response to the financial crisis. The result is that banks are holding capital against NPEs to mediate default risk, preventing them from using this capital to fund new business and stimulate economic growth.

This dissertation aims to fill the gap in the literature and research on whether increasing NPEs in Irish banks has a negative impact on economic growth.

Chapter 2: Literature Review

Since the introduction of new regulatory guidelines and the new definition of NPEs, banks across Europe have been reassessing their loan books and determining what proportion of them are non-performing. The EBA defines NPEs as exposures (loans) either 90 days past due or where the lender has assessed the borrower as unlikely to pay, or both. With respect to the unlikely to pay criterion, once the lender assesses them as such the borrower's loan will be classified as an NPE, even if the borrower has never missed a loan payment (EBA, 2017).

This new facet of the definition has resulted in what were previously classified as performing loans being reclassified as NPE. This has a significant impact on the banks' overall operations. As has been outlined in the introduction, increasing NPEs also increases the banks' capital requirements which prohibits them from lending this capital to new business. If bank lending is restricted this may have an adverse impact on economic growth.

With this in mind, an exploration and analysis of the literatures pertaining to all of the above will be presented by the following three themes; finance and banking as drivers of economic growth, regulation and capital requirements as a foundation for bank stability, and NPEs in advanced economies. This literature review aims to determine if finance and banking has been found to have a significant impact on economic growth, if regulations and capital requirements lay the foundation for better financial stability and banking practices, and if NPEs burden the economy.

2.1 Finance and Banking as Drivers of Economic Growth

The relationship between economic growth and finance and banking is a dependent one. There are many other things that stimulate economic growth like innovation, research and development and technological advances. While these all ignite economic activity in various industries, many will require funding. The funding for new businesses and projects, along with the employed persons investment in their home, is primarily sourced from banks and the financial market. Therefore, without the existence of finance and banking, economic activity would go unfunded and there would be fewer supports for the economic growth.

Nobel Laureate Merton Miller, best known for his contributions to capital structure theory with fellow Nobel Prize winning economist Franco Modigliani, was cited repeatedly in peer reviews for famously writing that the notion "that financial markets contribute to economic growth is a proposition too obvious for serious discussion" (Miller, 1998). Despite this statement, there has been extensive theoretical and empirical research on the relationship between financial development and economic growth. This is due to the debate as to whether financial and banking development acts as an accelerant of economic growth or whether the financial system simply responds to economic activity. Unlike Miller, British economist Joan Robinson (1952) believed in the latter, arguing that finance merely goes to the sector where its services are required rather than being the cause of economic growth.

Levine (2005) performed an extensive review of existing literature and analysis on the topic of finance and banking's contribution to economic growth to establish which of the above opposing views is truer. Included in the research were findings by Goldsmith (1969) which documented the positive correlation between finance and economic growth across 35 countries. Levine and Renelt (2002) sought to improve on statistical problems associated with Goldsmith's cross-country analysis and through the use time series analysis found the there was a significant link between financial

development and economic growth. Significantly, Jayaratne and Strahan (1996) found that banking reform in the United States increased the quality of bank lending which accelerated real per capita growth rates. Through comparing literatures on finance and economic growth, which encompassed varying data collection and analytical techniques and improving upon them, Levine (2005) found that there is a "strong positive link" between the financial system and long-run economic growth.

However, this was not found to be true from an Irish perspective. Despite the establishment of the IFSC in 1987 and its continued success, accounting for almost 40% of total employment in the financial services industry in Ireland; the economic growth experience in the country in the near two decades leading up to the crisis could not be strongly attributed to financial development according to Honohan (2006). While Honohan (2006) doesn't provide the cause of economic growth in Ireland in this literature, other literary sources assert that economic growth experienced from the late 1980's to early 2000's was attributed to a myriad of activities including fiscal stabilisation, the European Structural and Investment funds and increase in graduates employed in the country (Barry, 1999).

In addition to the above pre-crisis research on this topic in Ireland, and the lack of adequate regulatory framework in Irish banking and financial markets when the euro was introduced along with the "light touch" approach the regulator in Ireland adopted with regard to supervision in the industry in the lead up to 2007 (Honohan, 2010), it is reasonable to question the degree of oversight that occurred when attributing financial markets and banking on economic growth in Ireland. Notwithstanding the evidence found in the mid-2000s in relation to Ireland, it is impossible to reject the overwhelming literary evidence that finance, and banking positively impact economic growth. With a relationship of this nature it is imperative that there is regulatory framework and supervisory guidance is securely embedded in the sector, which will ultimately improve industry development. This ideal is supported by in the research by Levine (2005) where he highlights that convincing evidence which illustrates finance and banking's acceleration of long-run economic growth will influence the priority that policymakers attach to financial regulation.

Although this was not the case in Europe prior to the introduction of the euro and regulation in Ireland during this time was far from prudent; as outlined in chapter one and the introduction to chapter two, there have been major developments in regulatory framework with respect to banking in Europe in response to what happened across the finance sector in the aftermath of the crisis.

2.2 Regulation and Capital Requirements as a Foundation for Bank Stability

The regulation of banks and financial markets came under huge scrutiny in the wake of the global economic and financial crises. Despite the global aspect of the crises, what was experienced in Ireland was caused by domestic factors that can be linked to financial regulation (Kinsella and O' Sullivan, 2011). The inadequate regulatory framework and banking supervision resulted in Irish banks becoming privatised (AIB and PTSB), merging (EBS with AIB) and ultimately liquidating (Anglo Irish Bank and Irish Nationwide Building Society). Not everyone believes in the regulation of financial markets or banks, however. Some industry workers find that heavily regulated banks restrict bank officials from doing the right thing in order to what is right and that regulators may be acting in their own self-interest (Kane, 1996).

When it comes to the instability of financial services, and banks in particular, in the lead up to the financial crisis there were many quick to say that they saw it coming – most popularly the New York Times best-selling book, The Big Short (2010) – which was later adapted into a blockbuster movie starring Hollywood's finest. The book focussed on the credit default swap market and followed

different individuals who worked in financial services, whom all saw the enormity of the property bubble years before it burst, and documents the huge losses incurred by Merrill Lynch and AIG thanks to their bull behaviour regardless of risk. However, contrary to the retrospective academic research (Kinsella and O' Sullivan, 2011) on this topic – and that the idea that the crisis was as a result of complex transactions in the financial market – the writing was on the wall for some academics long before the noughties.

Due to the huge advancements in computers and information technologies in the early 1990's the already fast paced financial services sector received what could be described as an injection of steroids. In the decade before the scrutiny that was unleashed on Irish bank and academic literature such as Kinsella and O' Sullivan's were produced, there were academics genuinely worried about the stability of banks with the regulations they were operating under, and one financial market professor in particular couldn't have predicted what occurred in Ireland more accurately. Edwards (1996), who is against additional government regulation for nonbank financial institutions, stressed that one of the two reasons for the publication of his book drew from the fear that no one seemed to be interested in the policy implications of financial market activities. Edwards (1996) expressed his surprise that the biggest potential problem was with traditional banks in their attempt to keep up with the new and complex environment they were operating in and highlighted his scepticism that banks could continue to expand into riskier activities without interfering with the effectiveness of prudential regulation. However, it wasn't' until after the dye was cast that this was taken into serious consideration in Ireland (Honohan, 2009).

The ECB were criticised for not having had the appropriate regulatory framework in place prior to the euro's circulation and market integration (Pisani-Ferry, et al. 2010). Since the financial and economic crisis, they have developed much more robust regulatory framework which applies to all euro area banks. With the agreement of Basel III requirements among the members of the Basel Committee on Banking Supervision in 2010, EU banks improved their capital ratios from 9.6% in Q4 2009 to 12.3% in Q2 2015 leading to improved stability within the European financial system (Duffie, 2016). The introduction of Basel III saw an increase in the level of capital required for banks to hold in respect to NPLs increase by 2% from Basel II, which increases the banks' liquidity, and in turn financial stability. This is the type of prudential regulation that Edwards eluded to back in 1996.

