Macro-Prudential Implications of Sustainability Policies in the Banking Sector

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

Sustainability related issues, such as inequality, water security, and climate risk, represent a significant concern for many individuals and organizations, threatening the stability of the world's markets, including the financial markets. Meanwhile, the financial sector developed strategies and products to improve social and environmental prosperity. Also, financial regulators created incentives to promote sustainable practices. However, the effect of sustainable practices and regulations on the banks' financial stability is unclear. Literature evidences a research gap in studies linking financial stability and sustainable finance practices and regulations. Additionally, the main theories that cover financial stability overlook the systemic risk that originated from climate and social sources. The main objective of this thesis is to analyze the influence of sustainable finance regulations over the financial stability of Latin America from 2008 to 2017. This research study uses the data from 149 banks in 17 countries in Latin America form 2008 to 2018. The Zscore is used to measure the levels of financial stability of the banks studied. These banks are divided into two groups depending on the existence of sustainable banking regulations in the countries they operate. Several quantitative methods are applied, including a two-mean difference Welch t-test, a panel binary logit regression, a random-effects regression, and a dynamic panel data regression using a two-step GMM model. Comparing banks operating in countries with and without sustainable banking regulations shows significant results. Banks located in countries that have sustainable finance regulations present higher financial stability levels. This study concludes that sustainable finance regulations promote financial stability as well as sustainable banking practices. Further research is needed to understand the transition towards sustainable banking and impacts on systemic risk.

Key Words: Sustainable finance, sustainability development, sustainable finance regulations, financial stability, dynamic panel analysis

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Dedication

For my mom and dad, let's build a better future.

For Vicky. We can do this, our adventure is just beginning.

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Chapter 1

Introduction

Resistance to economic shocks, asset price stability, and currency value and function are some of the characteristics of a financially stable economy (Jiang et al., 2019). Banks and financial institutions' primary concern is their financial returns and the financial risk attached to it (Weber, 2012). Financial stability and sustainable activities are significant aspects that should be considered in the banking sector, though they tend to be overlooked. In the last ten years, several countries in Latin America joined Brazil's initiative to consider sustainability in their financial regulations. This unprecedented trend has changed financial institutions' behaviour within the banking sector, creating incentives to develop new environmental policies and products. However, how efficient have these policies been in terms of financial stability? Are these measures headed towards a more resilient banking system? These are essential questions that bankers and academics have tried to answer since the 2007-2009 subprime mortgage crisis. This thesis aims to understand whether sustainable finance regulations influence the financial stability of banks by comparing banks that operate in countries with and without a sustainable regulatory framework in their

financial market.

This master thesis looks into the banking system in Latin America and analyzes the financial stability of 149 banks in 17 Latin American countries to understand how it is affected by sustainable finance regulations. This study uses several quantitative analytical methods to understand the relationship between environmental regulations in the financial sector and banking stability, including a Welch t-test, a logit panel regression, a fixed effect regression, and a 2-step generalized method of moments (GMM) panel regression. The results of this thesis green regulations in the financial sector have a positive impact on the bank's financial stability.

The remainder of this chapter will introduce basic concepts regarding financial stability and sustainable finance, as well as summarize the main sustainable finance regulations in Latin America. The problem statement later addressed in the chapter, followed by the research objectives.

1.1 Financial Stability

Financial stability refers to a healthy financial system, though it has different applications in finance, and it is hard to define. Central banks, financial institutions, and other financial entities frequently use their definition of financial stability (Stefaniak, 2019). However, for Schinasi (2004), "a financial system is in a range of stability whenever it is capable of facilitating (rather than impeding) the performance of an economy, and of dissipating financial imbalances that arise endogenously or as a result of significant adverse and unanticipated events" (pp.8). This definition implies that financial stability is an ever-changing state of the financial system, handling internal and external shocks form the economy to contribute towards its performance.

Other authors refer to financial stability by using its counterpart, financial crisis or instability. This perspective is a consequence of several unstable episodes of the financial markets throughout history, which motivated researchers from several fields into numerous investigations about the phenomenon of financial instability. However, in terms of policy-making, evaluation, and economic development, considering financial stability as a policy objective is more efficient (Schinasi, 2004). Although the definition of financial stability is somehow ambiguous, it is generally agreed to be a common main goal of every central bank and country in the world, as it promotes the economies on a multidimensional level (Schinasi, 2004).

Furthermore, systemic risk is one of the main concerns of financial institutions when considering financial stability. Systemic risk consists of the externality that surges as a consequence of a financial institution's failure, which has the potential to replicate in other financial institutions (Acharya et al., 2017). To avoid this risk, central banks and governments implement macroprudential policies (Magyar Nemzeti Bank, nd). The main

objective of macroprudential policies is to prevent "the macroeconomic costs of systemic financial distress, taking into account feedback effects that the behaviour of individual financial institutions have on each other, and on the whole economy" (Galati and Moessner, 2013, pp. 864). Additionally, financial institutions need to internalize the cost of creating systemic risk, or else they will be encouraged to create more risk in the financial sector (Acharya et al., 2017).

A stable financial system is of paramount importance for ensuring a healthy economy. An economy with a stable financial system copes with economic shocks, provides asset price stability, and incorporates currency value and function (Jiang et al., 2019). Additionally, a stable financial system helps the economy to manage financial risk, maintain low unemployment levels, and allocate resources and assets efficiently (World Bank, 2012). In other words, a stable financial system is essential since it provides a range of gains for financial institutions and all stakeholders. Additionally, episodes of financial instability or crisis have shown the importance of maintaining a secure and reliable financial market.

1.2 Sustainable Finance

Sustainable finance can be defined as a branch or an alternative of traditional finance that integrates economic, social and environmental into financial analysis and decisions. Sustainable finance introduces practices that reduce negative impacts on the environment and society, such as pollution emission reduction, and adapts the economy to avoid future environmental consequences (Wang and Zhi, 2016). Additionally, it concentrates on keeping the welfare of future generations, while still meeting current needs (Dyllick and Hockerts, 2002; Schaltegger and Burritt, 2005; Busch et al., 2016; Weber and Feltmate, 2016).

Sustainable finance introduces environmental and social versions of traditional financial products in the industry. For instance, sustainable loans help people finance projects and help the economy grow while keeping a moral code to follow regarding environmental, social, and economic impacts (Weber and Feltmate, 2016). Investor and portfolio managers have access to other financial products, like bonds, funds, or stocks. If they value green policies, adopting them can increase the stock market value of those assets (Schmalensee, 2012). These financial activities are also referred as impact investing. Furthermore, if the case is project finance, the Equator Principles provide a set of rules or principles that financial institutions should follow to reduce the environmental and social impact of significant investments (Weber and Feltmate, 2016). The ultimate goal of sustainable finance is to reach sustainable development, which, basically consists of committing to reach a more equitable and healthier world for future generations (Keeble, 1988).

1.3 Sustainability Initiatives in the Financial Sector

To promote sustainable practice in the banking sector, different organizations have created guidelines, regulations, and other initiatives. The following section provides a brief description of the leading international and regional sustainable finance initiatives.

The pursue of sustainable development has inspired different organizations to take the initiative and introduce sustainability frameworks into the financial sector. The list of the initiatives includes international regulations led by non-governmental organizations (NGOs), regional and national initiatives.

International guidelines and regulations for sustainable finance have an essential role in the transformation of the financial sector towards sustainability.

Some initiatives bring together academics and experts in sustainability and finance to develop sustainability in the financial markets. Some of these organizations include:

- The Corporate Forum on Sustainable Finance,
- The Global Green Finance Council (GGFC),
- Network of Central Banks and Supervisors for Greening the Financial System (NGFS),
- Task Force on Climate-related Financial Disclosures (TCFD),
- G20 Sustainable Finance Study Group,
- and the Sustainable Banking Network (SBN).

Other initiatives provide frameworks and guidelines for financial institutions in the pursuit of financial projects and products, like the Loan Principles (GLP & SLLP), the Equators Principles, and the UN Sustainable Development Goals.

1.4 Sustainable Finance Practices and Regulations in Latin America

Latin America consists of the continental area conformed by 26 countries distributed in the South, Central and North American continent, and the Caribbean islands. This study will focus on 18 countries from the region: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Dominican Republic, Uruguay, and Venezuela.

During the last 20 years, Latin America has seen notable improvement. Several countries in this region have exhibited a degree of macroeconomic stability, probably never seen since they were founded as independent nations (Bittencourt, 2012). Indeed, 16 of the economies mentioned above of the region have managed to sustain one-digit inflation rates with stable growth rates in the established study period (2008-2018).

Some Latin American countries have taken the initiative to create a sustainable legal framework (Oyegunle and Weber, 2015). These regulations include practicing environmental and social risk management, support project finance, and other aspects regarding sustainability in the financial sector. As a result, the creation of financial products like green bonds has been increasing in Latin America. Consequently, from 2014 to 2017, there were 26 green bonds issued, which stands for $8.4 billion in the region (ECLAC, 2017). However, these bonds seem to represent only 1.6% on average of the total bonds issued in the region.

Below are named and briefly described the key policies in Latin American countries mitigate environmental and social risks in the financial sector:

1.4.1 Brazil

Brazil was the first country in Latin America to commit the financial sector to develop sustainable practices. The sustainable regulations on the financial sector consist of the Green Protocol (Protocolo Verde in Portuguese) and six regulations later introduced.

The introduction of the social and environmental framework into the banking system started in 1995 with the Green Protocol to stand up to environmental and social challenges that jeopardized water resources, preservation of biodiversity, sustainable management of forest, human labor rights, diversity and local culture (Ministerio do Meio Ambiente, 1995).

The initiative resulted from the action of five banks, Banco Nacional de Desenvolvimento Economico e Social (BNDES), Caixa Econoˆmica Federal (Caixa), Banco Do Brasil, Banco Da Amazoˆnia, and Banco do Nordeste do Brasil in partnership with Brazil's Ministry of Environment (Ministerio do Meio Ambiente in Portuguese). Later, four resolutions were introduced by the Brazilian National Monetary Council (Conselho Monet'ario Nacional in Portuguese) to address environmental, social, and governance issues in the sector: Resolution N° 3,545 (2008) regarding the protection of the Amazon biome; Resolution N° 3,813 (2009) for Sugarcane investment, regulation N° 3,876 (2010) for Slave labor, and Resolution N° 3,547 (2011) to ensure governance and risk management by an internal capital adequacy assessment process (International Finance Corporation, 2018).

Two more resolutions created regarding environmental and social responsibility for financial institutions. In 2014, the Central Bank of Brazil introduced the Resolution N.4,327 detailing the principles to create good practices that mitigate environmental and social risks (2014). Additionally, Resolution N.4,557 follows up the last one in 2017, requiring financial institutions to create structures for capital and risk management, including socio-environmental risks.

1.4.2 Colombia

The financial regulations to promote sustainability in the Colombian financial sector started with the Green Protocol (Protocolo Verde in Spanish) on June 7 th, 2012, signed by the Ministry of Environment and Sustainable Development and ASOBANCARIA (Banking Association). The protocol started thanks to the voluntary initiative of said institutions. It consists of voluntary guidelines to cope with ESG issues that financial institutions can practice as tools to implement projects and further risk management analysis and ecoeffi-

ciency, including loan and investment programs. Later, the protocol was followed in 2017 by General Guidelines for the Implementation of Environmental and Social Risk Analysis, a complimentary that guided banks towards the correct implementation of the Green Protocol.

Initially, 12 banks signed the document voluntarily, and so far, 22 banks have signed the protocol, and 11 have implemented the environmental and social risk management system (International Finance Corporation, 2018)

1.4.3 Ecuador

The financial market in Ecuador joined the sustainable initiative thanks to the nation's Banking Association (ASOBANCARIA) in 2016 with the implementation of the Sustainable Banking Protocol (Protocolo de Banca Sustentable in Spanish). This protocol provides the signing parties with voluntary strategies to promote investment that encourage sustainable practices and sustainable internal controls within signing financial institutions and create investment and credit risk assessment methods that include environmental and social risks (ASOBANCARIA, 2016). Being a signing member of the protocol is voluntary, and ten commercial banks initially signed it, with now 13 signing financial institutions.

1.4.4 Mexico

Mexico's sustainable regulations in the banking system consist of two key policy documents: The Bank's Sustainability Protocol (Protocolo de Sustentabilidad de la Banca in Spanish) and the Green Bond Principles MX. First, the Bank's Sustainability Protocol, launched by the Banking Mexico Association (ABM) in 2016. The protocol, signed by 18

commercial banks and five development institutions, declares the global challenges that climate change represents and the Mexican commitment to face them. This document incorporates five strategic principles to reach its objectives: internal sustainability policies institutionalization, environmental and social risks management in the investment and credit processes; sustainable investment; efficient use of resources in internal processes; and monitoring and dissemination of the guild's sustainability practices and policies. Second, the Green Bond Principles MX was published in 2018 by the Climate Finance

Advisory Group (CCFC, in Spanish). The principles consist of a set of requirements for Mexican green bond issuers to provide them guidance during the green bond issuance process. These guidelines include the use of proceeds from the issuance, evaluation, and project selection process, emission proceeds management, annual reporting, and external evaluation and review (CCFC, 2018).

1.4.5 Panama

Panama's effort to create a sustainable finance market stated by joining the Sustainable Banking Network (SBN) in January 2018. Later, the publication of Panama's Sustainable Finance Protocol (Protocolo de Finanzas Sustentables de Panama' in Spanish) was published in July 2018 by the Sustainable Committee of the Panama Banking Association (ABP or Asociacion Bancaria de Panama in Spanish). The protocol intends to improve the financial sector in terms of competitivity, reputation, risk reduction, market diversification, and sustainable development. Additionally, the document highlights the importance of creating and disclosing all green finance products, including green bonds, credit cards, green lines of credit, and others. Initially, sixteen commercial banks signed the document. Other actions taken by the ABP include training and workshops regarding green

finance products. Furthermore, the efforts to sign and follow the protocol voluntary; thus, there is no supervision enforced nor financial or non-financial incentives for banks from the government to join the protocol.

1.4.6 Peru

The development of the environmental regulations in the Peruvian financial sector started with the initiative of the Superintendence of Banking and Insurance (SBS or Superintendencia de Bancos, Seguros y AFP in Spanish) in 2015 with the approval of the Resolution N. 1928-2015: Regulation for Social and Environmental Risk Management; and the Document SBS N. 01-2015: The role of enhanced due diligence in the regulation of socioenvironmental risk management for financial firms.

The first establishes the minimum requirements regarding social and environmental risk management. It highlights specific steps that financial institutions need to mitigate social and environmental risks from loans and credits provided, as well as the procedures and formats for quarterly reports of the institution. The second document published complements and describes the regulation mentioned above. It objectively clarifies the role of each institution, group of people, and entity to provide better guidance for the compliance of the regulation. Besides, it summarizes relevant international sustainable finance norms to banks within the country, including the UN's Guiding Principles on Business and Human Rights, ISO26000, the OECD Guidelines for Multinational Enterprises, IFC Performance Standards, Equator Principles, and UN Principles for Responsible Investment.

Following this regulation, the SBS published in 2018 a Green Bonds Guidelines for Peru (Gu'ıa de Bonos Verdes para el Peru' in Spanish), a guide created to develop the green bonds market in Peru. Additionally, this guideline provides a step by step process

recommended by the SBS on how to create and emit a green bond. It details the complete process, including the creation, evaluation process, bond emission, and disclosure.

1.5 Problem Statement

The effect of sustainable finance regulations on financial stability has both practical and theoretical implications. The application of sustainable finance regulations has a potential to influence significantly in economies, providing the conditions for it to develop from economic and sustainability perspectives.