As was the case in Ireland, the taxpayer is regularly left footing a hefty bill as a result of financial crises. Regulatory framework proposed by the European Commission in 2012 quoted that European taxpayers contributed over €4.5 trillion to rescue the banks in the EU after the Great Recession. While the Commission accepted that there had been a coordination between supervisors in the past, it emphasised the need for common decision making in the context of a single currency. This common decision making, now known in the industry as the Single Rulebook does exactly that.

While there have been many regulatory developments within the Single Rulebook none have caused the same volume of discussion or debate as NPEs and the capital requirement implications associated with them, which has led banks to the bulk loan sales witnessed in the last number of years.

2.3 NPEs in Advanced Economies

Since the introduction of the Single Rulebook, and the new rules regarding NPEs (formerly NPLs), banks operating in Europe have been putting policies, procedures and a lot of working hours into

finding the best solution for resolving their loans. As a result of the behaviours of the individuals working in Ireland's financial sector prior to the crisis, which resulted in the sector being dubbed the "wild west of European financing" (Lavery and O'Brien, 2005), Ireland had among the highest levels on NPEs in Europe (ECB, 2017). There are many reasons as to why a banks' NPEs increase; reduction in household income, unemployment, adverse cashflow and/or liquidity. Another reason why NPEs rise, which could likely explain the volume of NPEs in Ireland after the financial crisis, is due to the loss of equity in an asset as a result of reduction in property valuation, reducing the incentive for the owner to continue with their repayments (Donnery et al., 2018).

As outlined in the introduction to chapter 2, the EBA have defined NPE and clearly stipulated the criteria of same. There is another caveat however when it comes to determining how much of a borrower's exposure is non-performing; that is if more than 20% of one entity's exposures are non-performing, this will have a pulling effect and will classify all of their borrowings as non-performing (EBA, 2017). This caveat, along with NPEs in general, has a very significant and negative impact on a bank's financial position. Not only because their bad debts are increasing and the likelihood of the cashflows (repayments) they have projected actually materialising is reduced, which may impact the banks' ability to complete projects that were approved on basis of those projects, but also because of capital requirements (Maggi and Guida, 2009).

For each year that an NPE remains on their books, banks will be required to increase their minimum coverage (capital required) to mitigate the default risk. The level of coverage varies between secured and unsecured debt – with the latter having higher capital requirements, sooner – but ultimately both can reach up to 100% coverage if the NPE is not resolved (ECB, 2019). This significant legislation, which was only passed last year, coupled with the pulling effect rule will adversely impact the banks' balance sheets if NPEs go unresolved. Losses on banks' balance sheets have been proven to have a strong negative impact on the economy, therefore the resolution of NPEs in imperative in the pursuit of economic growth (Balgova et al., 2016).

Resolution of NPEs can be achieved by using one of two methods: passive or active management. Because NPEs is a ratio of the proportion of bad loans over total loans, one way of reducing NPEs is by increasing the denominator, which is passive. Active methods include specialist debt management and restructuring, write-offs or loan sales. Due the increased capital requirements forcing banks to hold capital, the passive method of increasing the banks loan book becomes more difficult as long as the NPEs remain (Maggi and Guida, 2009). Th use of active resolution has shown to be successful in the recovery of financial performance in banks, and that when the non-performing problem is ignored it can result in reduced economic growth (Balgova et al., 2016).

A number of studies and peer reviews have supported this statement. Nkusu (2010) sought to find how vulnerable the economy was to NPEs rising in banks. His study focused on GDP as a dependant variable of NPEs across 26 advanced economies and found the there was a strong negative relationship between economic growth and NPEs, however he did not include Ireland's advanced economy in his work. Similarly, other studies have found that not only does rising NPEs have a negative relationship with economic growth but also credit growth and employment in Europe (Klein, 2013).

This finding regarding credit growth supports the idea that passive resolution to the NPE problem may not be an option for a lot of banks who find themselves with high levels of bad loans in their balance sheet and that the active method Irish banks have adopted is the most appropriate for the recovery of their balance sheets, expansion of their credit and promotion of economic growth.

Conclusion

The literature review has centred around the chosen research area. The literature included provides empirical and theoretical background into the financial-economic relationship, regulatory framework and NPEs in advanced economies. As outlined in this chapter's introduction the aim of literature review was to determine if finance and banking has any impact on the economy, if regulations and capital requirements lay the foundation for stability in the financial system and if NPEs burden the economy. The purpose of selecting each of these sub areas was to form an academic basis that validates the research being conducted in this dissertation.

The academic literature reviewed, sourced from varying economic bodies and university professors, supports the view that finance and banking have an impact on economic growth. In his extensive research Levine (2005) determined, with overwhelming support from other literary sources, that there is a strong positive link between a well-functioning financial system and long-run economic growth. When it comes to regulation and capital requirements providing stability in the financial system Edwards (1996), a professor at Columbia University, was able to foresee that there was inadequate regulatory framework in place for traditional banks in the growing financial sector. Furthermore, the literature pertaining to NPEs support the view that they are a burden on the economy and adversely affect economic growth in advanced economies. Notwithstanding this, there has been little research on the determining the impact NPEs have on Irelands economy, and if they have a greater or lesser impact than studies performed in other countries or cross-country analysis.

The next chapter will explain how a research question was developed from the literature reviewed on the research area.

Chapter 3: Research Question

3.1 Developing the Research Question

The researcher began the process of developing a research question by first choosing the broad topic of NPEs and the Irish economy. After conducting some preliminary readings on this topic during 2019, in preparation for this dissertation, the researcher found that Irish banks were in the process of finalising billions of euros worth of problem loans to asset management companies (Conlon, 2019) along with economists working in the banking sector in Ireland addressing the Irish government to speak about the economic significance of reducing banks' bad loan books (Weston, 2019).

The researcher identified a research problem after conducting a literary review on the topic; which covered the relationship between financial services and the economy, the regulatory framework – which aims to stabilise financial markets – and the impact of NPEs in advanced economy. The gap in the research is that Ireland has not been included in previous studies on NPEs' economic impact. While the literature doesn't specify that this was intentional, it is still unknown to what extent NPEs have a impact on the Irish economic growth. The gap in the research ultimately resulted in the formation of the following research question:

"What impact does NPEs vesting in Irish banks have on economic growth?"

This question is worthy of research because while there are studies on finance and economic growth, most have either been conducted prior to the financial crisis or more recently in advanced economies with the exclusion of Ireland in their methods. The literature supports the fundamental view that finance and banking support economic growth, that regulation improves the financial systems stability, and that NPEs are a burden to the economy. Nonetheless, there are no academic, statistical findings on the impact of NPEs vesting in Irish banks on the country's economy.

In the next chapter the focus will turn to the research philosophies and the approach used to collect data that were employed to answer this question.

Chapter 4: Methodology

Research is the process of intellectual discovery, which has the potential to transform our knowledge; it is the logical search for new and useful information on a specific topic (Rajasekar et al. 2006; and Ryan et al., 2002). There are unanswered problems in all areas of our world, and they can be solved through research. In order for a body of work to be considered research it is necessary to adhere to specific criteria (Goundar, 2012);

- The work uses a set of philosophies (approaches; primarily quantitative or qualitative), and
- Uses techniques and methods which have been tested for their validity and reliability (that the correct procedures were applied and quality of measurement that enables work to be repeated), and
- Is unbiased and objective (that the researcher does not deliberately conceal something found in the research).

Research methodology and research methods are not the same thing. Research methods are the specific procedures used for collecting and analysing data, whereas research methodology is the systematic way to solve a problem, it is the overarching strategy and rationale for the research (Rajasekar et al. 2006). It is imperative to clearly set out the research's methodology design as it can vary from research problem and research area. Similarly, the research method utilised, be they quantitative or qualitative, in two research problems may be the same but the research methodology can still be different.

This chapter will begin by providing the reader with an overview of research philosophy. Next, the researcher will discuss the procedure which was adopted for this research and the rationale for this choice of method. The chapter will continue by providing the techniques used to collect data and the data analysis. The researcher will set out their justification for choosing the methods employed in this study and their limitations along with ethical considerations.

4.1 Research Philosophy and Approach

Prior to carrying out research it is imperative to first understand the philosophical approaches that will shape the research methods employed. There are two main aspects of research philosophy; ontology and epistemology. Epistemology, derived from the Greek word for knowledge, is the aspect of research philosophy that is concerned with what is, or ought to be, considered as accepted knowledge in a field of study. Ontology, derived from the Greek word for being, is the philosophical study of being. Both of these aspects can be further subcategorised. For the purpose of this dissertation the researcher will focus on the epistemological aspect of research philosophy. Epistemology, also known as the theory of knowledge, describes how one should generate truthful knowledge which determine the types of methods used in their research. There are two types of epistemology; positivism and interpretivism (Peace, 2013).

Positivism put simply, only accepts phenomena that can be measured or observed by the senses. Positivism is objective and not influenced by anything which cannot be measured. For research to fit into this category it needs to be unbiased and the researcher opinions must not influence their research or findings – the data must speak for itself. As such, this type of epistemology uses quantitative methods to form statistical findings and conclusions.

Interpretivism does not solely rely on scientific methods in the generation of knowledge. It deems the scientific method inappropriate to the study of human beings due to free will and autonomy. This type of epistemology focuses more on thoughts and feeling that underpin the behaviour observed, rather

that the outcome of what was observed. Interpretivism is subjective and the researchers can show empathy to and build a rapport the subject matter of their research. As such, this type of epistemology uses qualitative methods to develop a theory or concept.

There are two types of approach to research; deductive and inductive. The deductive approach requires theoretical structure before a hypothesis is developed and data is collected, whereas the inductive approach begins with a question and analysis which predicates theoretical structure. Given the lay out and structure of this research paper and its contents up to this point, it can be determined that the approach to this research is deductive in nature.

Now that the researcher has demonstrated an in-depth understanding of the philosophical that shape research methodology and research methods, this chapter will continue with the procedure adopted for this research.

4.2 Research Method

As demonstrated above, philosophical approaches shape the research methods employed in one's research. However, the research area chosen will likely determine the philosophical approach. This research is being conducted in the area of finance, banking and economics; therefore, it does not fit into the ontological aspect of research philosophy and as such falls under the epistemological aspect.

The aim of the research is to answer a problem pertaining to NPEs and the impact they have on the Irish economy, as such the research strategy is correlational in nature. Due to the nature of this problem the researcher has chosen quantitative analysis to generate the acceptable knowledge required to answer the research problem. This is not to say that qualitative methods could not be used in the research area of banking and economics, for example; if the researcher wanted to answer the question "what was it like being involved in a loan sale?" from the perspective of borrowers who fell on hard times, the more appropriate approach would be qualitative methods as it would allow the researcher have empathy for those being interviewed.

Quantitative research method is used quantify the problem, through the use of numerical data which is transformed into usable statistics. Quantitative data can be collected in many forms such as surveys, structured interviews and experiments. The data collected is then used to find patterns and/or averages, make predictions and/or test causal relationships. Quantitative data can be primary or secondary in nature. Primary research refers to data which the researcher has collected directly from an original source (e.g. a structured interview) and secondary research is data which has been collected from a source that has published the data (e.g. GDP growth reported by the CSO) (Goundar, 2012).

When the researcher decided upon their research topic and question it was their intention to collect both primary and secondary data. The primary data would have been collected in the form of structured interviews with industry experts on NPEs. However, due to the global pandemic that occurred from March of this year – which is still having a major impact on life and business world-wide – this became an unrealistic method; as industry experts on NPE were called to assist with the development of COVID19 payment breaks offered by banks in response to reduced household income as a result of business closures.

Now that the research methods employed have been identified the remainder of this chapter will focus on other facets of research design. Research design is the blueprint for how the research question will be answered. The design contains the objectives implied by the research question, specifying the sources from which this data will be collected and how the data collect will be analysed (Saunders et al., 2016). The next sections of this chapter will detail the remaining aspects of research design, data collection and analysis

4.3 Data Collection

As mentioned above, research design is the blueprint for how the research question will be answered. Quantitative research design can be divided into three categories; experimental design, cross-sectional design and longitudinal design. Experimental design establishes cause and effect relationships and requires precise control over the dependent and independent variables used. Cross-sectional design is an alternative to experimental design (where precise control over variables cannot be achieved). Cross-sectional design examines the extent to which two or more variables measured over the same time period associate with one another. Cross-sectional design provides a basis for experimental research. Longitudinal design examines repeated observations of the same variables, albeit at different moments in time.

This research will be employing cross-sectional design to answer the research question. The sample size data collected for this research is over a twenty year time period (2000 – 2019) in four of the longest running banks in Ireland, the decision to choose "home grown" banks was as a result of time constraints and data for other banks operating in this country being difficult to source. The rationale behind the period chosen was due to the significant developments in the research area during this time. The economic growth experienced in Ireland from 2000 – 2007, the NPEs which rose in Irish banks as a result of the crash between 2007 and 2014 and the regulatory reform in Europe from 2012 to present. The size of the sample was also determined by the inability to source data relating to NPEs prior to 1999.

Dependent Variable Data Collection:

The dependent variable selected for this research was GDP. This data was sourced from the CSO website and relates to the period desired (2000 – 2019). Due to the huge presence of multinational corporations in Ireland, the GDP tends to not truly reflect the real economic growth of the country given that income from foreign multinationals is included in this variable. To account for this the researcher also collected Ireland's GNI data. GNI is similar to gross national product (GNP = GDP + net property income from abroad – income earnt by multinational), GNI as defined by the World Bank is the sum of value added by all resident producers + any product taxes not included in the valuation of output + net receipts of primary income from abroad (compensation of employees and property income).

Independent Variable Data Collection:

Data collection for the independent variable of NPE relied solely upon the annual reports of the chosen banks sourced from their respective investor relations webpages. The researcher chose data from Ireland's four largest banks; AIB, BOI, PTSB and UB. Unfortunately for this research, the only banks whose archival reports went back as far as the chosen time frame was AIB and BOI. In the interest of rectifying issues with the data the researcher reached out to PTSB and UB representatives in the search for missing data, however this did not materialise in time for submittal of the research. While

NPE data and supporting information was clearly outlined in more up to date annual reports, the further back the report was the more difficult it was to determine exactly how much of the loan book was non-performing. This was primarily due to changes in style and flow of report and jargon used. Similarly, there was no NPE ratio provided in earlier reports which resulted in a considerable amount of time spent sorting this data. More details on how the data was organised will be provided in the data analysis subsection.

The entire data set as described above is present in table 1 below:

Variable	Variable Type	Data Set Range	Number of Years	Source of Data
GDP	Dependent	2000 – 2019	20	CSO
GNI	Dependent	2000 – 2018	19	CSO
AIB	Independent	2000 – 2019	20	AIB
BOI	Independent	2000 – 2019	20	BOI
PTSB	Independent	2012 – 2019	8	PTSB
UB	Independent	2009 – 2019	11	UB

Table 1: Summary of data collected

4.4 Data Analysis

Data analysis methods adopted depend on the type of data sourced and how it is prepared for analysis. Quantitative data is numerical data which is transformed into usable statistics. There are two main forms of quantitative statistics used in research: descriptive and inferential. Descriptive statistics describe the characteristics of the chosen sample while inferential statistics are used to draw conclusions about the population based on the chosen sample. The aim of statistical analysis on the data collected is for the researcher to be able to make a statement about their hypothesis (De Fusco et al., 2007). The researcher has derived the following null and alternative hypothesis from the research question produced in chapter three having reviewed the literature and discovering a gap in peer reviews when it comes to the impact of NPEs on Ireland's economic growth.