Financial stability is a necessary condition that economies should maintain to pursue sustainable and economic development (Schinasi, 2004). With a stable financial sector, an economy is prepared to absorb adverse economic shocks, reducing the damage in the economy and society (Jiang et al., 2019). Maintaining financial stability and reducing systemic risk is critical for a country to develop sustainability.

In the literature on financial stability, several studies have shown the importance of a stable financial sector (Kasman and Carvallo, 2014; Barth et al., 2013), the role of financial institutions (Tabak et al., 2013; Shehzad and De Haan, 2015), regulations (Agoraki et al., 2011; Barth et al., 2013; Allen and Gu, 2018; Bermpei et al., 2018), and central banks and policymakers (Acharya, 2009). However, researchers tend to overlook the effects of climate and social risks over financial stability.

Meanwhile, sustainable finance introduces sustainable practices into the financial sector, providing a range of economic benefits to both financial institutions and the economy in general. Some of these benefits include risk reduction (Weber, 2017), higher performance (Dam and Scholtens, 2015), and economic development. Consequently, some governments

include regulations in their financial system that enforce sustainable behaviour from firms in the financial sector (Zadek and Robins, 2016), which has led towards benefits in terms of social, economic, and environmental impacts (Weber, 2017). Between 2008 and 2018, six countries in Latin America, Brazil, Colombia, Ecuador, Mexico, Panama, and Peru, included sustainable regulations in their financial systems. These policies have helped banks to adopt sustainable practices in their organizational culture and business practices (Oyegunle and Weber, 2015; Weber and Oni, 2015).

Furthermore, as sustainable finance has grown in the financial sector, more opportunities for research have shown significant impacts on the introduction of green finance on banks' financial performance (Dam and Scholtens, 2015; Monasterolo and Raberto, 2018). Countries like Brazil, Mexico, and Colombia, have been applying strict environmental policies from 2008, 2012, and 2016, respectively. This shift in the regulatory background of the region in the financial sector provides a significant sample to study and compare the stability with other countries. However, research that covers financial practice in the Latin American region is scarce.

The literature overlooks the connection between sustainability and financial stability, or when attempts to connect sustainability with financial stability, lacks sustainability perspective, only relying on traditional monetary and macroprudential policies (Jiang et al., 2019). To gain a fuller understanding of the effects of sustainable regulations in the banking sector on financial stability, quantitative research that provides significant empirical evidence is required. Focusing on sustainable banking and finance stability can help develop robust theories of financial stability and how it is affected by the banks' level of sustainability, as well as potentially informing future policy objectives.

This thesis aims to better understand the macroprudential implications of sustainable finance regulations. The sustainable regulations in the financial industry will be analyzed,

and data from 149 banks will be gathered and analyzed. This thesis will use quantitative methods to contrast the stability of banks in countries with and without sustainable finance regulations between 2008 and 2018. This data will be analyzed using panel data statistical analysis such as logit regression, fixed effect panel data analysis, and dynamic panel data analysis.

1.6 Research Question and Objectives

This study aims to answer the following research question:

What is the influence of sustainable finance regulations on the financial stability of Latin America?

Therefore, the general objective of this thesis is to analyze the influence of sustainable finance regulations over the financial stability of Latin America from 2008 to 2017.

Additionally, to reach this objective, it has been broken down into three more specific objectives, which are:

1. Investigate the existence sustainable regulations in the banking system on Latin American countries by reviewing the banking regulatory framework in the region.
2. Create a database of macroeconomic, sustainability, and financial indicators for the leading banks of the countries in the region.
3. Develop a quantitative model that includes institutional, macroeconomic, and sustainable data to understand whether sustainable banking regulations and practices have a significant impact on Latin American financial stability in the financial sector.

The rest of this master thesis is structured as follows: Chapter 2 consists of a review of the literature of sustainable finance, financial stability, financial regulations, and their linkage. The methodology and methods that will be applied to analyze the data will be explained in Chapter 3, followed by the results section in Chapter 4. Furthermore, Chapter 5 presents a discussion of those results. Finally, Chapter 6 provides the concluding remarks of the thesis, followed by the bibliography used in the study.

Chapter 2

Literature Review

The following sections describe the primary literature on financial stability, sustainable finance, the effects of sustainable finance over banking risk and financial stability, and both sustainable and traditional sustainable regulations as macroprudential policies.

This chapter's objective is to provide an argument for sustainable finance regulations as an evident and necessary macroprudential policy based on literature. The chapter explains the increasing challenges of sustainability-related financial risks and the potential for sustainable finance to diminish this systemic risk.

Additionally, the chapter introduces the main theories that explain systemic risk sources and the primary regulations used to avoid episodes of financial instability. Finally, this chapter presents the central hypothesis of the thesis and the literature gap evidenced in the literature review.

2.1 Sustainability and Financial Stability

Literature linking sustainability and financial stability approaches to the later as a consequence of the success or failure of adapting sustainable processes into current systems (Ryszanka, 2016; Battiston et al., 2017; Cui et al., 2018). Financial institutions and scholars agree that to develop sustainability, it is crucial to face specific challenges, such as climate change, water security, air pollution, and others, which can materialize into external shocks and sources of systemic risk (Ryszanka, 2016). Therefore, markets' timing and ability to respond to said shocks (Battiston et al., 2017) are crucial to preserving financial stability. Experts believe that financial stability will increase over time as sustainability develops within the financial markets, given the social, environmental, and economic benefits that sustainable development provides to the market (Cui et al., 2018).

Other studies have shown the detrimental implications that arise from high climate risk over the financial system (Skidmore, 2001; Klomp, 2014; Dietz et al., 2016; Scott et al., 2017) as well as the systemic risk that it carries (Rozenberg et al., 2013; Campiglio et al., 2018; Dietz et al., 2016). The size and scope of climate-related catastrophes, development level of the financial markets, and acerbity of financial regulations play a crucial factor when determining the impacts of a natural disaster on a country's financial system (Klomp, 2014). Climate change and the respective social response also creates a detrimental effect represented in transitional and physical risks to the financial industry, which has a direct negative impact on the bank's objectives (Scott et al., 2017).

These repercussions include a substantial threat to the liquidity (Klomp, 2014), reduction in asset value (Dietz et al., 2016), as well as an increased rate of non-performing loans, higher portfolio allocation, economic activity, and, consequentially, bank system and systemic stability. Households are potentially affected on account of the high exposure of

pension funds and pension schemes to climate risk (Monasterolo et al., 2017). Additionally, there is a positive correlation between household savings rates and damages caused by natural disasters (Skidmore, 2001). Overall, climate-related effects degrade financial stability, and the efficiency of economic policies is minimal as soon as the damages of climate change start to impact the economy (Dafermos et al., 2018). However, turning into a socially responsible investment could help funds to outperform during a market crisis period (Nofsinger and Varma, 2014).

The objective of shifting towards sustainable development interplays with the possibilities of a future financial crisis. Carbon externalities should be a component of the broader reflection on the sustainability of public and private debts and the related pressure on current consumption levels (Rozenberg et al., 2013). Thus, societies need to avoid excessive economic losses and keep their financial system stability (Campiglio et al., 2018) while shifting to a low-carbon economy or face the irreversible economic consequences of climate change and natural disasters (Dietz et al., 2016). Hence, policymakers should create incentives to reduce greenhouse gas emissions targeting the main susceptible sectors to climate risk (Monasterolo et al., 2017)

2.2 Sustainable Finance

The literature of sustainable finance has developed in different areas, including financial performance, sustainability performance, and banking risk. The term sustainable finance combines both financial services and the need to reach the needs of current societies without compromising future generations (Soppe, 2004), which differs from traditional finance theories.

Sustainable finance shows benefits for financial institutions regarding their performance.

Sustainable practices in financial institutions have shown a relationship with the organizations' financial performance (Dam and Scholtens, 2015). Studies have found theoretical foundations that CSR and corporate performance of institutions have a positive correlation (Dam and Scholtens, 2015). Simulations show that green public policies can promote green growth by influencing firms' expectations and the credit market. Green sovereign bonds represent a short-term win-win solution, while green fiscal measures have higher immediate distributive effects that induce negative feedback on the economy (Monasterolo and Raberto, 2018)

Furthermore, environmental risks have come to the attention of most financial institutions and central banks. Research suggests that modern finance is transitioning towards sustainability due to external shock, such as climate change, water insecurity, low carbon markets, and the creation of new financial products and incentives (Weber, 2005; Ryszanka, 2016). Furthermore, financial institutions' disclosure of sustainable measures and practices, specifically environmental impacts and sustainable development, is critical (Weber, 2012). However, it is as essential to provide transparency to said reports, and indicators such as loan applications being assessed by environmental credit risk indicators compared to all loan applications (Weber, 2012). Hence, the financial activities detrimental to both the environment and society create risks for the institution (Cui et al., 2018) can decrease through the adoption of positive environmental activities.

The presence of environmental and social aspects in credit risk management is prominent in the literature, especially the effects it has on its performance. Investors, therefore, increasingly demand that firms assess and disclose their management of environmental issues (Bauer and Hann, 2012). Financial service institutions have a duty regarding direct and indirect impacts reporting on the environment and sustainable development (Weber, 2012). Displaying detrimental behaviours to the environment, and society increases mate-

rial risks, and reducing such behaviour decreases said risk (Cui et al., 2018). Additionally, institutions engaged proactively with environmental issues and development possess a lower cost of debt charge, and there is evidence on a weak link to higher credit ratings (Bauer and Hann, 2012).

2.3 Banking Regulations and Financial Stability

Policymakers mainly use regulations in the financial sector to guarantee the financial stability of the industry through adjusted limiting financial capital provision and financial risk (Acharya, 2009). Studies recommend creating incentives in the banking sector, such as prudential regulations and supervision, to develop institutional bank stability (Anginer and Demirguc-Kunt, 2014). Prudential regulations and supervision over banks have shown higher quality loans and lower moral hazard (Shehzad and De Haan, 2015), as well as limiting the engagement of banks in non-interest income activities (Bermpei et al., 2018) and systemic risk (Acharya et al., 2017). However, other studies have shown concern towards financial institutions too big to fail; the 2007-2009 subprime crisis evidenced the risk that these companies represent. Their expectations of being partially restored by economic authorities in case of a crisis (Tabak et al., 2013) compromises the stability of the global financial system. Hence, regulatory reviews of potential stake-holders agency problems and internal governance are irrelevant, especially for more prominent financial institutions (Kasman and Carvallo, 2014) to minimize the chances of financial crisis given their larger size, complexity, and systemic importance.

The financial system's regulatory framework shows a change in the behaviour of financial institutions regarding risk management. Regulations that incorporate capital requirements and supervisory power reduce non-preforming loans and, as a consequence, credit

risk (Agoraki et al., 2011). Some financial institutions tend to be cautious of possible financial implications and financial uncertainties that come from financial regulations (Dam and Scholtens, 2015). These findings and the change of behaviours in the industry have increased the popularity of financial regulations (Barth et al., 2013).

Furthermore, regulatory effectiveness has a secure link with a country's institutional quality. Regulations in countries with weak democratic institutions are associated with higher corruption in the lending process with no similar beneficial effects on stability (Barth et al., 2013). Also, regulations alone have no control over financial crises; policymakers must consider other mechanisms, as well as preventive measures, should be considered at the institutional level (Allen and Gu, 2018). Hence, political stability is essential to increase the benefits of capital regulations and activities restrictions over the bank's stability and developing economies would benefit from capital regulation and special monitoring in terms of bank stability (Bermpei et al., 2018). However, researchers should consider environmental stability and sustainable practice when evaluating future financial crises.

2.4 Financial Stability and Sustainable Finance Regulations

The amount of existing literature that evaluates climate change's repercussion on financial stability is scarce since most of it bases on the effects on financial performance. (Weber et al., 2015; Dam and Scholtens, 2015; Weber, 2017; Cui et al., 2018) It is imperative to adopt the necessary measures to protect a nation's economic and financial stability regarding climate change adaptation since they will define the level of exposure of the financial markets (Battiston et al., 2017).

Regulatory standards also play an essential part in the application of sustainable practices inside the financial markets. Nowadays, financial markets are vigilant of the usually uncertain financial implications that result from environmental regulatory interventions as the demands for stricter environmental regulations increase (Bauer and Hann, 2012). Central Banks and governments implement these regulations in the hope that environmental policies increase financial stability and economic development, as well as enhancing financial and environmental performance (Weber, 2017). Policies such as green credit policies can increase an institution's corporate sustainability and create a more stable and profitable financial sector (Weber, 2017). For instance, several countries, like China, Brazil, and Bangladesh, have adopted environmental regulations in their financial sector to reduce the carbon footprint of the country banks' portfolios (Zadek and Robins, 2016). The ERM Guidelines in Bangladesh evidenced that sustainability criteria can predict credit losses of banks in developing countries (Weber et al., 2015). Additionally, the Green Credit Policy in China addresses both environment and financial performance, creating institutional pressure on the Chinese Financial system (Cui et al., 2018).

Banks in countries that enforce environmental legislation engage in more corporate social responsibility (CSR) activities, and self-regulation in the financial industry has a significantly positive effect on CSR (Chih et al., 2010).

The relevant politics of green finance can ease the financing bottleneck that the government faces to some degree combined with reform and innovative financial tools. The policies include two aspects: first, the reform and innovation of existing financial tools, an exploration of the type of fiscal policy and the feasible way to raise money for green finance development; second, the reform of existing fiscal revenue management and distribution policy, namely the efficiency and direction in the use of monetary funds (Wang and Zhi, 2016).

2.5 Identification of Gaps in the literature

The literature review of sustainable finance, its regulations, and financial stability evidence gaps and future research opportunities. Several studies have shown the effects of regulations on financial stability. These studies show that legislation and supervisory power enhance the capacity of a bank to provide financial stability. Similarly, the literature section dedicated to sustainable finance regulations evidences the benefits of ESG criteria and a potential increase in financial performance. Despite this, little progress has been made towards incorporating environmental and sustainable frameworks that analyze climate change macro-financial impacts (Campiglio et al., 2018). Stability, from a macroeconomic perspective, is crucial to make a financial push to the economy (Bittencourt, 2012). Unfortunately, there are little incentives from the private sector to move towards sustainable alternatives that could arise from stringent climate policies, given the constant delay of policy acts as a result of uncertainty and disagreement regarding climate change-related policies (Mercure et al., 2016). On the other hand, despite these recent findings of the role of environmental regulatory standards on financial performance, more research is needed to analyze the effect of sustainable finance policy on the financial sector sustainability (Weber, 2017). Finally, this literature review provides evidence of the little amount of financial and economic research in Latin America that evaluates the relationship between sustainable development and financial stability.

2.6 Theoretical Framework

Two theories stand out in the literature that attempts to explain systemic risk and the implications of economic policies on a country's financial stability.

The theory of systemic risk and design of prudential bank regulation describes systemic risk and the importance of a regulatory figure to create policies that avoid systemic risk. This theory, introduced by Acharya (2009), "incorporates the likelihood of default by banks on deposits, financial externalities from the failure of one bank on other banks, regulatory incentives, and the interaction of these features" (pp. 228). This theory includes a normative and a systemic feature. The positive component of the theory defines systemic risks and its equilibrium. Meanwhile, the normative component designs regulations to alleviate inefficient systemic risk (Acharya, 2009).

The theory, within its positive feature, models the concept of systemic risk-shifting, the choice of correlation across assets between different banks given the existence of limited liability and a negative externality of default by banks (Jensen and Meckling, 1976; Stiglitz and Weiss, 1981; Acharya, 2009; Acharya et al., 2017). In other words, banks decide to invest in the same assets to reduce the effects of negative externalities (Benoit et al., 2017). The firms' lack of liability nullifies the limits of correlation that banks would compromise as they prefer to survive with the crisis, as they benefit from this correlation thanks to bailouts (Farhi and Tirole, 2012). Furthermore, the theory explains specific regulations that should be avoided (Farhi and Tirole, 2012). It describes a regulatory framework that includes a bank closure policy and capital requirements to reduce the chances of a massive bank bailout scenario (Acharya, 2009), liquidity requirement or, equivalently, of a cap on short-term debt (Farhi and Tirole, 2012).