Null hypothesis: NPEs do not have a significant impact on economic growth in Ireland.

Alternative hypothesis: NPEs do have a significant impact on economic growth in Ireland.

However, before the researcher could began analysis of the data collected, it first needed to be sorted, organised and presented appropriately prior to statistical analysis. When collecting NPE data, which was gathered from over 60 annual reports, the researcher input the data into excel for first review and perform initial analysis. The NPE data provided in the annual reports was reported as the actual value rather than the proportion of the total loan book. As a result, the researcher also stored the total loan book value in excel to be able to determine the NPE ratio and its growth year on year for each respective bank, in total and in AIB and BOI jointly, due to the data for both banks covering the twenty year time horizon. While this task was time consuming considering the volume of annual reports, once this task was complete the researcher could begin analysing the data.

All of the data in this research is continuous and measures of ratio data: GDP, GNI, and NPEs are all ratios. After the researcher collected the data it was first sorted in excel before being exported to Statistical Package for the Social Sciences (SPSS) for analysis. The researcher began their analysis with descriptive statics. This included measuring the central tendency and dispersion of each variable. Measures of central tendency include the mean, mode and median; while measures of dispersion

include standard deviation and variance (Lind et al., 2012). The interpretation and presentation of the descriptive statistical analysis can be found in chapter five of the research.

Once this was complete the researcher performed inferential statistical analysis using SPSS. Inferential statistics are employed to test the probability that the null hypothesis is true. Probability represents the likelihood of something occurring. There are two inferential tests used in this research: Pearson's correlation, which tests the relationship between two continuous variables, and linear regression, which tests the relationship of one predictor variable and one outcome variable. Correlation and linear regression analysis were performed between the following variables: Total NPE as the predictor variable and GNI as the outcome variable.

A summary of the analysis is presented in table 2 below:

Variable 1	**Variable 2**	**Dependent Variable**	**Test**
Total NPE Growth	GNI Growth	GNI Growth	Pearson Correlation
Total NPE Growth	GNI Growth	GNI Growth	Linear regression

Table 2: Summary of Inferential Statistical Analysis

The interpretation and presentation of the inferential statistical analysis can be found in chapter five of the research.

4.5 Justification and Limitations

In this subsection the research methodology and methods will be justified as well as their limitations highlighted. The structure, presentation and compartmentalisation of the methodology section was introduced with the purpose of justifying the research methodology adopted in each subsection. Nonetheless, justification of the methodology adopted in this research will be reiterated.

Saunders et al.'s (2016) famous research onion illustrates the many layers to research methodology. The outer layer deals with the varying philosophies from research can be based; as outlined earlier in this chapter there are two main aspects of research philosophy, epistemology and ontology. Given that ontology is the study of being it was not relevant to the research question proposed. There are two main philosophies that are derived from epistemology, positivism and interpretivism. In subsection 4.1, the researcher provides the justification of the positivism philosophy applied to the research along with an example of where interpretivism could be applied in the research area. The next layer of the onion is research approach; the researcher has demonstrated the approach taken in throughout the research so far, which is deduction.

The remaining layers of the onion include choice of research method, time horizons and techniques and procedures. The choice of research method adopted in the research was quantitative due to the nature of the research question. For the same reason, the time horizon was chosen as cross-section as the research followed four variables over the same period of time. The data collection and analysis techniques are justified as they meet the relevant assumptions required. From review of the literature outlined in chapter two on this research area, while some used both quantitative and qualitative methods, all of them used quantitative, cross-sectional methods.

All research has its limitations and no research method is perfect – this research isn't an exception (Goundar, 2012). The main limitation that needs to be stressed is that the research is not exhausted in the inclusion of NPEs in Irish banks – there are over 60 banks operating in Ireland. Collecting the data and analysing it for four banks took a considerable amount of time to perfect and sort.

The data for NPE in PTSB and UB does not go back to 2000, unlike AIB and BOI. This missing data may exaggerate the rise in NPEs in the aftermath of the financial crisis, however to what extent cannot be determined. The statistical analysis also has its limitations as it does not include other independent variables that have an impact on economic growth. However, the aim of this research is specific to the relationship between NPEs and economic growth over a time horizon of twenty years.

4.6 Ethical Considerations

Every researcher should consider the ethical implications their research may pose. If the researcher had collected the primary data intended for this research prior to COVID19, ethical consideration would have been made with respect to complying with data protection regulations, protecting the identity of those interviewed as well as the security of the data received and that it would not be held any longer than required.

As a result of events outside of the researchers control no primary data was obtained for this research. This research anonymously collected secondary data from multiple sources online which is publicly available and is not owned by the researcher. As such, this research does not pose any ethical concerns.

This chapter has demonstrated in detail the research methodology and methods that were adopted for this research. The next chapter will provide the results of the descriptive and inferential statistical analysis that was performed that will allow the researcher to make a statement about the research hypothesis.

Chapter 5: Analysis and Findings

This chapter will present and interpret the results and findings from the statistical methods adopted by the researcher. As highlighted in chapter four, statistical methods can be subcategorised into descriptive and inferential statistics. In most instances the data collected and used for analysis has a sample size of 20 with the exception to GNI, which only has a sample size of 19 (2019 results are not yet available from the data source, CSO). This data was sorted in excel before being exported and analysed using SPSS version 27. This chapter is broken down into two subsections which will include the findings and presentation of the analysis on the relationship between NPEs as the independent variable and two dependent variables; GDP and GNI. The purpose of this chapter is to interpret the analysis and report the findings of the research; the next chapter will discuss how the research findings compared with peer review findings.

5.1 Descriptive Statistics

Descriptive statistics is the organising, presenting and analysing of data (Lind et al., 2012). The methodology section of this research clearly justifies the use of quantitative data with respect to finding the answer to the research question proposed in chapter three of this dissertation. Table 1 in section 4.3 summarises the secondary continuous quantitative data collected for the research.

The organisation of GDP and GNI was made easy as the source (CSO) has the data organised and presented in a desirable format and was easily exported from their website to excel. As mentioned in the data analysis section, a considerable amount of time was spent in the formatting, organising and presentation of the raw data. Once this task was complete the raw data was exported to SPSS where the researcher began the research analysis.

The analyse function in SPSS provided table 3 below which describes the measure of central tendency and dispersion of the dependent variables:

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
GDP Growth	20	-.094094339321187	.349120717798150	.071882077855636	.085978071105310	.007	1.472	.512
GNI Growth	19	-.140625597491492	.161212388965915	.052613377416814	.070490627991760	.005	-1.302	.524
Valid N (listwise)	19							

Table 3: GDP Growth and GNI Growth Descriptive Statistics

This table summarised the data and demonstrates that the average growth in GNI and GDP were 5.3% and 7.2%, respectively. This use of basic data analysis techniques supports the researchers use of GNI in the research as a more accurate variable for real economic growth in Ireland; note how the range in GDP is greater than 25%, while the range in GNI is only 2%. Range, like standard deviation and variance is a measure of dispersion. The mean values observed lack meaning without knowledge of

the distribution; the average is only a useful measure of centre if the distribution is symmetrical. This is where the skewness statistic becomes important. Skewness can range from -3 to +3 (Lind et al., 2012); the data above indicates that GDP growth is positively skewed and GNI growth is negatively skewed, albeit to a moderate degree. This numerical data regarding the respective dependent variables' skewness is supported illustratively in the histograms below:

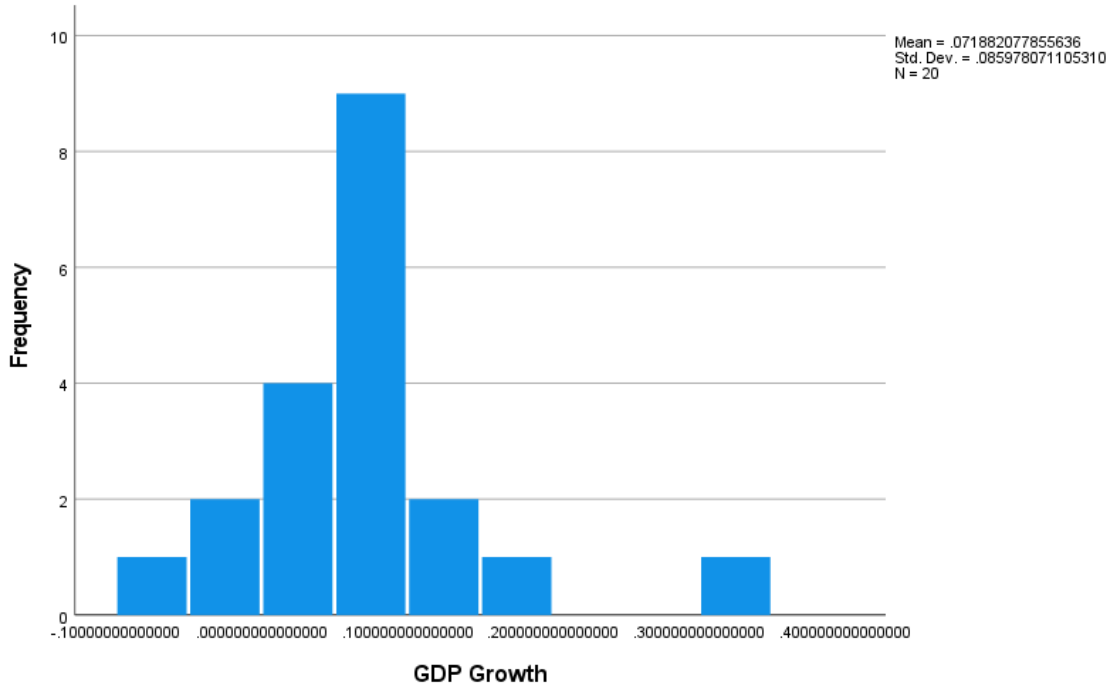

Figure 1: Skewness of GDP Growth

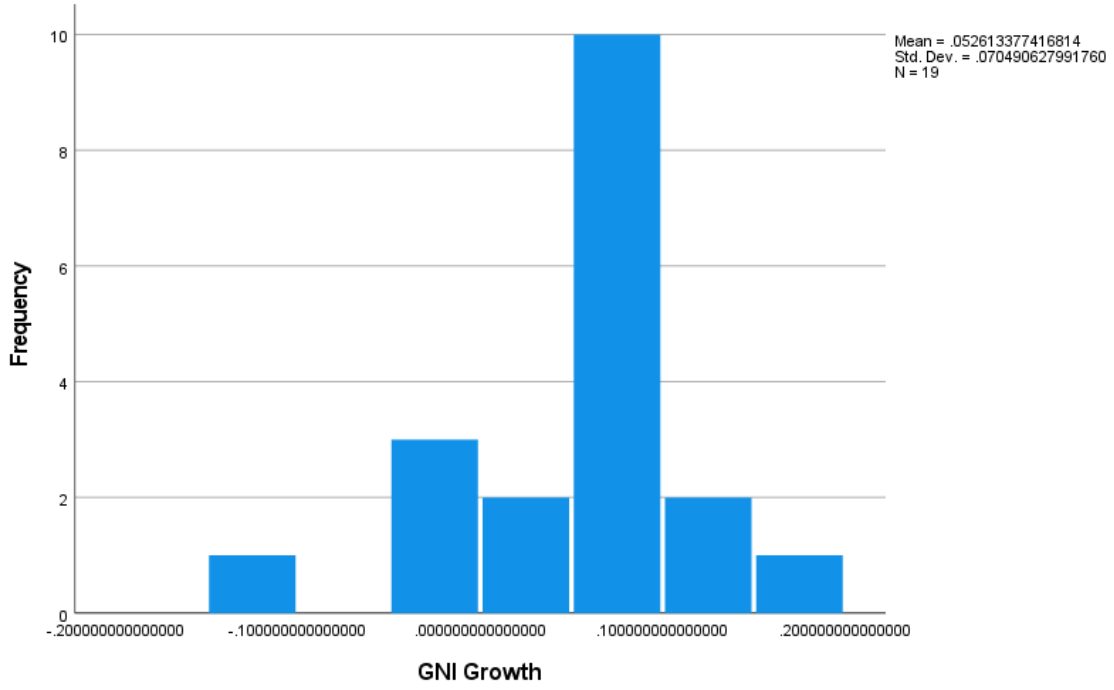

Figure 2: Skewness of GNI Growth

The same techniques were employed to analyse the independent variable of NPE. As highlighted in chapter 4, the researcher could not find NPE data for all four banks dating back to 2000. It was always the intention to sum the four banks' NPEs to demonstrate the Total NPEs in Irish banks for the purpose of the research, however in the interest of statistical analysis the researcher paired AIB and BOI NPE data, as they are the only two banks which represented the full time horizon.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
Total NPE Growth	20	-.391656031182091	2.723908216136196	.248607306062829	.724451648923409	.525	2.432	.512
AIB/BOI NPE Growth	20	-.377967023011415	2.277325437947200	.206829077752854	.640416485769695	.410	2.183	.512
Valid N (listwise)	20							

Table 4: Total NPE Growth and AIB/BOI NPE Growth Descriptive Statistics

The table above summarises the NPE growth data for all four banks and AIB/BOI. The average Total NPE growth and AIB/BOI growth are 24.9% and 20.7%, respectively. The higher average in Total NPE growth is reflective the limitations in the data therein, with the introduction of UB and PTSB data from 2009 and 2012 respectively causing increased growth in the following year. However, the 4% increase in total data would have likely accumulated in any case, had all data for the selected time horizon been collected, this is justification for using the Total NPE growth as the independent variable for the purpose of inferential statistical analysis. From review of both the average Total NPE growth and average GNI and GDP growth it is clear to deduce that from 2000 to 2019 the growth in NPE grew 5 and 4 times more than GNI and GDP respectively. As mentioned above, the mean lacks statistical value if the as a useful measure of centre if the data is not symmetrical. The skewness statistic for Total NPE Growth and AIB/BOI NPE Growth are 2.4 and 2.2, respectively this indicates that there is considerable positive skewness. Data sets that are positively or negative skewed single a peak in values, which was the case with respect to NPEs between 2007 and 2013. Below are the histograms which provide an illustrative description of the skewness:

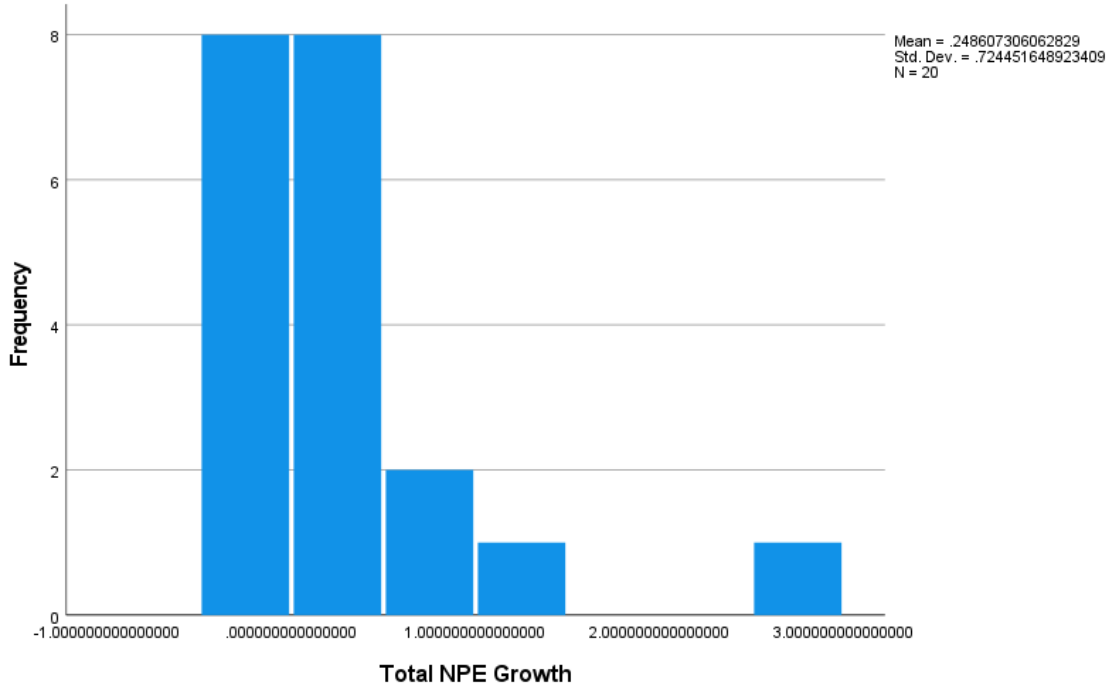

Figure 3: Skewness of Total NPE Growth

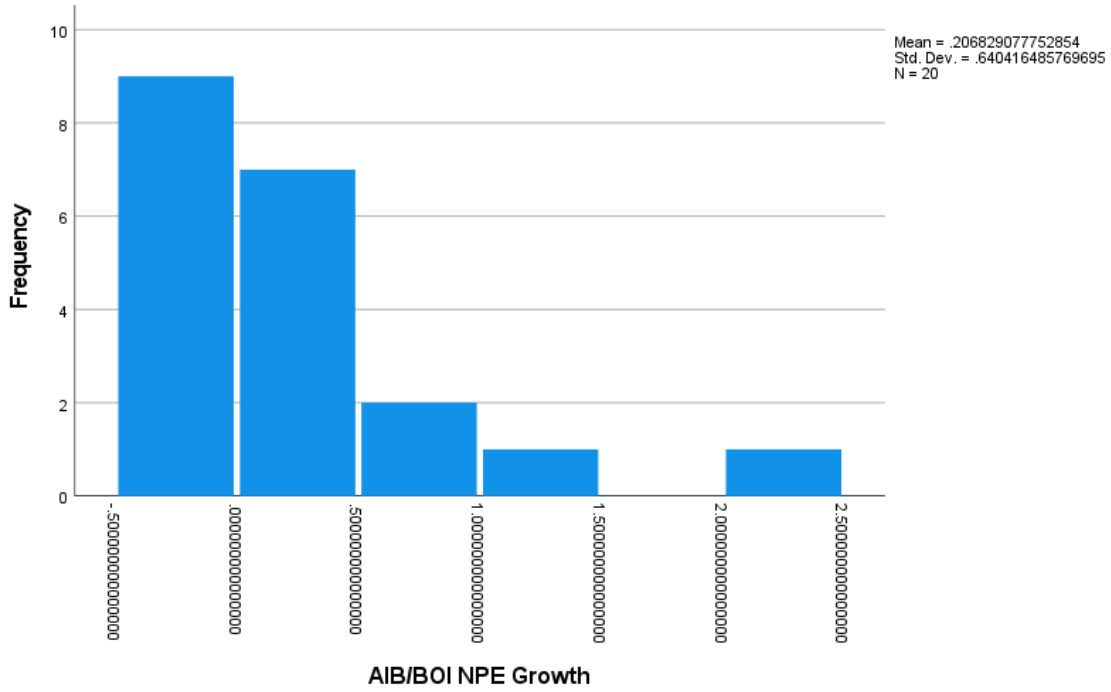

Figure 4: Skewness of AIB/BOI NPE Growth

As this research aims to measure the relationship between two variables (Total NPE vs GDP/GNI) the final and most important descriptive statistic employed was the creation of a scatter plot. The graph function in SPSS allowed the researcher to input the following variables which formed two scatter plots:

- Total NPE Growth (independent variable) and GDP Growth (dependent variable)
- Total NPE Growth (independent variable) and GNI Growth (dependent variable)

In statistics, the independent variable is measured on the x-axis while the dependent variable is scaled on the y-axis (Lind et al., 2012). See the results of the scatter plots below:

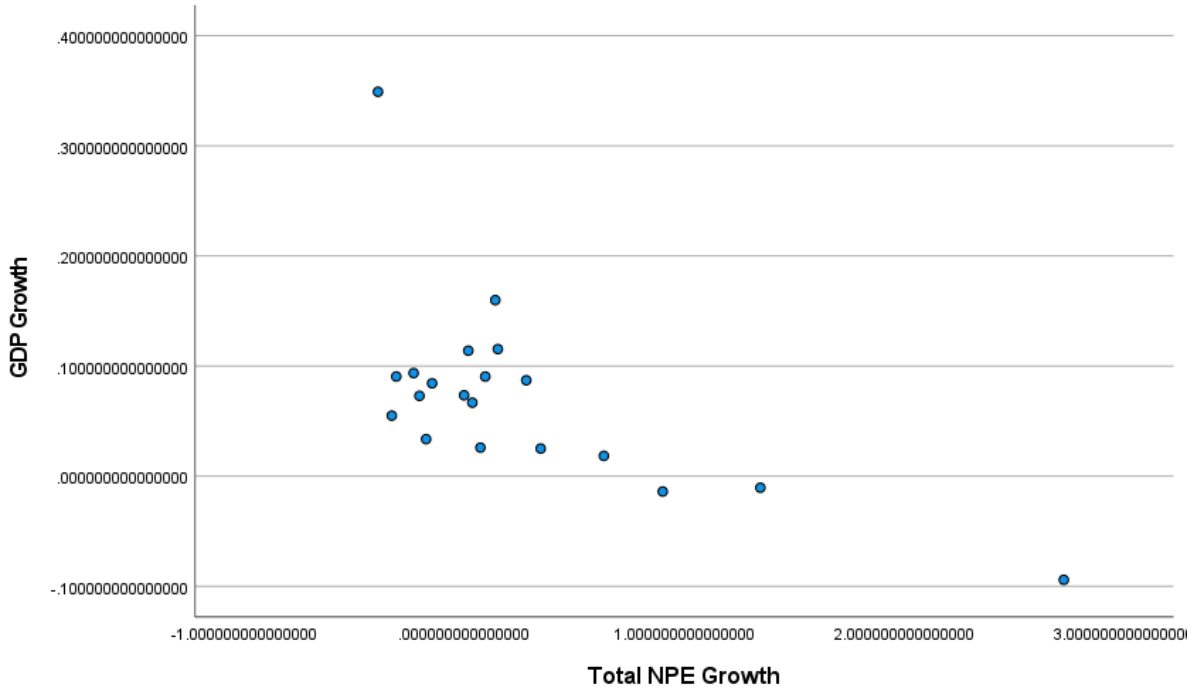

Figure 5: Scatterplot of Total NPE Growth and GDP Growth

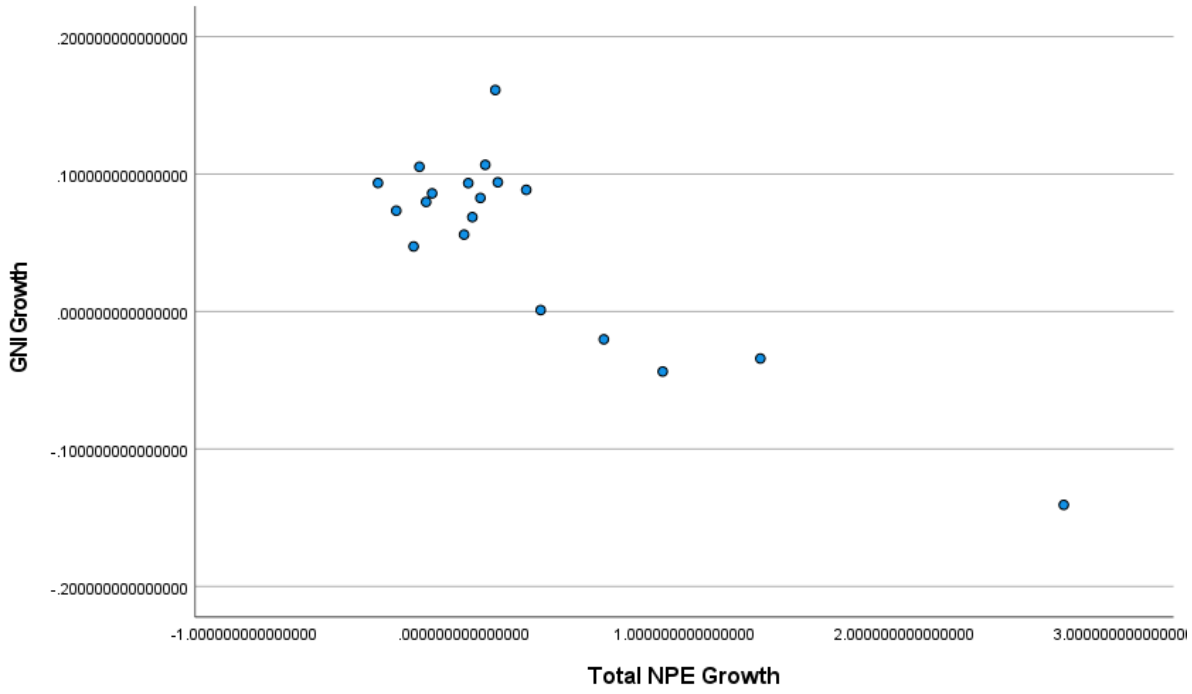

Figure 6: Scatterplot of Total NPE Growth and GNI Growth

The scatterplots above both illustrate that there is a negative relationship between the two variables. This result is similar to those found in peer reviews which will be discussed in more detail in chapter 6. There is enough evidence after performing the descriptive statistical analysis to determine that there is an inverse relationship between NPEs and economic growth, but it does not answer the research question as to the extent that NPEs impact economic growth. The next section, inferential statistics will attempt to do this.

5.2 Inferential Statistics

Having performed descriptive statistical analysis, the researcher formed a better understanding of the data. Regression and correlation analysis make predicting the value of one variable from another knowledge of another possible. Table 2 in section 4.4 summarised the inferential statistical analysis that was adopted for this research. Inferential analysis can be performed by using parametric or non-parametric statistics. Parametric statistics have certain assumptions (Lind et al., 2012), mainly:

- Continuous variables (either interval or ratio)
- Homoscedastic (where variances along the line of best fit remain similar)
- Linear (no significant outliers)
- Independent variables should not be corelated. This assumption is not applicable in this research as there is only one independent variable (and one dependent variable)
- Data set is normally distributed (symmetrical)

As was demonstrated in the descriptive statistics section above the figure 5: scatterplot of NPE Growth and GDP Growth illustrates that there are significant outliers in the dataset. This was as a due to two shocks to GDP, the recession in 2008 and an adjustment that occurred in 2013 resulting in growth of nearly 35% in just one year. Along with this, table 3 and figure 1 show that the data is only moderately symmetrical. Due to two of the above assumptions being violated the researcher could not justify performing parametric statistics using GDP as the dependent variable for the purposes of this research. This is not to say analysis couldn't be conducted, non-parametric statistics are employed in instances such as this. In any case, this research also obtains a more desirable economic indicator of GNI. While the data was proven to be moderately negatively skewed in the descriptive statistics subsection (table 4 and figure 2) the histogram isn't significantly skewed and as such the GNI data meets the assumptions for parametric inferential statistics. Therefore, the inferential data presented below employs GNI as the dependent variable.

Pearson Correlation Coefficient

De Fusco et al (2007), states that the correlation coefficient can be validly calculated if the means and variance of the independent variable and the dependent variable, as well as the covariance of the variables, are finite and constant. The most common correlation method used for continuous data is the Pearson. The tables below summarise the computation of correlation analysis between the Total NPE growth and GNI growth:

Correlations

		Total NPE Growth	GNI Growth
Total NPE Growth	Pearson Correlation	1	-.857**
	Sig. (2-tailed)		.000
	N	20	19
GNI Growth	Pearson Correlation	-.857**	1

	Sig. (2-tailed)	.000	
	N	19	19

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5: Correlation Between Total NPE Growth and GNI Growth

Similarly, the table below summarise the computation of correlation analysis between AIB/BOI NPE growth and GNI growth:

Correlations

		GNI Growth	AIB/BOI NPE Growth
Pearson Correlation	GNI Growth	1.000	-.841
	AIB/BOI NPE Growth	-.841	1.000
Sig. (1-tailed)	GNI Growth	.	.000
	AIB/BOI NPE Growth	.000	.
N	GNI Growth	19	19
	AIB/BOI NPE Growth	19	19

Table 6: Correlation Between AIB/BOI NPE Growth and GNI Growth

The Pearson correlation coefficient provides a number between 1 and -1, the sign of the correlation coefficient indicates the direction of the relationship. Both of the tables above have a minus correlation figure which statistically proves that there is a negative relationship between NPEs and GNI. The strength of the correlation is generally assessed as weak correlation, moderate correlation and strong correlation. The correlation computation in tables 5 and 6 above demonstrate a strong negative correlation. As I adopted to flag significant SPSS has highlighted the significance level at 0.01.

Linear Regression

As outlined at the beginning of this subsection, the researcher determined that the assumptions of linear regression were met with respect to GNI as the dependent variable and as such this was the regression analysis employed in the research. This is generally the next statistical test employed after correlation. This linear regression is used to predict the value of a variable (GNI) based on the value of another variable (NPE) (Lind et al., 2012). SPSS provided a number of outputs when employing the linear regression analysis and they are presented below with respect to Total NPE Growth and GNI Growth:

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate

1	.857[a]	.734	.719	.037381340004739

a. Predictors: (Constant), Total NPE Growth

b. Dependent Variable: GNI Growth

Table 7: Linear Regression Model Summary; Total NPE Growth and GNI Growth

The R value in the table above represents correlation (not directionality). The R Square value demonstrates how much of the total variation in the dependent variable, GNI growth, can be explained by the independent variable, Total NPE growth. The R Square value above indicates that 73.4% of the variation in GNI growth can be explained by Total NPE growth, which is a substantial finding.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.066	1	.066	47.007	.000[b]
	Residual	.024	17	.001		
	Total	.089	18			

a. Dependent Variable: GNI Growth

b. Predictors: (Constant), Total NPE Growth

Table 8: ANOVA; Total NPE Growth and GNI Growth

The goal of inferential statistics is to find the probability of the chance a particular event will occur. Any inferential statistics employed by a research will include a *p* value (probability). This is denoted under Sig. above. The .000 result found is a *p* value less than 0.05. This means that the null hypothesis is rejected, and the alternative is accepted. The F value is also significant. This value is the ratio of residual variance without and with the predictor. A large F value support the alternative hypothesis, that a reduction in the residual variances can be attributed to the predictor.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	.076	.009		8.214	.000	.056	.095
	Total NPE Growth	-.083	.012	-.857	-6.856	.000	-.108	-.057

a. Dependent Variable: GNI Growth

Table 9: Coefficients; Total NPE Growth and GNI Growth

The coefficients table above provides the statistics necessary to predict GNI growth from Total NPE growth. The Sig. value in this table determines whether Total NPE growth contributes statistical significance to the model. As outlined under the ANOVA findings; statistical significance is *p* value less than 0.05. Therefore, Total NPE growth does contribute statistical significance. The B value enables the user to present the following regression equation, which is statically correct:

GNI growth = .076 -.083(Total NPE growth)

Research Question and Hypothesis

The research question, which was formulated based on literature review on the research area and to fill a gap therein, was outlined in chapter 3 of this dissertation as follows:

"What impact do NPEs vesting in Irish banks have on economic growth?"