Another important source of systematic risk is the tail risk, which has increased as a source of risk capable of creating contagion and amplification effects since the introduction of new capital requirements of Basel III (Benoit et al., 2017). These capital requirements are creating incentives for banks to substitute reasonable risk with tail risk, which is not considered in the regulatory framework. The increase towards tail risk provides lower

losses for financial institutions in the short term, but the adverse effects are significant on a financial crisis scenario. Studies show that banks' inclination towards tail risk instead of regular risk diminishes the benefits of capital requirements during periods of economic instability (Perotti et al., 2011). Also, there is a significant influence from securitization activities on tail risk. These activities increase exposure to tail risks through contracts between intermediaries that would improve welfare. The significant amount of contracts that securitization facilitates makes the banking system fragile during economic crises (Gennaioli et al., 2013).

2.7 Hypothesis

Considering the research gap evidenced on topics and theories that link sustainable finance regulations and financial stability in the literature review, this study evaluates the following hypothesis:

- H_o: The existence of sustainable finance regulations has no significant effect on the financial stability of banks in Latin America.
- H_1: The existence of sustainable finance regulations has a significant effect on the financial stability of banks in Latin America

Chapter 3

Methods

The following section explains the methods used in this study, including data manipulation and quantitative analysis. Regarding manipulation, first, it describes the proposed type of investigation and research approach. Furthermore, it explains the data gathering process, data source, and data cleaning, as well as the use of the $Zscore$ as a measure of financial stability and the control variables used in the model.

The quantitative methods section consists of several statistical tests and analyses that evaluate the relationship between financial stability and sustainable finance regulations. Initially, the Welch t-test examines the mean difference of the $Zscore$ of banks in countries with different policies. Furthermore, this section introduces the following panel data regression models: a binary logistic model, a random-effects model, and a dynamic panel data analysis using a two-steps generalized method of moments. This methodology aims to find the effect of sustainable finance regulations on financial stability.

3.1 Proposed Type of Investigation and Research Approach

This thesis consists of a quantitative correlational analysis using archival data. The study uses a quantitative approach to create generalizable knowledge about the effects of sustainable finance regulations in the bank's financial stability. This research adopts a causal-comparative since: it compares two groups of banks, categorizing them by considering if they function in countries with or without sustainable finance regulations. Moreover, the study uses secondary archival data from different organizational and national sources and databases.

This research aims to understand whether sustainable regulations in the financial sector have a positive impact on a country's and bank's financial stability has, taking into consideration several determinants of bank stability. This study assesses 149 banks in 18 different countries located in the Latin American region using a quantitative approach. This research will assess and identify banks' financial stability and the Latin American region using a quantitative approach.

3.2 Data

The following subsection describes the data used in this research, as well as the primary sources. The sample data for this study consists of an unbalanced panel data of 149 banks from a broad international data set from 18 countries: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Honduras, Mexico, Panama, Paraguay, Peru, Puerto Rico, Uruguay, and Venezuela. The time frame of

this study is from 2008 to 2018. Therefore, this study uses 1240 cross-sectional segments (see Table 3.1).

The data collection of the bank-level variables consisted of a mixture of manual compilation from the bank's annuals and consolidated financial statements, mainly the Balance Sheet and Income Statements. The bank-level variables gathered were total assets, total liabilities, total loans, and total income after taxes. Additionally, the data analysis process includes financial and macroeconomic variables as control variables. These indicators are the Gross Domestic Product (GDP) and Inflation (using the GDP deflator). This obtained through the International Monetary Fund (IMF) database.

The data were cleaned, modified, and processed using Microsoft Excel. Additional calculations were needed to proceed to the final data analysis, such as the $Zscore$s, the return of assets (ROA), the equity-to-assets ratio, and the loan loss provision to total loan ratio. Finally, the software used to analyze the statistical models was Gretl, statistics and econometric software.

3.2.1 Measuring financial stability

The indicator that will be employed to measure the level of financial stability for every bank every year is the $Zscore$. This indicator is prevalent in empirical studies to determine the level of a bank's financial stability (Boyd and Runkle, 1993; Beck et al., 2007; Demirgüç-Kunt et al., 2008; Laeven and Levine, 2009; Čihák and Hesse, 2010; Bermpei et al., 2018). It represents the value that measures the solvency risk of a bank by relating its capital level to the variability in its returns, or "the number of standard deviations that a bank's return on assets has to fall for the bank to become insolvent (Anginer and Demirguc-Kunt, 2014, pp.628). Hence, the $Zscore$ is defined as:

Table 3.1: Data Coverage

Row Labels	Count of Bank	Number of Observations
Argentina	12	102
Bolivia	10	68
Brazil	10	100
Chile	10	101
Colombia	10	85
Costa Rica	10	102
Dominican Republic	10	59
Ecuador	4	32
Guatemala	9	37
Honduras	10	61
Mexico	9	99
Panama	10	102
Paraguay	10	82
Peru	10	109
Puerto Rico	2	19
Uruguay	7	34
Venezuela	6	48
Grand Total	149	1240

$$Z_i = \frac{ROA + EA}{\sigma ROA} \tag{3.1}$$

Where, Z_{it} stands for the $Zscore$ of the bank i in the year t, ROA_{it} stands for the return of assets of the bank i in the year t, EA stands for equity-to-assets ratio of the bank i in the year t, and $\sigma(ROA)_{it}$ stands for the standard deviation of return of assets of the bank i in the year t. The ROA_{it} is calculated by dividing the net income of a bank i by its total assets after taxes. Furthermore, EA_{it} consists of the ratio obtained when dividing a bank's total shareholder equity by its total assets. Finally, to calculate $\sigma(ROA)_{it}$ while avoiding disturbances or bias given by the time-frame used, this study will use three-year rolling time windows following the methodology from previous research (Bermpei et al., 2018). The natural logarithm of the $Zscore$d will be used in order to reduce variances in the indicator's value.

3.2.2 Sustainable Finance Regulations as a Dichotomic Variable

This study will use a categorical dichotomic (dummy) variable to compare banks that are countries with and without sustainable finance regulations. The sustainable regulations dichotomic variable shows the existence of regulatory legislation that promotes sustainable financial activities. The values for these variables are either 1 or 0, depending on the existence or nonexistence of regulations, respectively. Data regarding the existence of sustainability-related regulations over the banking sector in each country will be gathered manually through a review of each country's banking regulations.

3.2.3 Control Variables

Several control variables are used further in the research to smooth exogenous effects that could affect the dependent variable. All the control variables are continuous variables that represent ratios of either financial or macroeconomic data. Hence, macroeconomic and bank level factors affect bank stability; therefore, bank and country specific control variables are used in this study.

The bank level control variables used in this research will be the equity to asset ratio, total asset growth, capital to asset ratio, Return on Assets (ROA), loan loss provision to loan loss ratio. The equity to asset ratio is measured by the ratio of the total equity to total assets, and it represents the bank's capitalization, which is expected to have a neutralizing effect on the bank risk-capital regulation nexus (Acharya et al., 2017; Delis et al., 2012). The total asset growth to control bank growth and its relation to higher risk (Demirgüç-Kunt and Huizinga, 2010; Bermpei et al., 2018), measured by the subtraction of a bank's total assets and the value for that variable the previous year. Loan loss provision to total loss ratio will be used as a proxy of the bank's loans, calculated by the ratio of the bank's loan-loss provision to the total loans. All the values from the bank level control variables were calculated after the data collection from each bank's financial statements.

The macroeconomic control variables are the growth of the gross domestic product (GDP growth) and the inflation rate. GDP growth will cover the effect of economic conditions, calculated by the subtraction of the gross domestic product of a country in a specific year with the value of that variable the previous year and finally divided by the GDP of the previous year. The inflation rate embodies a proxy for monetary conditions, using the GDP deflator. The values for these indicators were collected from the database of the International Monetary Fund (IMF).

3.3 Empirical Methods

The following subsection will explain the empirical methods applied in this thesis. In total, four empirical tests were applied during the development of this thesis to provide a robust analysis. First, a Welch T-test was used in order to check the mean difference of the $Zscore$ between countries with and without sustainable finance regulations. This analysis is followed by three different panel data econometric models that included data from the 17 countries from 2008 to 2018. The first one is a logit binary model; the second one will be a random effects model, and the third a dynamic panel data model using a two-step dynamic generalized method of moments method.

3.3.1 Welch T-test for the $Zscore$

This study will use a Welch T-test to evaluate the mean difference level of financial stability using the $Zscore$ between banks in countries with and without sustainable policies in the banking industry. Understanding the difference between the means of financial stability in countries with and without sustainable finance regulations can explain the effects these types of policies can project on the banks' risk management and stability in this region.

Usually, mean difference studies apply a simple T-test of two independent means. This way, the means of each financial stability indicator ($Zscore$) during the period studied for each country can be compared. However, the amount of countries and banks that rely on sustainable finance regulations (7 countries and about 70 banks) is significantly lower than those with conventional finance regulations (14 countries and 140 banks). Consequently, a Welch T-test would be a more reliable method to estimate the means of each when the observations and variances differ significantly.

The Welch's t-test defines the t-statistic by the following formula:

$$t = \frac{Z}{S} = \frac{X_1 - X_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_1^2}{n_2}}} \tag{3.2}$$

Where:

X_i: Sample mean for $i = 1, 2$

s_i^2: Sample variance for $i = 1, 2$

n_i: Sample size for $i = 1, 2$

The first sample of the mean will include the sample countries that possess sustainable financial regulations. Consequently, the second sample includes the rest of the countries that remain with current banking regulations. Similarly, the variance and sample size correspond to countries with sustainable finance regulations and current regulations.

3.3.2 Binary Logistic (Logit) Regression Model

This study will apply a logistic or logit regression model in order to explain the effects of the existence of sustainable finance regulations on banks' financial stability. A logit panel regression provides an efficient evaluation of a categorical variable's effects over a nominal variable. This happens because this statistical analysis transforms the dependent variable:

$$odds_i = \frac{P_i}{1 - P_i} \tag{3.3}$$

Where:

$odds_i$: ratio of probability of success

P_i: Probability of i

Then, the logarithm of the odds is calculated as:

$$L_i = \ln\left(\frac{P_i}{1 - P_i}\right) \tag{3.4}$$

Where,

L_i: Logarithm of the ratio of probability of success.

Now, by using a linear regression, the previous equation can be expressed as:

$$L_i = \beta_1 + \beta_2 X_{i,t} + u_{i,t} \tag{3.5}$$

Finally, the model that will be used for this thesis will be:

$$SFR_{i,t} = \beta_1 + \beta_2 \ln z_{i,t} + u_{i,t} \tag{3.6}$$

Where:

$SFR_{i,t}$: dichotomic variable for banks located in countries with or without sustainable finance regulation, tanking the values of 0 and 1, respectively,

β_i: coefficient of the variables for $i = 1, 2$

$ln(z)_{i,t}$: natural logarithm of the $Zscore$, and

$u_{i,t}$: error component.

For this model, the dependent variable is the dummy variable $SFR_{i,t}$ and the independent variable is $ln(z)_{i,t}$.

3.3.3 Random Effects

This study will apply a random effect analysis to study the effects of sustainable finance regulations on Latin American countries' financial stability. The random-effects model is a panel data analysis method that handles the constant for each section as a random parameter. The variability of the constants can be defined as:

$$a_i = a + v_i \tag{3.7}$$

where v_i is a zero mean standard random variable. This quality can be defined as the assumption that each cross section differs in its intercept term.

Thus, the random effects model takes the form:

$$Y_{it} = (a + v_i) + \beta_1 X_{1it} + \beta_2 X_{2it} + ... + \beta_k X_{kit} + u_{it} \tag{3.8}$$

or

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + ... + \beta_k X_{kit} + (v_i + u_{it}) \tag{3.9}$$

This study will use a random-effects model given that the sample is unbalanced, or in other words, the number of time series (years) differs from the number of cross-section data (banks).

Now, with equation 3.9, the model used in this thesis can be defined as:

$$\ln Z_{itj} = \alpha + \beta_1 X_{jt} + \beta_2 B_{it} + \beta_3 SFR_{jt} + (v_i + u_{it}) \tag{3.10}$$

where:

$i, t, and j$: bank, time, and country, respectively.

$ln(Z)_{i,t}$: natural logarithm of the bank's financial stability measure,

$\alpha_{i,t}$: constant value,

$X_{j,t}$: macroeconomic control vector,

$B_{i,t}$: bank specific control variables vector, and

$SFR_{i,t}$: dummy variable of the bank i that published sustainability reports in the year t.

The dependent variable of the regression is $ln(Z)_{i,t}$, $SFR_{i,t}$ is the independent variable, and $X_{j,t}$ and $B_{i,t}$ are the control variables. Additionally, several statistical tests will be applied to the resulting model of the random effects panel, including the Joint test, the Breusch-Pagan test, and the Hausman test and the Durbin-Watson test. This test will support using random effects over a pooled ordinary least squares model (OLS) or a fixed-effect model.

Joint Hypothesis test

The Joint Hypothesis test is a statistical test used in panel data models to understand whether to use a pooled OLS or a fixed-effect model. The null hypothesis of the test states that the pooled OLS model is adequate. The test's output provides a $F - statistic$ and a corresponding p-value. The null hypothesis is rejected when the test provides a p-value lower than 0.05.

Breusch-Pagan LM test

The Breusch-Pagan LM test (Greene and McKenzie, 2012) is a test used in panel data models to decide whether to use a pooled OLS or a random-effects method. This

test evaluates the pooled OLS residuals to understand which method is adequate for the model. The null hypothesis of the test states that the pooled OLS method is adequate for the model. The output of the test provides an LM statistic with its corresponding p-value. If the p-value is less than 0.05, the null hypothesis is rejected, supporting the random effect model.

Hausman test

TThe Hausman test (Hausman, 1978) is a statistical test that is used to measure the consistency of both the ordinary least squares (OLS) and the generalized least squares (GLS). The test is used to assist in deciding between fixed effects and random effects. The null hypothesis of the test states that the random effects are consistent and efficient for the model. The test provides an H-statistic, which provides a p-value, the information needed to decide on rejecting the null hypothesis (if lower than 0.05). In that case, the test implies that the fixed effects model is more appropriate since it is consistent.

3.3.4 Dynamic Panel Data Analysis

This thesis uses a dynamic panel data analysis to study the influence of sustainable banking regulations on the systemic financial stability of the countries in the region. The main difference between a regular panel data analysis and a dynamic panel analysis is the inclusion of a lagged dependent variable as an independent variable. One of the most reliable methods to estimate parameters for a dynamic panel analysis is the Generalized Method of Moments (GMM). A GMM method consists of a parametric method for estimating parameters in statistical panel data.

The model proposed to estimate this relationship will be the following:

$$ln(Z)_{i,t} = \alpha_{i,t} + \beta_1 ln(Z)_{i,t-1} + \beta_2 g_{i,t} + \beta_3 X_{i,t} + \beta_4 B_{i,t} + \beta_5 SFR_{i,t} + E_{i,t} \tag{3.11}$$

where:

i, t, and j: bank, time and country, respectively,

$ln(Z)_{i,t}$: natural logarithm of the bank's financial stability measure,

$\alpha_{i,t}$: constant value,

$ln(Z)_{i,t-1}$: natural logarithm of the bank's financial stability measure,

$X_{i,t}$: macroeconomic control vector,

$B_{i,t}$ stands for the vector of bank specific control variables,

$SFR_{i,t}$: dummy variable for banks functioning in a country with or without sustainable finance regulations.

A lagged dependent variable will also be included as an independent variable given the possible persistence of a bank's stability (Agoraki et al., 2011; Bermpei et al., 2018). Furthermore, the control vectors will smooth the macroeconomic and financial components. Therefore, the control variables will address the differences shown in different countries regarding their economic development and stability that affect the performance, and consequently, the ROA. This way, the influence and effects of regulations on financial stability will be more precise and reliable. Lastly, to identify the validity of the model, several tests will be applied including the Wald tests for the joint significance of the regressors, the second-order autocorrelation (AR(2)) of the residuals test, and the Sargan test for overidentification.

Wald test

The Wald test is a statistical test used to determine the explanatory variables' significance or validity in a model. The Wald statistic evaluates the null hypothesis that the parameters are not valuable for the model. To reject the null hypothesis implies that removing or changing variables would affect the model significantly.

AR(2) test

The second-order autocorrelation of the error terms test, or AR(2), tests for the null hypothesis that there is no second-order serial correlation. Failing to reject the null hypothesis of this test would mean that the test model conditions are correctly specified, and there is no serial autocorrelation.

Sargan test

Sargan test for overidentification evaluates the validity of the instruments of the model. The test analyzes the null hypothesis that states that the instruments are valid. The evaluation consists of an s statistics asymptotically distributed as chi-square with degrees of freedom, which are equal to the number of overidentifying restrictions. If the value of the p-value falls under 0.05, the test rejects the null hypothesis, which would mean that the model's instruments are not valid.

3.3.5 Limitations and Boundaries

The availability of some financial, macroeconomic, and sustainable data is limited, given that individual banks in some countries in the Latin American region keep a low-level

official accounting data available. Some banks keep some of their documents confidential, or the ones provided have different formats, which means that analyzing each document to create a database of the bank's financial and sustainable indicators could take extra effort. Additionally, to obtain the data, it was necessary to review some countries' accounting guidelines to understand financial statements. Formatting of the documents was not the best quality, so most of the data had to be typed, opening space for errors in the data set.

Chapter 4

Results

The following section presents and examines the experimental results of the statistical methods outlined in Chapter 3. The first subsection describes the main descriptive statistics of the variables used in the study. Second, this chapter shows the result for the different panel data models proposed: the logit binary model, the fixed effects model, and the dynamic model using a GMM method. Thus, the effects of the green finance regulations on the bank's financial stability are explained, and various implications for design are discussed.

4.1 Data and descriptive Statistics

The descriptive statistics for all the indicators used during this research can be found in Table 4.1. The data analyzed consists of 1639 observations with one dependent variable, two independent variables, and seven instrumental variables on a 11 years' time period.

Table 4.1: Descriptive Statistics

Variable	Mean	Median	Minimum	Maximum	Std. dev
ln(z)	3.7342	3.7325	-1.1289	10.7520	1.1956
g	0.0156	0.0101	-0.4397	0.8264	0.0525
E/A	0.0918	0.0960	-8.9428	0.9993	0.3403
ROA	0.0151	0.0131	-0.0301	0.1224	0.0115
LLP/TL	0.0417	0.0275	-0.1199	1.5034	0.0905
dGDP	0.0593	0.0573	-0.3095	0.3195	0.0958
Inflation	6.6830	4.6760	-4.6206	41.119	7.4243

Table 4.2: Correlation Coefficients

ln(z)	g	E/A	ROA	LLP/TL	dGDP	Inflation	
1.0000	−0.0786	0.1422	−0.0166	−0.0611	−0.0690	−0.1558	ln(z)
	1.0000	0.0770	−0.0172	−0.0201	0.2446	−0.0505	g
		1.0000	0.2653	−0.0528	−0.0107	0.0347	E/A
			1.0000	0.0769	0.0335	0.3142	ROA
				1.0000	−0.0139	0.0837	LLP/TL
					1.0000	0.0295	dGDP
						1.0000	Inflation

First of all, the dependent variable $ln(Z)_{i,t}$ has a mean of 0.0156 and standard deviation of 0.0525, reaching its lowest value was -0.4397 and its highest at 0.8264. However, the natural logarithm of the Z-score has 399 missing values, the highest number of missing values for any variable in the dataset.

Secondly, the independent dummy variable, SFR, has 1,639 observations. For this sample, 1,291 are 0s or, in other words, come from countries that do not enforce sustainable finance regulations (78.77% of the total sample). Regarding the 1s, or the data points from countries that enforce these types of policies, there are 348 observations (21.77% of the total sample). There are no missing values for this variable. Lastly, the independent variable $g_(i,t)$ has a mean of 3.7342 and standard deviation of 1.1956, reaching its lowest value was -1.1289 and its highest at 10.7520. However, the natural logarithm of the Z-score has 399 missing values, the highest number of missing values for any variable in the data set.

4.1.1 Sustainable Finance Regulation Categorical Variable

In the table below, the dichotomic variable that state the existence or lack of sustainable finance regulations in the countries chosen for the study. This table follows the existent regulations described in Chapter 1. Therefore, the countries that apply sustainable regulations in their financial sector will have a number "1" and the rest will have a number "0".

Table 4.3: Sustainable Finance Policies in Latin America

Country	**Key Policies**	**Policy Aim**	**Date Established**
Brazil	Protocolo Verde	Sustainable Finance Practices	1995
	Regulation N° 3,545	Protextion of the Amazon Biome	2008
	Regulation N° 3,813	Sugarcane investment	2009
	Regulation N° 3,876	Slave labor	2010
	Regulation N° 3,547	Good practices that mitigate environmental and social risks	2011
	Regulation N° 4,327	Social and Environmental Responsibility for financial institutions	2014
	Regulation N° 4,557	Social and Environmental Responsibility for financial institutions	2017
Colombia	Protocolo Verde	Green Finance	2012
Ecuador	Protocolo de Banca Sustentable	Green Finance	2016
Mexico	Protocolo de Sustentabilidad de la Banca	Sustainable Banking Requirements	2016
	Green Bonds Principles	Green Finance	2018

Table 4.3 Continued

Country	Key Policies	Policy Aim	Date Established
Panama	Protocolo de Finanzas Sustentables de Panama	Green Finance	2018
Peru	Resolution N° 1928-2015	Regulation for Social and Environmental Risk Management	2015
	Document SBS N° 01-2015	The role of enhanced due diligence in the regulation of socioenvironmental risk management for financial firms	2015
	Guía de Bonos Verdes para el Perú	Green Bonds Guidelines	2018

Table 4.4: Sustainable Finance Regulations Dummy Variable

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Argentina	0	0	0	0	0	0	0	0	0	0	0
Bolivia	0	0	0	0	0	0	0	0	0	0	0
Brazil	1	1	1	1	1	1	1	1	1	1	1
Chile	0	0	0	0	0	0	0	0	0	0	0
Colombia	0	0	0	0	1	1	1	1	1	1	1

1 represent the existence of sustainable banking regulations.

0 represent the inexistence of sustainable banking regulations.

Table 4.4 Continued

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Costa Rica	0	0	0	0	0	0	0	0	0	0	0
Dom. Rep.	0	0	0	0	0	0	0	0	0	0	0
Ecuador	0	0	0	0	0	0	0	0	1	1	1
El Salvador	0	0	0	0	0	0	0	0	0	0	0
Guatemala	0	0	0	0	0	0	0	0	0	0	0
Honduras	0	0	0	0	0	0	0	0	0	0	0
Mexico	0	0	0	0	0	0	0	0	1	1	1
Nicaragua	0	0	0	0	0	0	0	0	0	0	0
Panama	0	0	0	0	0	0	0	0	0	1	1
Paraguay	0	0	0	0	1	1	1	1	1	1	1
Peru	0	0	0	0	0	0	1	1	1	1	1
Puerto Rico	0	0	0	0	0	0	0	0	0	0	0
Uruguay	0	0	0	0	0	0	0	0	0	0	0
Venezuela	0	0	0	0	0	0	0	0	0	0	0

1 represent the existence of sustainable banking regulations.

0 represent the inexistence of sustainable banking regulations.

4.2 Welch t-test for the Z-score

The Welch t-test for two means difference compares the means of the values of the natural logarithms of the Z-score of the countries with and without environmental finance regulations. This test's null hypothesis states that the true difference between the means

of the two samples is 0. The first sample includes countries with sustainable finance regulations, with 341 observations, a mean of 3.8563, and a standard deviation of 1.1178. Furthermore, the second sample consists of data from countries without environmental finance regulations, including 847 observations with a mean of 3.6419, and a standard deviation of 1.0354.

The results of the statistical analysis (see table 4.6) display a t-statistic of 3.1548 and a p-value of 0.0016 after using 1,188 data points. These values indicate that the t-statistic is statistically significant. Thus, there is significant evidence to reject the null hypothesis that states that the difference between the mean of the group of banks in countries with sustainable regulations and the banks in countries without them is equal to 0.

Table 4.5: Two Sample t-test Mean Difference Results Comparing Banks in Countries with and without Sustainable Banking Regulations

SFR Dummy	n	Mean	SD	t-cal	df	p-value	decision
1	338	89.69	145.16	2.75	473	0.0061	Reject
0	847	65.94	101.27				

4.3 Panel Data Analysis

The following section will include the results of a panel data analysis (additional to the two sample means difference T-test) using the models described in Chapter 3. The following subsections will elaborate on the model construction process, with a detailed analysis of its findings. First, the process for model identification and construction is explained. Then, the two-step generalized method of moments panel data analysis result is presented.

4.3.1 Model Identification and Construction

After the data gathering, calculating, and cleaning process, all the data points were imported to the software Gretl. The identification and construction process consisted of using several statistical tests between different statistical models to recognize the best fit. The statistical panel data models tested were the binary logit regression, pooled OLS model, random effects model, fixed-effects model, and two-step dynamic model. The statistical tests include the White test, AR(2) Test, Hausman Test, and the Sargan over-identification test.

Moreover, another technique applied consisted of changing the number of time periods in the dataset. During this process, 8 different models were created for each of the statistical models mentioned above. Finally, the models that best explained the effects of this study were Random Effect and a Two-Step Dynamic Panel Data Analysis, as recommended in the literature (Bermpei et al., 2018; Jiang et al., 2019).

4.3.2 Logit Analysis

The results for the logit panel regression analysis can be found on Table 4. The dependent variable for the model was the dichotomic variable SFR and the independent variable lnZ. The value of the coefficient of the independent variable was 0.2076 and a standard error of 0.0641. The p-value of the model for the independent variable is 0.0012, which is statistically significant. Finally, the log-likelihood of the model is 11.3803 with a p-value of 0.0007. Therefore, it is possible to reject the null hypothesis that states that the sustainable finance regulations are not associated with the value of the Z-score.

Table 4.6: Logit Regression

Variable	Coefficient	Std. Error	Z	p-value
const	-1.6948	0.2536	-6.681	< 0.0001
lnZ	0.2076	0.0641	3.235	0.0012
Log-likelihood	11.3803			0.0007

4.3.3 Random Effects Panel Data Analysis

The results shown in Table 4.7 show the random effects panel data analysis that explains the relationship between sustainable finance regulations and the logarithm of the Z-score. The number of observations used in this analysis was 1,181 observations, within 143 cross sectional units and 11 time series, from 2008 to 2018.

The dependent variable for this model was the logarithm of the $Zscore$ independent variable in this model is the dummy variable for Sustainable Finance Regulations. This variable showed a positive relationship with the dependent variable from models 1 to 7 and showing the coefficients 0.3037, 0.2913, 0.2770, 0.2704, 0.2772, 0.2217, and 0.1786, respectively. The p-values had a value under 0.05 of the coefficients presented statistical significance, except for the model 8. The rest of the variables are used as control variables, but the signs that are shown in table 4.7 are coherent.

Joint test

The p-values for the F-statistic were under 0.05 for all in all the models (see Table 4.7). Therefore the null hypothesis that the pooled OLS model is adequate is rejected, meaning that the fixed effects method is more adequate for the model.

Table 4.7: Fixed Effects Panel data Analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	lnZ	**lnZ**	**lnZ**	**lnZ**	**lnZ**	**lnZ**	**lnZ**
SFR	0.3037**	0.2913**	0.2770**	0.2704**	0.2772**	0.2217*	0.1786
	(0.1218)	(0.1181)	(0.1187)	(0.1182)	(0.1207)	(0.1261)	(0.1212)
g		-2.5120**	-1.894**	-1.922**	-1.644*	-1.381	-1.451
		(0.965)	(0.9655)	(0.9583)	(0.915)	(1.073)	(1.058)
ROA			2.554**	2.594**	2.637**	2.877**	2.771**
			(0.4791)	(0.4707)	(0.4725)	(0.4216)	(0.4480)
A/E				-4.459	-2.728	-2.315	0.6063
				(4.009)	(4.301)	(4.606)	(4.538)
LLP/TL					-0.3417	-0.3841	-0.4631
					(0.4141)	(0.3951)	(0.3856)
dGDP						-0.5668	-0.6076
						(0.4737)	(0.4605)
Inflation							-0.02263**
							(0.0089)
Constant	3.627**	3.661**	3.385**	3.449**	3.434**	3.472**	3.598**
	(0.1029)	(0.0954)	(0.1073)	(0.1274)	(0.1307)	(0.1421)	(0.1601)

Standard errors are reported in parentheses.

, **, * indicates significance at the 90%, 95%, and 99% level, respectively.*

Table 4.7 Continued

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	lnZ	**lnZ**	**lnZ**	**lnZ**	**lnZ**	**lnZ**	**lnZ**
n	1,181	1,181	1,181	1,181	1,096	1,058	1,058
lnL	-1737	-1730	-1719	-1716	-1608	-1544	-1530
Joint test	0.0026	0.0009	0.0001	0.0000	0.0000	0.0000	0.0000
Breusch-Pagan Test	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hausman Test	0.2445	0.4779	0.6360	0.2940	0.1590	0.1180	0.0819

Standard errors are reported in parentheses.

, **, * indicates significance at the 90%, 95%, and 99% level, respectively.*

Breusch-Pagan test

The Breusch-Pagan test showed p-values under 0.05 for the LM statistic of all the models tested (see Table 4.7). These values provide enough evidence to reject the null hypothesis of the test. Therefore, the random effects method is more adequate than the pooled OLS method.

Hausman Test

The Hausman test diagnostic was applied to all the random effect models (see Table 4.7) to evaluate whether the methods applied were accurate to calculate the model's estimators. The values of the test were 0.2445, 0.4779, 0.6360, 0.2940, 0.1590, 0.1180, and 0.0819 for models 1 to 7, respectively. All the values were higher than 0.05, implying that there is not enough evidence to reject the null hypothesis. Therefore, the random effects are consistent within the models.

4.3.4 Dynamic Panel Data Analysis

The models shown in table 4.8 illustrate the results for the Two-Step GMM Dynamic Panel Data Analysis that explains the influence of sustainable finance regulations on a bank's financial stability. This data analysis model will include a lagged dependent variable as an independent variable to explain the financial stability continuity and gradual changes in banks and financial institutions (Bermpei et al., 2018; Jiang et al., 2019). The panel regression consisted of 1031 observations within 143 cross sectional units and 11 time series.

The dependent variable used in the model is $Zscore_{i,t}$, while the independent variables were $SFR_{i,t}$ and $g_{i,t}$. The rest of the variables, ROE, A/E, ROA, LLP/TL, and dGDP,

are used as control variables to understand its effect on the independent variables. Finally, the lagged value of the dependent variable was defined as $Zscore(-1)$ and consists of $theZ - score$ delayed by one year for every bank.