From this the researcher presented the following null and alternative hypothesis, originally stated in chapter 4:

Null hypothesis: NPEs do not have a significant impact on economic growth in Ireland.

Alternative hypothesis: NPEs do have a significant impact on economic growth in Ireland.

From the results shown in this chapter the null hypothesis has been rejected and the alternative accepted: NPEs have a significant negative impact on economic growth in Ireland, to a very strong extent.

The next chapter will discuss the findings with reference to the findings in peer reviews.

Chapter 6: Discussion

In this chapter the researcher will discuss the findings of their research by providing a summary of the descriptive and inferential statistics employed in the research, along with the results found and reference to similar studies' findings that were highlighted in the literature review. The chapter will continue with an overview of the difficulties experienced with respect to data collection and other obstacles that were overcome.

Summary of Statistics Employed to Achieve the Research Objective

The research objective was clear; find the answer to the question "What impact does NPEs vesting in Irish banks have on economic growth?". In order to achieve the research objective, the researcher used quantitative techniques and procedures once the data was collected. The data was collected from secondary sources that are available to the general public and as such the researcher did not have ethical considerations in the collection and storage of the data. Various descriptive and inferential statistics were employed, the significant results are summarised as follows:

- The GDP range was over 25% which was due to shocks (2008 recession and 2013 adjustment).
- GNI was deemed a more appropriate dependent variable as in met all the assumptions for parametric statistics.
- While there was missing data from two out of the four banks year on year growth between Total NPE and AIB/BOI NPE was in line with one another, AIB and BOI were the only two banks whose data went back the full time horizon
- The scatterplot of Total NPE Growth and GNI Growth implied a strong negative
- Pearson Correlation Coefficient proved that there was a strong negative relationship between the variable (-.857)
- Linear regression results: R Square = .734; p = .000 {<0.05}; t = 47.
- Null hypothesis rejected, alternative hypothesis: NPEs do have a significant impact on economic growth in Ireland accepted.
- Research objective achieved – what impact does NPEs vesting in Irish banks have on economic growth? As strong negative impact. Regression equation: GNI Growth = .076 -.083(Total NPE).

Comparing the Research Findings with Those in the Literature Review

The findings of the research are in line with what was expected from the findings in peer reviews. The researcher expected there to be a negative relationship between Total NPE growth and GNI growth, however the significance and extend to which NPEs impact the economic growth in Ireland was greater than anticipated and surprised the researcher.

The literature review in chapter two was broken down into three subsections to provide the full picture when it came to the research topic of NPEs. An early study of rising NPEs found that NPLs (what they were previously referred to as) *"play a central role in the linkages between credit marker frictions and macroeconomic vulnerabilities"* (Nkusu, 2010). As outlined in the literature review, Nkusu's research determined GDP to be dependant of NPEs. The results of this research are in line with and supports the findings of this research. Nkusu (2010) found that deterioration in the macroeconomy (which was proxied by GDP, unemployment rate and falling asset prices) was as a result of rising NPEs. This study included 26 advanced economies, many of which were European countries – the researcher doesn't provide much basis for country selection however Ireland would appear to have fit the criteria of an advanced economy with a high level of NPEs.

Balgova et al. (2016) research on the economic impact was three-fold with respect to different scenarios subsequent to rising NPEs. This extensive study found that reducing NPEs has a positive impact on the medium-term economy, while ignoring the NPE problem causes economic performance to suffer, with growth forgone computed at up to 2 percentage points per annum. This supports the undeniable findings in this research paper with respect to the level of significance and the strong negative relationship demonstrated between the variables.

Difficulties experienced

The researcher began to experience difficulties after they had chosen NPEs as their research topic. The primary reason was due to there being so much new information available from a business perspective, with new reports and profession opinion pieces being published on banking forums. Along with incoming information throughout the last 12 months relating to the topic of NPEs the researcher found it difficult to situate the topic fully within the research area. This is why the introduction and literature review were compartmentalised; the researcher wanted to provide a map to the research topic while also highlighting the relationship between the financial system and the economy, and the importance of regulation therein along the way.

The data was not perfect in this research. There is missing NPE values for two of the four banks chosen in this research. Given the significance of the results without these values, the objectives were still met. However, the results are not reflective of all banks and/or all NPEs.

As mentioned earlier, the researcher had intended to collect primary data to support what would have been an additional objective. This pertained to the new capital requirements and how they hinder passive NPE resolution techniques (through increase of total loan book). The researcher would have liked to gain knowledge from industry experts and what their views were on capital requirements; were they too much and an overreaction to a complex crisis? Or are they completely warranted and welcomed by financial institutions?

The primary reason this could not be performed was as a result of the COVID19 pandemic that closed down the country. While the researcher had been in initial discussions with above manager level participants it was an unrealistic task to complete given the circumstances. However, this is highlighted as a potential area for growth in the conclusion section. Another difficulty experienced in completely the research in light of COVID19 was the immediate closure of schools and libraries and the disruption to what was expected of the past semester. The researcher ultimately overcame obstacles those obstacles through the use of online resources, both in general and made available through the National College of Ireland.

Chapter 7: Conclusion

The purpose of this research was to determine the impact of NPEs on the Irish economy.

The reason for choosing this topic is due to the number of knock-on problems caused by NPEs, primarily with respect to economic growth. With the introduction of new regulatory framework there has been added pressure on banks to reduce NPEs and keep them below a threshold of 5% of total loans. Along with this new regulatory framework with respect to NPE levels, new capital requirements have been introduced as a negative incentive for banks to reduce their bad loans. This is a negative incentive because if NPEs increase, or simply just remain on banks' balance sheet they (the banks) will have to increase the capital on reserve year after year until the capital coverage is 100%. This will ensure the continued monitoring and management of NPEs as a preventative measure rather than a resolution.

What can be concluded from the research is that the economy requires a well-functioning banking system in order to grow. Without banks the day-to-day running of the "economic machine" would grind to a halt. Due to the extent that banking drives economic growth it is imperative that there is adequate regulatory framework and effective prudential regulations in place that enhance banking performance. This is what has been seen to have taken place in Europe since 2012. With NPEs set to rise again due to the COVID19 pandemic this research would imply that economic downturn is also on its way.

The objective of this research has been achieved with justified methodology and research method. The use of descriptive and inferential analysis provided the researcher with meaningful data from which they can draw conclusion. The over-arching conclusions is that there is a strong negative correlation between NPE growth and GNI growth (-.857) and that NPEs can be a predictor of economic growth and/or downturn: 73.4% of variation in GNI is attributable to NPE growth. This is new data which is being contributed to the research area and research topic. It is worth highlighting the fact that prediction does not mean causality.

Further research is required on this topic if the aim is to determine causality. There have been three shocks to Ireland's economy in the last 20 years; the Great Recession in 2007, the sudden reduction in NPEs in since 2013 and more recently the COVID19. Theses shocks make the variables react dramatically. To be able to determine the cause-effect relationship between such highly correlated variables the sample size must be a considerable amount more than the 20 observations analyzed in this research. Given that the long-term debt cycle is between 70 and 100 years it could be a long time before causality can be determined.

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