The dichotomic independent variable $SFR_{i,t}$ showed a positive relationship with the dependent variable from the models 8 to 15 with the coefficients 22.1588, 22.1253, 21.6187, 21.471, 21.0879, 20.5332, 16.7295, and 18.7669. All of the p-values of the coefficients are lower than 0.1, demonstrating statistical significance in the model.

Moreover, the growth of the total assets of each bank showed a negative relationship with the Z-score. The value of the parameters increased as more bank related instrumental variables where added and the variable lost statistical significance when the country based instrumental variables where included in the model. The values of the parameters for the sustainable regulations dummy variable were, from the model 8 to 14, -66.8118, -10.7936, -9.06660, -10.5172, -42.4789, -45.6591, and -52.0403, respectively.

Table 4.8: Dynamic Panel Model using 2-step Generalized Method of Moments

Variables	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	lnZ	**lnZ**	**lnZ**	**lnZ**	**lnZ**	**lnZ**	**lnZ**	**lnZ**
Zscore (-1)	0.2049***	0.2033***	0.1676***	0.1672**	0.1616***	0.1358**	0.1360**	0.1414**
	-0.0705	-0.0709	-0.0584	-0.0587	-0.0585	-0.0587	-0.0582	-0.0585
SFR	22.1588***	22.1253***	21.6187**	21.471**	21.0879**	20.5332**	16.7295*	18.7669**
	(8.3801)	(8.5144)	(8.74167)	(8.9)	(9.2283)	(9.9347)	(9.7304)	(9.2877)
g		-66.8118**	-10.7936	-9.06660	-10.5172	-42.4789	-45.6591	-52.0403*
		(30.7947)	(48.2179)	(48.3624)	(51.0713)	(29.0491)	(28.6044)	(28.7824)
ROA			301.235**	306.796	312.514	390.35	385.3380***	
			(153.479)	(154.94)	(153.148)	(146.839)	(147.718)	
A/E				-199.445**	61.6652**	33.9535***	295.155	383.937***
				(333.431)	(367.591)	(405.873)	(458.454)	(143.853)
LLP/TL					-2.17231	-1.86523	0.391	
					(35.7711)	(31.7769)	(32.7699)	
dGDP						-2.41697	-9.9197	
						(31.9131)	(32.8319)	
Inflation							-1.1613***	-1.0525***
							(0.3516)	(0.263)

Standard errors are reported in parentheses.

, **, * indicates significance at the 90%, 95%, and 99% level, respectively.*

Table 4.8 Continued

Variables	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	lnZ	**lnZ**	**lnZ**	**lnZ**	**lnZ**	**lnZ**	**lnZ**	**lnZ**
Constant	46.5530***	47.5049**	18.2171	20.7906	17.4296	13.9167	19.6410*	21.7314*
	(5.1897)	(5.2467)	(14.5944)	(12.6577)	(12.783)	(11.6214)	(11.7864)	(12.6278)
Wald (joint) test	24.7804***	32.0764***	43.5989***	44.001***	42.8395***	55.179***	72.1172***	73.569***
AR(2)	0.7612	0.7698	0.5954	0.5896	0.6499	0.4134	0.4394	0.3820
Sargan test	0.1119	0.106	0.0634	0.0528	0.1349	0.067	0.0341	0.0493
Observations	1031	1031	1031	1031	1031	1031	1031	1031
Instruments	56	57	58	59	60	61	62	62
n	143	143	143	143	143	143	143	143

Standard errors are reported in parentheses.

, **, * indicates significance at the 90%, 95%, and 99% level, respectively.*

Wald (Joint) test

The diagnostic test of the Wald statistic had values of 24.7804, 32.0764, 43.5989, 44.001, 42.8395, 55.179, 72.1172, 73.569, for models 8 to 15, respectively. The values of the Wald statistics generated p-values lower than 0.05, rejecting the null hypothesis in every case. Consequently, the test implies that the explanatory variables used for these models are valid.

AR(2) test

The the second-order autocorrelation of the error terms test provided as output the p-values 0.7612, 0.7698, 0.5954, 0.5896, 0.6499, 0.4134, 0.4394, and 0.3820 for the models 7 to 15, respectively. None of the values has a value under 0.05. Therefore, the test fails to reject the null hypothesis, so the moment conditions are correctly specified and the original error is uncorrelated.

Sargan test

The Sargan test is used to search for overidentification from the model's parameters. the models 14 and 15's outcome p-values are 0.0341 and 0.0493, respectively. These values imply that the test rejects the null hypothesis for the last models, which affects the validity of the instruments for those models. However, the value of most of the Sargan test p-values in the rest of the models are greater than 0.05, failing to reject the null hypothesis of the test and, therefore, proving the validity of the instruments used for those models.

Chapter 5

Discussion

This research study aims to demonstrate a relationship between the existence of sustainable finance regulations and financial stability for banks in Latin America. The results also show that sustainable finance practices have a significant effect on banks' financial stability. This evidence is indisputable in the Welch T-test and the dynamic panel data analysis using a 2-step GMM model.

First, the two-sample Welch t-test (Table 4.5) evidences a significant difference between the mean of the *zscore* between banks that operate in countries with (*M = 89.69, SD = 145.16*) and without (*M = 65.94, SD = 101.27*) sustainable finance regulations, with confidence level of 99% (*t-cal = 2.75, p = .0061*). Therefore, these results provide enough evidence to reject the null hypothesis that states that the difference in the mean of the *zscore* between banks in both groups is 0. This test implies that the levels of financial stability between both groups of banks are significantly different, showing higher levels for the banks operating under country-level sustainable regulations. However, this test does not remove any bias that comes from indicators that may affect the $Zscore$.

Furthermore, the binary logit analysis (Table 4.6) shows a positive relationship between the odds of a country implementing sustainable finance regulations and the financial stability in the banks of those countries. The sign of the regression coefficient reflects a positive relationship. Although the value of the coefficient is close to zero, implying a small effect of the estimator. The null hypothesis of the model is that the $Zscore$ coefficient is equal to zero, indicating no association with the existence of sustainable finance regulations. The p-value of the coefficient (p=.0012) is lower than the significance level of .001. Consequently, the test exhibits a statistically significant association between the banks' financial stability and the existence of sustainable regulations in the country in which they operate. The results from these tests imply that banks with financial stability are essential for policymakers to introduce sustainable finance regulations in the banking regulatory framework, though it is not a necessary condition.

This relationship aligns with findings in the literature (Bermpei et al., 2018) that show that it is more probable for a bank to have a higher $Zscore$ in the existence of political and institutional stability. The results suggest a bidirectional relationship between sustainable finance regulations and financial stability. However, the low value of the coefficient could imply that countries that lack financial stability avoid considering environmental policies given the costs that the actions from these regulations bring (Orlitzky et al., 2011) in the financial sector, particularly for projects that have high initial costs.

Next, the random effect models (table 4.7) show higher levels of financial stability for banks in countries with sustainable banking regulations. Also, the Hausman test shows that the random-effects model is the best fit for the analysis. The results were consistent in Models 1 to 6, regardless of the inclusion of control variables representing banking performance and macroeconomic performance. However, after including inflation to the regression, the coefficient for Model 7 was not statistically significant. The value of the

Durbin-Watson test for all models was under 1.5 for all the fixed-effect models. This value indicates a positive serial correlation in the regressions. Also, previous periods of financial stability or instability can affect financial stability significantly in the next year. Hence, another factor that could be producing a bias in the model is the absence of a lagged dependent variable as an independent variable. The positive autocorrelation and the inexistence of a lagged $Zscore$ create a bias that the dynamic panel model adjusts.

Lastly, the dynamic panel model (table 4.8) evidences a significant positive relationship between a bank's financial stability and environmental policies in the banking sector. The model shows a positive relationship for all the coefficients of the lagged dependent variable and the $zscore$ while being statistically significant. This positive relationship implies that banks have higher financial stability when they operate in countries with sustainable finance regulations. Also, the results show that a precedent history of financial stability can increase the chances of a bank maintaining its stability. Consequently, following the hypothesis, financial stability between banks operating in countries with and without sustainable finance regulations display a significant difference.

These findings contribute a clearer understanding of the implications of sustainable legislation in the banking industries on financial institutions' financial stability. The study results build on existing research regarding the importance of climate mitigation policies in the banking sector (Battiston et al., 2017). Similarly, this research relates to other studies that found that sustainable finance regulations create a more stable financial sector (Zadek and Robins, 2016; Weber, 2017). Furthermore, the results are consistent with research that has found lower systemic risk and asset price volatility due to climate risk-related legislation (Battiston et al., 2017). These results build on existing evidence of sustainability regulation in the banking sector, creating stability in the Chinese financial sector (Cui et al., 2018), and contribute by including results from the Latin American banking industry.

Additionally, this research aligns with studies that found positive impacts of evaluating sustainable policies in the financial sector. Some of these studies include the Green Credit Policy in China and its relationship with positive financial performance (Weber, 2017; Cui et al., 2018). Another example is the environmental risk management guidelines in Bangladesh, which provide significant insight into banks' negative performance (Weber and Oni, 2015). Sustainable finance regulations have also shown a positive impact over the carbon footprint of a bank's portfolio (Zadek and Robins, 2016), as well as an increase of corporate social responsibility (CSR) activities, and self-regulation in the financial industry (Chih et al., 2010).

Furthermore, previous research focused on the adverse effects of climate and social risks on individual and systemic perspectives (Rozenberg et al., 2013; Campiglio et al., 2018), credit risk (Bauer and Hann, 2012), and financial performance (Dam and Scholtens, 2015; Weber and Oni, 2015). In contrast, considering that sustainable regulations in the banking sector increase the sustainable practices in banks (Weber, 2017), these results demonstrate that sustainable practices by the banking sector promotes financial stability. Consequently, this research addresses a gap in the academic literature between sustainable finance, financial stability, and macroprudential regulations. Additionally, most previous empirical research on sustainable finance aimed to study countries like China, Bangladesh, and Nigeria (Weber, 2012; Weber and Oni, 2015; Jiang et al., 2019). In contrast, this research mainly researched countries in Latin America, which addresses another gap in the literature that links sustainability and financial studies.

Moreover, this study's results represent an opportunity for scholars in the areas of economics, financial stability, and sustainability management. These results should be considered when studying the connection between financial stability, systemic risk, and sustainable finance practices. In contrast with popular theories on financial stability that consider

the correlation of financial institutions' portfolios as a source systemic risk (Acharya, 2009), these results show the implications that social and environmental risks have to control systemic risk. Therefore, these results represent an empirical groundwork for developing a theoretical framework that includes the existence of sustainable practices and regulations in the financial sector on systemic risk and financial stability, following literature on climate risk and economic stability (Skidmore, 2001).

Regarding the limitations of the study, the lack of availability in the Latin American region may challenge the reliability of the results. Accounting and financial information from banks in Latin America are limited to online databases. Therefore, the data collected was obtained manually on the banks' websites. This data collection methodology increases the chances of typing errors and attrition bias for large data sets. Additionally, each country has different regulations regarding the finance and accounting information that must stay public. Further research involving optimized data collection methods is required.

This study analyzed the biggest banks in each country according to their assets. The banks used in the data sample are either international banks or local financial institutions of significant size regarding their assets. Therefore the results of this study may apply for big banks, although the reliability of the implications in this study may be different for small and medium-sized banks.

The methodology applied consists of measuring financial exposure by comparing the bank's solvency risk using the banks' scores in Latin America. Therefore, these results should be analyzed as a marginal contribution to the financial sector's systemic risk in the region. Other systemic risk and financial soundness indicators should be used in further research to understand better the implications of macroprudential environmental legislation in the financial sector. Some indicators that could be used include CoVar, the First-to-Default probability, Systemic Expected Shortfall, and distribution of systemic loss.

Regarding sustainability management, the analysis exclusively evaluated the existence of a sustainable regulatory framework in the banks where the banks analyzed to operate. These regulations were imposed by governments, central banks, or a group of banks that had a sustainable initiative. However, the multinational nature of most of the banks studied implies that the internal policies of these corporations may be followed across borders. Therefore, banks operating in countries without legislation that enforces sustainability in the banking sector might be using sustainable finance practices. As the analysis ignores individual indicators of sustainability, the conclusions exclude the impact of individual banks. Future research should evaluate individual actions and sustainable disclosures from specific financial entities.

Finally, the results provide empirical evidence to reject the null hypothesis stated previously in the second chapter. Consequently, the evidence accepts the alternative hypothesis stating that the existence of sustainable finance regulations has a significant effect on the financial stability of banks in Latin America.

Chapter 6

Conclusion

The following section will provide the concluding remarks of this master's thesis, covering the author's perspective on the main implications, both practical and academic, as well as the main limitations and research opportunities that arise.

This thesis analyzed the impact of sustainable finance regulations on the financial stability of banks in Latin America. The financial stability of 149 banks in 17 countries from 2008 to 2018 was quantified and tested with several quantitative analysis methods. These included a two mean difference Welch t-test, a binary logit panel analysis, a random-effects panel data analysis, and a dynamic panel regression using a two-step GMM model. Based on the quantitative analysis of the leading banks of the countries studied, the main conclusion of this thesis is that sustainable finance regulations show a positive impact on the financial stability of the banks in the financial sector.

This research studied the connection between sustainable finance practices and financial stability. A sustainable finance practice consists of a bank's strategy to reach sustainable development. A sustainable finance strategy includes both organizational behaviour and

business decision-making strategies. The investigation concentrates on countries in Latin America, highlighting the inclusion of sustainability practices in the legal framework of the financial sector of Brazil, Colombia, Ecuador, Mexico, Peru, and Paraguay. The literature suggests that strategies that aim to develop the economy, society, and environment can strengthen financial stability.

Furthermore, the literature review presents a case to demonstrate the positive and significant influence of sustainable finance regulations on a bank's financial stability. The literature review shows that policymakers continuously consider using regulations to control financial stability and systemic risk. Additionally, the literature shows that sustainable practices in the financial sector promote economic development and financial stability. The connection between financial stability and sustainable finance seems logical, though research regarding this connection is scarce, evidencing a gap in the literature.

Therefore, the methodology for this study compares banks operating in countries with and without sustainable finance regulations. This analysis consists of: a two-mean difference between both groups using a Welch t-test, a binary logit panel regression, a random-effects panel regression, and a dynamic panel regression using a 2-step GMM model. The results show a significant relationship between sustainable finance regulations and financial stability.

Based on these conclusions, future research should consider some factors. By only analyzing accounting figures, a layer of risk was assessed and evaluated. Hence, the quality of the analysis is relevant for institutional risk. However, financial stability analysis still needs to be developed within sustainability management, especially towards the implication of sustainable policies over systemic risk. More research is needed to evaluate the impact of sustainable measures and its effect on systemic risk, evaluating several systemic risk related indicators such as the CoVar indicator, the First-to-Default probability, Systemic Expected

Shortfall (SES), distribution of systemic loss, and other financial soundness indicators endorsed by the FMI.

Additionally, the implications of introducing this kind of policy should also be analyzed. The time of application and characteristics of the policies is imperative for the entire economy, as shocks coming from climate change could be early forecasted and, consequently, mitigated to reduce the implications over households and financial firms (Skidmore, 2001). The cost of adaptation and transition of new regulations needs to be studied to understand the short, medium, and long term implications of said policies and critical aspects to ensure a successful adaptation of firms and households.

This study also consists of data from an entire continent where the most prominent banks from selected countries were analyzed. This type of quantitative analysis could bring some bias given economic, social, political, and other factors over the accounting data used to estimate each bank's financial stability. Country specific mixed methodologies and case studies could be applied within the Latin American region to evaluate the macroprudential implications of sustainable regulations in the financial sector. This way, any international bias that could disturb the analysis can be minimized as much as possible.

Finally, this thesis evidences a link between financial stability and sustainable finance regulations. Therefore, Central Banks and governments should consider, such when evaluating the potential risks of environmental externalities on the financial system. Also, firms that have not yet adopted sustainable policies should consider the results of this thesis, given the resilience aspects that environmental institutions provide to firms that prevail in the results.

This thesis also contributes to the academy by filling a research gap regarding Latin American financial sustainability and the relationship between financial stability and sus-

tainable finance regulations. Additionally, this study evidences the effect of sustainable finance practices on financial stability. Finally, this masters' thesis provides an empirical framework to develop a theory on financial stability and sustainability.

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APPENDICES

Appendix A

Country and Bank Specific descriptive Statistics

A.1 List of Banks in the Study by Country

The following table (Table A.1) provides a list of the 149 banks included in the analysis. The descriptive statistics for the banks are included in the Appendix A. The descriptive statistics include the main variables used in the study for every bank.

Table A.1: List of Banks in the study by Country

Argentina	
Banco Credicoop Coop. Ltdo.	Banco Macro S.A.
Banco de la Ciudad de Buenos Aires	Banco Patagonia S.A.
Banco de la Nacion Argentina	Banco Santander Rio S.A.
Banco de la Provincia de Buenos Aires	Bbva Banco Frances S.A.

Table A.1 Continued

Banco Galicia Buenos Aires	Hsbc Bank Argentina S.A.
Banco Hipotecario S.A.	Industrial and Commercial Bank of China S.A.
Bolivia	
Banco Bisa S.A.	Banco Mercantil Santa Cruz S.A.
Banco de Credito de Bolivia S.A.	Banco Nacional de Bolivia
Banco Economico S.A.	Banco para el Fomento de Iniciativas Economicas S.A.
Banco Fissa	Banco Solidario S.A.
Banco Ganadero S.A.	Banco Union S.A.
Brazil	
Banco do Brasil	Bradesco Banco
Banco Safra S.A	Btg Pactual
Banco Santander Brasil -Adr	Caixa Economica Federal
Banco Votorantim S.A.	Citibank N.A.
Bndes	Itau Unibanco Hldg S.A.
Chile	
Banco Consoricio Santiago	Banco Security
Banco Credito e Inversiones	Bbva Chile
Banco de Chile	Bicecorp
Banco del Estado de Chile Bic	Itau Corpbanca Chile
Banco Santander-Chile	Scotiabank Chile
Colombia	

Table A.1 Continued

Banco Agrario de Colombia S.A.	Bancolombia
Banco de Bogota	Bbva Colombia
Banco GNB Sudameris	Colpatria
Banco Occidente	Banco Davivienda
Banco Popular-Colombia	Itau Corpbanca Colombia
Costa Rica	
Banco BAC San Jose	Banco Improsa
Banco BCT	Banco Nacional de Costa Rica
Banco Davivienda, S.A.	Banco Promerica
Banco de Costa Rica	Citibank Costa Rica
Banco General	Scotiabank de Costa Rica
Dominican Republic	
Banco BDI, S.A.	Banco Multiple BHD Leon
Banco de Ahorro y Credito Union S.A.	Banco Multiple Santa Cruz
Banco de Nueva Escocia	Banco Popular Dominicano, S.A.
Banco de Reservas de la Repubica Dominicana	Banco Vimenca
Banco Dominicano del Progreso	Citibank, N.A.
Ecuador	
Banco Bolivariano	Banco de la Produccion Produbanco
Banco de Guayaquil	Mutualista Pichincha
Guatemala	
Banco Promerica de Guatemala, S.A.	Banco G & T Continental, S.A.
BAC Reformador	Banco Internacional, S.A.

Table A.1 Continued

Banco Agromercantil de Guatemala	Banrural S.A.
Banco de Guatemala	Credito Hipotecario Nacional de Guatemala
Banco de los Trabajadores	
Honduras	
Banco del Pais, S.A.	Banco de Occidente S.A.
Banco Atlantida	Banco Financiera Centroamericana S.A. Ficensa
Banco Davivienda Honduras, S.A.	Banco Financiera Comercial Hondurena S.A. (Banco Ficohsa)
Banco de America Central Honduras, S.A.(Bac Bamer)	Banco Lafise (Honduras), S.A.
Banco de Desarrollo Rural Honduras, S.A.	Banco Promerica, S.A.
Mexico	
Banco Inbursa	Bancomext
Banco Interacciones	Deustche Bank Mexico, S.A.
Banco Mercantil del Norte	Hsbc Mexico
Banco Nacional de Mexico	Scotiabank Inverlat, S.A.
Banco Santander Mexico	
Panama	
Bac International Bank	Banesco
Banco General S A	Banistmo

Table A.1 Continued

Banco Latinoamericano de Comercio Exterior	Caja de Ahorros
Banco Nacional de Panama	Global Bank Corporation
Bancolombia (Panama)	Multibank
Paraguay	
Banco Atlas	Banco Regional S.A.E.C.A.
Banco Continental	Bbva Paraguay
Banco Gnb Paraguay	Citibank Paraguay
Banco Itau Paraguay	Sudameris Bank S.A.E.C.A.
Banco Nacional de Fomento	Vision Banco S.A.E.C.A.
Peru	
Banco Continental	Banco Santander Peru S.A.
Banco de Credito del Peru	Citibank del Peru S.A.
Banco Financiero	Hsbc Bank Peru S.A. (Gnb)
Banco Interamericano de Finanzas	Mi Banco
Banco Internacional del Peru	Scotiabank Peru
Puerto Rico	
Banco Popular de Puerto Rico	Oriental Bank
Uruguay	
Banco de La Republica Oriental del Uruguay	Citibank N.A. Uruguay
Banco Hipotecario de Uruguay	Hsbc Bank (Uruguay) S.A.
Banco Itau Uruguay	Scotiabank Uruguay S.A.
Banco Santander Uruguay	

Table A.1 Continued

Venezuela	
Banco del Caribe	Banco Venezolano de Credito
Banco Mercantil S.A.	Banesco S.A.
Banco Nacional de Credito	Bbva Banco Provincial

A.2 Descriptive Statistics

The following subsections provide the descriptive statistics for every bank included in the study for data collected from 2008 to 2018. All the banks are listed by country. The table includes the variables of Total Asset to Capital ratio (TA/C), growth of the gross domestic product (GDP Growth), Inflation, the logarithm of the z-Score (Ln(z)), loan loss provision to total loans ratio (LLP/TL), ROA, and Total Asset growth.

A.2.1 Argentina

Table A.2: Descriptive Statistics for Banks in Argentina

	Mean	**Std. Dev**	**Maximum**	**Minimum**
Banco Credicoop Coop. Ltdo.				
TA/C	0.0735	0.0145	0.0428	0.0942
GDP Growth	0.0658	0.1572	0.2722	−0.1933
Inflation	27.6175	8.8344	41.1194	15.3776
Ln(Z)	31.1018	29.6540	95.7667	13.2108
LLP/TL	0.0175	0.0056	0.0281	0.0099
ROA	0.0175	0.0056	0.0281	0.0099
Total Asset Growth	0.0033	0.0131	0.0230	−0.0185
Banco de la Ciudad de Buenos Aires				
TA/C	0.1167	0.0187	0.0864	0.1401
GDP Growth	0.0658	0.1572	0.2722	−0.1933
Inflation	27.6175	8.8344	41.1194	15.3776
Ln(Z)	51.2043	67.4316	223.0971	12.5498
LLP/TL	0.0264	0.0081	0.0380	0.0179

Table A.2 Continued

	Mean	Std. Dev	Maximum	Minimum
ROA	0.0264	0.0081	0.0380	0.0179
Total Asset Growth	0.0077	0.0173	0.0298	−0.0183
Banco de la Nacion Argentina				
TA/C	0.1167	0.0187	0.0864	0.1401
GDP Growth	0.0658	0.1572	0.2722	−0.1933
Inflation	27.6175	8.8344	41.1194	15.3776
Ln(Z)	51.2043	67.4316	223.0971	12.5498
LLP/TL	0.0264	0.0081	0.0380	0.0179
ROA	0.0264	0.0081	0.0380	0.0179
Total Asset Growth	0.0077	0.0173	0.0298	−0.0183
Banco de la Provincia de Buenos Aires				
TA/C	0.1889	0.1920	0	0.4349
GDP Growth	0.0658	0.1572	0.2722	−0.1933
Inflation	27.6175	8.8344	41.1194	15.3776
Ln(Z)	25.7219	27.9405	66.9144	1.5277
LLP/TL	0.0173	0.0074	0.0283	0.0089
ROA	0.0173	0.0074	0.0283	0.0089
Total Asset Growth	0.0062	0.0147	0.0283	−0.0072
Banco Galicia Buenos Aires				
TA/C	0.0887	0.0098	0.0779	0.1120
GDP Growth	0.0658	0.1572	0.2722	−0.1933
Inflation	27.6175	8.8344	41.1194	15.3776
Ln(Z)	45.5943	40.7345	134.1098	12.8073

Table A.2 Continued

	Mean	Std. Dev	Maximum	Minimum
LLP/TL	0.0192	0.0071	0.0298	0.0063
ROA	0.0192	0.0071	0.0298	0.0063
Total Asset Growth	0.0091	0.0170	0.0338	−0.0143
Banco Hipotecario S.A.				
TA/C	0.1906	0.0601	0.1193	0.2734
GDP Growth	0.0658	0.1572	0.2722	−0.1933
Inflation	27.6175	8.8344	41.1194	15.3776
Ln(Z)	60.6859	63.8423	203.3739	11.0905
LLP/TL	0.0181	0.0080	0.0296	−0.0020
ROA	0.0181	0.0080	0.0296	−0.0020
Total Asset Growth	−0.0014	0.0198	0.0285	−0.0348
Banco Macro S.A.				
TA/C	0.1428	0.0222	0.1148	0.1931
GDP Growth	0.0658	0.1572	0.2722	−0.1933
Inflation	27.6175	8.8344	41.1194	15.3776
Ln(Z)	78.3966	38.6340	141.6507	25.4178
LLP/TL	0.0375	0.0080	0.0477	0.0280
ROA	0.0375	0.0080	0.0477	0.0280
Total Asset Growth	0.0066	0.0146	0.0274	−0.0168
Banco Patagonia S.A.				
TA/C	0.1410	0.0234	0.1143	0.1844
GDP Growth	0.0658	0.1572	0.2722	−0.1933
Inflation	27.6175	8.8344	41.1194	15.3776

Table A.2 Continued

	Mean	Std. Dev	Maximum	Minimum
Ln(Z)	25.6841	10.3245	51.2145	11.9858
LLP/TL	0.0386	0.0071	0.0531	0.0288
ROA	0.0386	0.0071	0.0531	0.0288
Total Asset Growth	0.0100	0.0252	0.0347	−0.0353
Banco Santander Rio S.A.				
TA/C	0.1039	0.0178	0.0762	0.1269
GDP Growth	0.0658	0.1572	0.2722	−0.1933
Inflation	27.6175	8.8344	41.1194	15.3776
Ln(Z)	40.0217	29.6671	105.6693	9.6572
LLP/TL	0.0298	0.0098	0.0448	0.0154
ROA	0.0298	0.0098	0.0448	0.0154
Total Asset Growth	0.0105	0.0181	0.0362	−0.0152
BBVA Banco Frances S.A.				
TA/C	0.1166	0.0138	0.0900	0.1428
GDP Growth	0.0658	0.1572	0.2722	−0.1933
Inflation	27.6175	8.8344	41.1194	15.3776
Ln(Z)	21.7535	7.5708	35.1372	12.8326
LLP/TL	0.0282	0.0088	0.0431	0.0124
ROA	0.0282	0.0088	0.0431	0.0124
Total Asset Growth	0.0059	0.0177	0.0305	−0.0165
HSBC Bank Argentina S.A.				
TA/C	0.1128	0.0091	0.1029	0.1288
GDP Growth	0.0658	0.1572	0.2722	−0.1933

Table A.2 Continued

	Mean	Std. Dev	Maximum	Minimum
Inflation	27.6175	8.8344	41.1194	15.3776
Ln(Z)	22.7655	22.3299	66.8440	8.9576
LLP/TL	0.0171	0.0137	0.0369	0
ROA	0.0171	0.0137	0.0369	0
Total Asset Growth	0.0039	0.0229	0.0318	−0.0340
Industrial And Commercial Bank Of China S.A.				
TA/C	0.1069	0.0105	0.0910	0.1184
GDP Growth	0.0658	0.1572	0.2722	−0.1933
Inflation	27.6175	8.8344	41.1194	15.3776
Ln(Z)	24.8232	17.0540	55.4840	12.5446
LLP/TL	0.0256	0.0067	0.0339	0.0141
ROA	0.0256	0.0067	0.0339	0.0141
Total Asset Growth	0.0070	0.0115	0.0288	−0.0038

A.2.2 Bolivia

Table A.3: Descriptive Statistics for Banks in Bolivia

	Mean	**Std. Dev**	**Maximum**	**Minimum**
Banco BISA S.A.				
TA/C	0.0930	0.0141	0.0721	0.1073
GDP Growth	0.1100	0.0809	0.2709	0.0001
Inflation	4.5117	5.8294	14.6024	−4.6206
Ln(Z)	173.7534	284.8528	751.2652	26.7565
LLP/TL	0.0161	0.0029	0.0199	0.0123
ROA	0.0161	0.0029	0.0199	0.0123
Total Asset Growth	0.0115	0.0087	0.0265	0.0028
Banco de Credito de Bolivia S.A.				
TA/C	0.0854	0.0135	0.0679	0.1149
GDP Growth	0.1100	0.0809	0.2709	0.0001
Inflation	4.5117	5.8294	14.6024	−4.6206
Ln(Z)	36.7324	22.9722	73.9558	8.0146
LLP/TL	0.0152	0.0091	0.0378	0.0075
ROA	0.0152	0.0091	0.0378	0.0075
Total Asset Growth	0.0166	0.0091	0.0275	0.0031
Banco Economico S.A.				
TA/C	0.0680	0.0072	0.0600	0.0795
GDP Growth	0.1100	0.0809	0.2709	0.0001
Inflation	4.5117	5.8294	14.6024	−4.6206
Ln(Z)	64.7767	36.0237	107.3759	17.7031
LLP/TL	0.0105	0.0023	0.0140	0.0061

Table A.3 Continued

	Mean	Std. Dev	Maximum	Minimum
ROA	0.0105	0.0023	0.0140	0.0061
Total Asset Growth	0.0190	0.0093	0.0349	0.0038
Banco Fisa S.A.				
TA/C	0.0755	0.0111	0.0671	0.1022
GDP Growth	0.1100	0.0809	0.2709	0.0001
Inflation	4.5117	5.8294	14.6024	−4.6206
Ln(Z)	33.8846	28.8142	87.3663	3.2230
LLP/TL	0.0066	0.0058	0.0124	−0.0060
ROA	0.0066	0.0058	0.0124	−0.0060
Total Asset Growth	0.0801	0.0562	0.1871	0.0032
Banco Ganadero S.A.				
TA/C	0.0613	0.0011	0.0596	0.0626
GDP Growth	0.1100	0.0809	0.2709	0.0001
Inflation	4.5117	5.8294	14.6024	−4.6206
Ln(Z)	86.6559	28.0535	125.4032	58.3082
LLP/TL	0.0088	0.0009	0.0100	0.0077
ROA	0.0088	0.0009	0.0100	0.0077
Total Asset Growth	0.0171	0.0053	0.0243	0.0116
Banco Mercantil Santa Cruz S.A.				
TA/C	0.0690	0.0086	0.0553	0.0809
GDP Growth	0.1100	0.0809	0.2709	0.0001
Inflation	4.5117	5.8294	14.6024	−4.6206
Ln(Z)	38.7843	29.6034	121.9892	14.6113

Table A.3 Continued

	Mean	Std. Dev	Maximum	Minimum
LLP/TL	0.0123	0.0058	0.0247	0.0040
ROA	0.0123	0.0058	0.0247	0.0040
Total Asset Growth	0.0174	0.0100	0.0359	−0.0015
Banco Nacional de Bolivia				
TA/C	0.0718	0.0041	0.0663	0.0793
GDP Growth	0.1100	0.0809	0.2709	0.0001
Inflation	4.5117	5.8294	14.6024	−4.6206
Ln(Z)	60.3934	41.7017	150.3800	22.5638
LLP/TL	0.0113	0.0033	0.0169	0.0049
ROA	0.0113	0.0033	0.0169	0.0049
Total Asset Growth	0.0149	0.0073	0.0234	0.0032
Banco para el Fomento de Iniciativas Economicas S.A.				
TA/C	0.0774	0.0026	0.0743	0.0814
GDP Growth	0.1100	0.0809	0.2709	0.0001
Inflation	4.5117	5.8294	14.6024	−4.6206
Ln(Z)	40.0452	20.9322	60.6968	15.9254
LLP/TL	0.0090	0.0044	0.0133	0.0031
ROA	0.0090	0.0044	0.0133	0.0031
Total Asset Growth	0.0138	0.0067	0.0244	0.0072
Banco Solidario S.A.				
TA/C	0.1138	0.0213	0.0839	0.1457
GDP Growth	0.1100	0.0809	0.2709	0.0001
Inflation	4.5117	5.8294	14.6024	−4.6206

Table A.3 Continued

	Mean	Std. Dev	Maximum	Minimum
Ln(Z)	63.8115	40.0503	113.1312	16.7557
LLP/TL	0.0184	0.0073	0.0250	0.0015
ROA	0.0184	0.0073	0.0250	0.0015
Total Asset Growth	0.0988	0.2379	0.7325	0.0060
Banco Union S.A.				
TA/C	0.0684	0.0118	0.0470	0.0856
GDP Growth	0.1100	0.0809	0.2709	0.0001
Inflation	4.5117	5.8294	14.6024	−4.6206
Ln(Z)	31.6286	17.8541	70.5263	11.0046
LLP/TL	0.0093	0.0040	0.0180	0.0050
ROA	0.0093	0.0040	0.0180	0.0050
Total Asset Growth	0.0340	0.0317	0.0963	−0.0313

A.2.3 Brazil

Table A.4: Descriptive Statistics for Banks in Brazil

	Mean	Std. Dev	Maximum	Minimum
Banco do Brasil				
TA/C	0.0538	0.0186	0	0.0721
GDP Growth	0.0390	0.1649	0.3250	−0.2662
Inflation	7.1175	1.9622	8.7786	3.0254
Ln(Z)	38.7790	18.9661	75.2022	5.5695
LLP/TL	0.0110	0.0034	0.0169	0.0057
ROA	0.0110	0.0034	0.0169	0.0057
Total Asset Growth	0.0058	0.0169	0.0360	−0.0279
Banco Safra				
TA/C	0.0652	0.0065	0.0574	0.0766
GDP Growth	0.0390	0.1649	0.3250	−0.2662
Inflation	7.1175	1.9622	8.7786	3.0254
Ln(Z)	292.8466	309.3707	1000.7532	31.9122
LLP/TL	0.0123	0.0016	0.0144	0.0103
ROA	0.0123	0.0016	0.0144	0.0103
Total Asset Growth	0.0043	0.0146	0.0226	−0.0260
Banco Santander Brasil ADR				
TA/C	0.1474	0.0276	0.0898	0.1897
GDP Growth	0.0390	0.1649	0.3250	−0.2662
Inflation	7.1175	1.9622	8.7786	3.0254
Ln(Z)	72.3335	43.8563	148.9110	27.3342
LLP/TL	0.0099	0.0043	0.0177	0.0046

Table A.4 Continued

	Mean	Std. Dev	Maximum	Minimum
ROA	0.0099	0.0043	0.0177	0.0046
Total Asset Growth	0.0095	0.0314	0.0981	−0.0158
Banco Votorantim S.A.				
TA/C	−0.8069	2.7005	−8.9428	0.0820
GDP Growth	0.0390	0.1649	0.3250	−0.2662
Inflation	7.1175	1.9622	8.7786	3.0254
Ln(Z)	−18.9560	55.9865	16.8119	−158.5264
LLP/TL	0.0119	0.0310	0.1031	−0.0125
ROA	0.0119	0.0310	0.1031	−0.0125
Total Asset Growth	−0.0254	0.0816	0.0688	−0.2278
BNDES				
TA/C	0.0795	0.0225	0.0333	0.1200
GDP Growth	0.0390	0.1649	0.3250	−0.2662
Inflation	7.1175	1.9622	8.7786	3.0254
Ln(Z)	79.1990	76.6933	242.0366	8.6175
LLP/TL	0.0118	0.0047	0.0192	0.0067
ROA	0.0118	0.0047	0.0192	0.0067
Total Asset Growth	0.0059	0.0194	0.0393	−0.0224
BRADESCO BANCO				
TA/C	0.0841	0.0062	0.0761	0.0941
GDP Growth	0.0390	0.1649	0.3250	−0.2662
Inflation	7.1175	1.9622	8.7786	3.0254
Ln(Z)	90.8444	79.2948	278.5607	19.9355

Table A.4 Continued

	Mean	Std. Dev	Maximum	Minimum
LLP/TL	0.0137	0.0036	0.0169	0.0039
ROA	0.0137	0.0036	0.0169	0.0039
Total Asset Growth	0.0052	0.0159	0.0288	−0.0276
BTG Pactual				
TA/C	0.1177	0.0423	0.0760	0.2006
GDP Growth	0.0390	0.1649	0.3250	−0.2662
Inflation	7.1175	1.9622	8.7786	3.0254
Ln(Z)	30.1864	31.8057	116.1364	3.1731
LLP/TL	0.0227	0.0088	0.0435	0.0110
ROA	0.0227	0.0088	0.0435	0.0110
Total Asset Growth	0.0131	0.0517	0.1441	−0.0775
Caixa Economica Federal				
TA/C	0.0441	0.0088	0.0324	0.0583
GDP Growth	0.0390	0.1649	0.3250	−0.2662
Inflation	7.1175	1.9622	8.7786	3.0254
Ln(Z)	38.4517	21.9534	71.5639	11.8470
LLP/TL	0.0082	0.0026	0.0131	0.0033
ROA	0.0082	0.0026	0.0131	0.0033
Total Asset Growth	0.0074	0.0130	0.0239	−0.0172
Citibank N.A.				
TA/C	0.0806	0.0095	0.0667	0.0952
GDP Growth	0.0390	0.1649	0.3250	−0.2662
Inflation	7.1175	1.9622	8.7786	3.0254

Table A.4 Continued

	Mean	Std. Dev	Maximum	Minimum
Ln(Z)	78.1899	227.5686	764.1176	3.4219
LLP/TL	0.0142	0.0147	0.0473	−0.0045
ROA	0.0142	0.0147	0.0473	−0.0045
Total Asset Growth	0.0019	0.0163	0.0433	−0.0113
Itau Unibanco HLDG S.A.				
TA/C	0.0889	0.0096	0.0741	0.1031
GDP Growth	0.0390	0.1649	0.3250	−0.2662
Inflation	7.1175	1.9622	8.7786	3.0254
Ln(Z)	70.0907	64.3965	188.5412	15.2524
LLP/TL	0.0169	0.0020	0.0202	0.0134
ROA	0.0169	0.0020	0.0202	0.0134
Total Asset Growth	0.0089	0.0171	0.0425	−0.0170

A.2.4 Chile

Table A.5: Descriptive Statistics for Banks in Chile

	Mean	Std. Dev	Maximum	Minimum
Banco Consoricio Santiago				
TA/C	0.1181	0.0260	0.0911	0.1720
GDP Growth	0.0545	0.0986	0.2677	−0.0641
Inflation	3.8297	2.5291	8.9623	−0.0534
Ln(Z)	28.1412	36.5971	110.4647	5.6516
LLP/TL	0.0156	0.0159	0.0545	−0.0102
ROA	0.0156	0.0159	0.0545	−0.0102
Total Asset Growth	0.0671	0.1116	0.3593	−0.0037
Banco Credito e Inversiones				
TA/C	0.0761	0.0068	0.0618	0.0836
GDP Growth	0.0545	0.0986	0.2677	−0.0641
Inflation	3.8297	2.5291	8.9623	−0.0534
Ln(Z)	125.7032	87.9416	291.9302	34.7446
LLP/TL	0.0131	0.0024	0.0168	0.0096
ROA	0.0131	0.0024	0.0168	0.0096
Total Asset Growth	0.0100	0.0085	0.0248	−0.0045
Banco de Chile				
TA/C	0.0928	0.0274	0.0716	0.1728
GDP Growth	0.0545	0.0986	0.2677	−0.0641
Inflation	3.8297	2.5291	8.9623	−0.0534
Ln(Z)	71.3115	34.1290	129.8472	28.9453
LLP/TL	0.0182	0.0026	0.0224	0.0145

Table A.5 Continued

	Mean	Std. Dev	Maximum	Minimum
ROA	0.0182	0.0026	0.0224	0.0145
Total Asset Growth	0.0048	0.0094	0.0218	−0.0104
Banco del Estado de Chile				
TA/C	0.0466	0.0040	0.0423	0.0553
GDP Growth	0.0545	0.0986	0.2677	−0.0641
Inflation	3.8297	2.5291	8.9623	−0.0534
Ln(Z)	139.5720	146.6625	485.0984	34.6214
LLP/TL	0.0044	0.0009	0.0064	0.0035
ROA	0.0044	0.0009	0.0064	0.0035
Total Asset Growth	0.0070	0.0067	0.0195	−0.0042
Banco Santander Chile				
TA/C	0.0831	0.0039	0.0758	0.0876
GDP Growth	0.0545	0.0986	0.2677	−0.0641
Inflation	3.8297	2.5291	8.9623	−0.0534
Ln(Z)	52.7153	23.7121	102.9155	30.5267
LLP/TL	0.0166	0.0028	0.0216	0.0128
ROA	0.0166	0.0028	0.0216	0.0128
Total Asset Growth	0.0048	0.0078	0.0153	−0.0083
Banco Security				
TA/C	0.0710	0.0092	0.0571	0.0859
GDP Growth	0.0545	0.0986	0.2677	−0.0641
Inflation	3.8297	2.5291	8.9623	−0.0534
Ln(Z)	49.5922	33.9511	118.9096	10.7758

Table A.5 Continued

	Mean	Std. Dev	Maximum	Minimum
LLP/TL	0.0086	0.0030	0.0115	0.0005
ROA	0.0086	0.0030	0.0115	0.0005
Total Asset Growth	0.0070	0.0098	0.0311	−0.0031
BBVA Chile				
TA/C	0.0635	0.0045	0.0579	0.0705
GDP Growth	0.0545	0.0986	0.2677	−0.0641
Inflation	3.8297	2.5291	8.9623	−0.0534
Ln(Z)	84.9806	45.6054	177.5365	31.2760
LLP/TL	0.0063	0.0013	0.0087	0.0041
ROA	0.0063	0.0013	0.0087	0.0041
Total Asset Growth	0.0058	0.0125	0.0208	−0.0209
Bicecorp				
TA/C	0.0894	0.0077	0.0747	0.1033
GDP Growth	0.0545	0.0986	0.2677	−0.0641
Inflation	3.8297	2.5291	8.9623	−0.0534
Ln(Z)	73.8857	71.7100	188.6576	0.9566
LLP/TL	0.0105	0.0057	0.0188	−0.0039
ROA	0.0105	0.0057	0.0188	−0.0039
Total Asset Growth	0.0377	0.1033	0.3403	−0.0410
Itau Corpbanca Chile				
TA/C	0.1024	0.0120	0.0877	0.1212
GDP Growth	0.0545	0.0986	0.2677	−0.0641
Inflation	3.8297	2.5291	8.9623	−0.0534

Table A.5 Continued

	Mean	Std. Dev	Maximum	Minimum
Ln(Z)	55.5288	45.0437	140.6288	5.9559
LLP/TL	0.0075	0.0082	0.0141	−0.0123
ROA	0.0075	0.0082	0.0141	−0.0123
Total Asset Growth	0.0228	0.0378	0.1268	−0.0103
Scotiabank Chile				
TA/C	0.0603	0.0854	−0.1812	0.1015
GDP Growth	0.0545	0.0986	0.2677	−0.0641
Inflation	3.8297	2.5291	8.9623	−0.0534
Ln(Z)	38.4963	84.5927	222.9219	−109.1436
LLP/TL	0.0092	0.0033	0.0141	0.0039
ROA	0.0092	0.0033	0.0141	0.0039
Total Asset Growth	0.0187	0.0267	0.0819	−0.0143

A.2.5 Colombia

Table A.6: Descriptive Statistics for Banks in Chile

	Mean	Std. Dev	Maximum	Minimum
Banco Agrario de Colombia S.A.				
TA/C	0.0942	0.0122	0.0777	0.1147
GDP Growth	0.0517	0.1285	0.2306	−0.2299
Inflation	4.1818	1.7092	7.7414	2.0785
Ln(Z)	34.7777	30.0067	113.4507	12.1560
LLP/TL	0.0210	0.0074	0.0335	0.0106
ROA	0.0210	0.0074	0.0335	0.0106
Total Asset Growth	0.0058	0.0144	0.0321	−0.0240
Banco de Bogota				
TA/C	0.1049	0.0180	0.0660	0.1223
GDP Growth	0.0517	0.1285	0.2306	−0.2299
Inflation	4.1818	1.7092	7.7414	2.0785
Ln(Z)	157.1970	116.5138	354.3318	48.9743
LLP/TL	0.0098	0.0040	0.0187	0.0059
ROA	0.0098	0.0040	0.0187	0.0059
Total Asset Growth	0.0068	0.0123	0.0176	−0.0172
Banco GNB Sudameris				
TA/C	0.0705	0.0060	0.0640	0.0848
GDP Growth	0.0517	0.1285	0.2306	−0.2299
Inflation	4.1818	1.7092	7.7414	2.0785
Ln(Z)	78.8437	51.2167	162.2300	19.4055
LLP/TL	0.0093	0.0019	0.0131	0.0068

Table A.6 Continued

	Mean	Std. Dev	Maximum	Minimum
ROA	0.0093	0.0019	0.0131	0.0068
Total Asset Growth	0.0149	0.0199	0.0388	−0.0225
Banco Occidente				
TA/C	0.1311	0.0165	0.1093	0.1657
GDP Growth	0.0517	0.1285	0.2306	−0.2299
Inflation	4.1818	1.7092	7.7414	2.0785
Ln(Z)	78.9432	56.5405	162.0688	9.4831
LLP/TL	0.0120	0.0060	0.0289	0.0062
ROA	0.0120	0.0060	0.0289	0.0062
Total Asset Growth	0.0079	0.0179	0.0393	−0.0226
Banco Popular Colombia				
TA/C	0.1279	0.0182	0.1071	0.1539
GDP Growth	0.0517	0.1285	0.2306	−0.2299
Inflation	4.1818	1.7092	7.7414	2.0785
Ln(Z)	353.7244	625.9137	1292.4816	28.2033
LLP/TL	0.0083	0.0030	0.0118	0.0047
ROA	0.0083	0.0030	0.0118	0.0047
Total Asset Growth	−0.0017	0.0140	0.0121	−0.0224
Bancolombia				
TA/C	0.1531	0.0103	0.1381	0.1703
GDP Growth	0.0517	0.1285	0.2306	−0.2299
Inflation	4.1818	1.7092	7.7414	2.0785
Ln(Z)	57.3673	36.2239	125.1399	16.3860

Table A.6 Continued

	Mean	Std. Dev	Maximum	Minimum
LLP/TL	0.0215	0.0080	0.0371	0.0133
ROA	0.0215	0.0080	0.0371	0.0133
Total Asset Growth	0.0107	0.0141	0.0307	−0.0158
BBVA Colombia				
TA/C	0.0793	0.0277	0	0.1020
GDP Growth	0.0517	0.1285	0.2306	−0.2299
Inflation	4.1818	1.7092	7.7414	2.0785
Ln(Z)	94.0716	77.8624	265.5295	20.0280
LLP/TL	0.0144	0.0041	0.0198	0.0085
ROA	0.0144	0.0041	0.0198	0.0085
Total Asset Growth	0.0091	0.0153	0.0306	−0.0170
Colpatria				
TA/C	0.0917	0.0094	0.0800	0.1113
GDP Growth	0.0517	0.1285	0.2306	−0.2299
Inflation	4.1818	1.7092	7.7414	2.0785
Ln(Z)	133.2116	240.4804	643.8331	14.7902
LLP/TL	0.0160	0.0077	0.0320	0.0047
ROA	0.0160	0.0077	0.0320	0.0047
Total Asset Growth	0.0147	0.0186	0.0365	−0.0296
Banco Davivienda				
TA/C	−0.6974	2.5568	−7.9740	0.1308
GDP Growth	0.0517	0.1285	0.2306	−0.2299
Inflation	4.1818	1.7092	7.7414	2.0785

Table A.6 Continued

	Mean	Std. Dev	Maximum	Minimum
Ln(Z)	−404.2063	1418.5508	247.6691	−4181.5907
LLP/TL	0.0157	0.0098	0.0417	0.0068
ROA	0.0157	0.0098	0.0417	0.0068
Total Asset Growth	0.0134	0.0135	0.0328	−0.0095
Itau Corpbanca Colombia				
TA/C	0.1248	0.0447	0.1011	0.2350
GDP Growth	0.0517	0.1285	0.2306	−0.2299
Inflation	4.1818	1.7092	7.7414	2.0785
Ln(Z)	57.3050	42.9279	137.8900	25.7724
LLP/TL	0.0068	0.0073	0.0190	−0.0011
ROA	0.0068	0.0073	0.0190	−0.0011
Total Asset Growth	0.0161	0.0390	0.0933	−0.0215

A.2.6 Costa Rica

Table A.7: Descriptive Statistics for Banks in Costa Rica

	Mean	Std. Dev	Maximum	Minimum
Banco BAC San Jose				
TA/C	0.1126	0.0097	0.0898	0.1232
GDP Growth	0.0783	0.0671	0.2194	−0.0017
Inflation	5.2010	3.0371	11.4177	2.0035
Ln(Z)	46.6162	44.9109	170.6223	13.1230
LLP/TL	0.0164	0.0057	0.0229	0.0022
ROA	0.0164	0.0057	0.0229	0.0022
Total Asset Growth	0.0186	0.0145	0.0539	−0.0021
Banco BCT				
TA/C	0.1265	0.0115	0.1064	0.1442
GDP Growth	0.0783	0.0671	0.2194	−0.0017
Inflation	5.2010	3.0371	11.4177	2.0035
Ln(Z)	44.1106	14.2341	69.4557	15.3275
LLP/TL	0.0129	0.0039	0.0209	0.0072
ROA	0.0129	0.0039	0.0209	0.0072
Total Asset Growth	0.0246	0.0269	0.0745	−0.0052
Banco Davivienda Costa Rica				
TA/C	0.1007	0.0138	0.0872	0.1252
GDP Growth	0.0783	0.0671	0.2194	−0.0017
Inflation	5.2010	3.0371	11.4177	2.0035
Ln(Z)	67.3928	69.7258	181.5001	4.6574
LLP/TL	0.0142	0.0152	0.0485	0.0036

Table A.7 Continued

	Mean	Std. Dev	Maximum	Minimum
ROA	0.0142	0.0152	0.0485	0.0036
Total Asset Growth	0.0156	0.0255	0.0776	−0.0199
Banco de Costa Rica				
TA/C	0.0412	0.2019	−0.5672	0.1151
GDP Growth	0.0783	0.0671	0.2194	−0.0017
Inflation	5.2010	3.0371	11.4177	2.0035
Ln(Z)	34.8871	48.1168	89.0243	−91.1792
LLP/TL	0.0089	0.0057	0.0248	0.0034
ROA	0.0089	0.0057	0.0248	0.0034
Total Asset Growth	0.0110	0.0305	0.0743	−0.0496
Banco General				
TA/C	0.2456	0.2727	0.0851	0.9756
GDP Growth	0.0783	0.0671	0.2194	−0.0017
Inflation	5.2010	3.0371	11.4177	2.0035
Ln(Z)	57.8509	34.9410	124.6112	6.6008
LLP/TL	0.0087	0.0193	0.0665	0.0003
ROA	0.0087	0.0193	0.0665	0.0003
Total Asset Growth	0.0967	0.1280	0.4188	6.4177×10^{-5}
Banco Improsa				
TA/C	0.0995	0.0165	0.0765	0.1196
GDP Growth	0.0783	0.0671	0.2194	−0.0017
Inflation	5.2010	3.0371	11.4177	2.0035
Ln(Z)	81.9128	56.9970	227.7848	36.1890

Table A.7 Continued

	Mean	Std. Dev	Maximum	Minimum
LLP/TL	0.0081	0.0021	0.0119	0.0050
ROA	0.0081	0.0021	0.0119	0.0050
Total Asset Growth	0.0099	0.0161	0.0380	−0.0175
Banco Nacional de Costa Rica				
TA/C	0.0960	0.0293	0.0249	0.1525
GDP Growth	0.0783	0.0671	0.2194	−0.0017
Inflation	5.2010	3.0371	11.4177	2.0035
Ln(Z)	74.5888	63.2115	222.2504	27.3244
LLP/TL	0.0079	0.0029	0.0141	0.0033
ROA	0.0079	0.0029	0.0141	0.0033
Total Asset Growth	0.0085	0.0095	0.0265	−0.0068
Banco Promerica				
TA/C	0.0859	0.0090	0.0686	0.0960
GDP Growth	0.0783	0.0671	0.2194	−0.0017
Inflation	5.2010	3.0371	11.4177	2.0035
Ln(Z)	49.2911	46.2679	138.7317	12.8950
LLP/TL	0.0113	0.0046	0.0228	0.0062
ROA	0.0113	0.0046	0.0228	0.0062
Total Asset Growth	0.0250	0.0095	0.0467	0.0086
Citibank Costa Rica				
TA/C	0.1620	0.0394	0.0979	0.2223
GDP Growth	0.0783	0.0671	0.2194	−0.0017
Inflation	5.2010	3.0371	11.4177	2.0035

Table A.7 Continued

	Mean	Std. Dev	Maximum	Minimum
Ln(Z)	45.6419	21.1510	100.7535	26.2309
LLP/TL	0.0088	0.0066	0.0242	−0.0009
ROA	0.0088	0.0066	0.0242	−0.0009
Total Asset Growth	−0.0066	0.0481	0.0966	−0.0769
Scotiabank de Costa Rica				
TA/C	0.1076	0.0101	0.0904	0.1177
GDP Growth	0.0783	0.0671	0.2194	−0.0017
Inflation	5.2010	3.0371	11.4177	2.0035
Ln(Z)	65.6736	45.3562	170.3914	12.1619
LLP/TL	0.0050	0.0031	0.0108	0.0004
ROA	0.0050	0.0031	0.0108	0.0004
Total Asset Growth	0.0122	0.0157	0.0451	−0.0112

A.2.7 Dominican Republic

Table A.8: Descriptive Statistics for Banks in Dominican Republic

	Mean	Std. Dev	Maximum	Minimum
Banco BDI, S.A.				
TA/C	0.0713	0.0476	0	0.0979
GDP Growth	0.0574	0.0303	0.1159	0.0018
Inflation	4.4162	2.9065	10.3917	0.6408
Ln(Z)	206.6817	35.0711	239.5799	169.7811
LLP/TL	0.0107	0.0025	0.0131	0.0075
ROA	0.0107	0.0025	0.0131	0.0075
Total Asset Growth	0.0040	0.0035	0.0080	0.0015
Banco de Ahorro y Credito Union, S.A.				
TA/C	−0.1534	0.6583	−1.5079	0.9058
GDP Growth	0.0574	0.0303	0.1159	0.0018
Inflation	4.4162	2.9065	10.3917	0.6408
Ln(Z)	47.9361	11.4759	60.6378	38.3149
LLP/TL	0.0198	0.0283	0.0820	−0.0165
ROA	0.0198	0.0283	0.0820	−0.0165
Total Asset Growth	0.0343	0.0583	0.1347	−0.0531
Banco de Nueva Escocia				
TA/C	0.1951	0.0155	0.1561	0.2083
GDP Growth	0.0574	0.0303	0.1159	0.0018
Inflation	4.4162	2.9065	10.3917	0.6408
Ln(Z)	70.6198	74.4675	218.1364	23.3274
LLP/TL	0.0193	0.0084	0.0378	0.0118

Table A.8 Continued

	Mean	Std. Dev	Maximum	Minimum
ROA	0.0193	0.0084	0.0378	0.0118
Total Asset Growth	0.0032	0.0033	0.0097	0.0002
Banco Banco de Reservas de la Republica Dominicana				
TA/C	0.0698	0.0048	0.0639	0.0818
GDP Growth	0.0574	0.0303	0.1159	0.0018
Inflation	4.4162	2.9065	10.3917	0.6408
Ln(Z)	56.5840	86.7261	316.7565	16.1299
LLP/TL	0.0146	0.0031	0.0199	0.0093
ROA	0.0146	0.0031	0.0199	0.0093
Total Asset Growth	0.0054	0.0036	0.0102	−0.0010
Banco Dominicano del Progreso				
TA/C	0.0908	0.0169	0.0690	0.1123
GDP Growth	0.0574	0.0303	0.1159	0.0018
Inflation	4.4162	2.9065	10.3917	0.6408
Ln(Z)	38.7457	46.6992	162.3236	9.4671
LLP/TL	0.0101	0.0046	0.0152	0.0012
ROA	0.0101	0.0046	0.0152	0.0012
Total Asset Growth	0.0046	0.0055	0.0134	−0.0032
Banco Multiple BHD Leon, S.A.				
TA/C	0.0758	0.0588	0	0.1200
GDP Growth	0.0574	0.0303	0.1159	0.0018
Inflation	4.4162	2.9065	10.3917	0.6408
Ln(Z)	253.9711	387.0575	928.0774	8.5040

Table A.8 Continued

	Mean	Std. Dev	Maximum	Minimum
LLP/TL	0.0236	0.0022	0.0264	0.0209
ROA	0.0236	0.0022	0.0264	0.0209
Total Asset Growth	0.0080	0.0090	0.0234	0.0003
Banca Multiple Santa Cruz				
TA/C	0.0990	0.0108	0.0842	0.1189
GDP Growth	0.0574	0.0303	0.1159	0.0018
Inflation	4.4162	2.9065	10.3917	0.6408
Ln(Z)	55.6009	79.4803	257.0538	15.6998
LLP/TL	0.0157	0.0048	0.0255	0.0073
ROA	0.0157	0.0048	0.0255	0.0073
Total Asset Growth	0.0121	0.0042	0.0184	0.0069
Banco Popular Dominicano, S.A. Banca Multiple				
TA/C	0.0957	0.0079	0.0856	0.1070
GDP Growth	0.0574	0.0303	0.1159	0.0018
Inflation	4.4162	2.9065	10.3917	0.6408
Ln(Z)	123.8715	71.0524	228.6914	23.8363
LLP/TL	0.0183	0.0015	0.0210	0.0168
ROA	0.0183	0.0015	0.0210	0.0168
Total Asset Growth	0.0045	0.0014	0.0070	0.0033
Banco Vimenca S.A.				
TA/C	0.3605	0.0872	0.1875	0.4208
GDP Growth	0.0574	0.0303	0.1159	0.0018
Inflation	4.4162	2.9065	10.3917	0.6408

Table A.8 Continued

	Mean	**Std. Dev**	**Maximum**	**Minimum**
Ln(Z)	22.6653	12.9202	38.6885	4.2498
LLP/TL	0.0248	0.0119	0.0459	0.0094
ROA	0.0248	0.0119	0.0459	0.0094
Total Asset Growth	0.0179	0.0213	0.0550	0.0023
Citibank				
TA/C	0.1606	0.0325	0.1376	0.1836
GDP Growth	0.0574	0.0303	0.1159	0.0018
Inflation	4.4162	2.9065	10.3917	0.6408
Ln(Z)				
LLP/TL	0.0364	0.0163	0.0480	0.0249
ROA	0.0364	0.0163	0.0480	0.0249
Total Asset Growth	−0.0006		−0.0006	−0.0006

A.2.8 Ecuador

Table A.9: Descriptive Statistics for Banks in Ecuador

	Mean	Std. Dev	Maximum	Minimum
Banco Bolivariano				
TA/C	0.0861	0.0047	0.0794	0.0936
GDP Growth	0.0728	0.0678	0.2108	−0.0239
Inflation	3.8745	4.2240	13.8473	−2.4910
Ln(Z)	33.4138	14.5766	60.0182	20.8397
LLP/TL	0.0116	0.0029	0.0175	0.0067
ROA	0.0116	0.0029	0.0175	0.0067
Total Asset Growth	0.0138	0.0108	0.0284	−0.0085
Banco de Guayaquil				
TA/C	0.0994	0.0121	0.0808	0.1134
GDP Growth	0.0728	0.0678	0.2108	−0.0239
Inflation	3.8745	4.2240	13.8473	−2.4910
Ln(Z)	39.1876	20.0290	76.7869	10.2462
LLP/TL	0.0115	0.0088	0.0307	−0.0014
ROA	0.0115	0.0088	0.0307	−0.0014
Total Asset Growth	0.0091	0.0097	0.0203	−0.0156
Banco de la Produccion Produbanco				
TA/C	0.0837	0.0047	0.0753	0.0881
GDP Growth	0.0728	0.0678	0.2108	−0.0239
Inflation	3.8745	4.2240	13.8473	−2.4910
Ln(Z)	72.7166	56.2758	156.2152	10.0167
LLP/TL	0.0098	0.0027	0.0141	0.0066

Table A.9 Continued

	Mean	Std. Dev	Maximum	Minimum
ROA	0.0098	0.0027	0.0141	0.0066
Total Asset Growth	0.0053	0.0063	0.0117	−0.0065
Banco Mutualista Pichincha				
TA/C	0.0970	0.0067	0.0848	0.1092
GDP Growth	0.0728	0.0678	0.2108	−0.0239
Inflation	3.8745	4.2240	13.8473	−2.4910
Ln(Z)	−5.5579	29.7887	30.8511	−62.8535
LLP/TL	0.0106	0.0052	0.0225	0.0049
ROA	0.0106	0.0052	0.0225	0.0049
Total Asset Growth	0.0112	0.0154	0.0444	−0.0130

A.2.9 Guatemala

Table A.10: Descriptive Statistics for Banks in Guatemala

	Mean	Std. Dev	Maximum	Minimum
Banco Promerica de Guatemala				
TA/C	0.1932	0.0641	0.1212	0.2814
GDP Growth	0.0798	0.0515	0.1528	−0.0358
Inflation	4.3864	2.0459	9.4407	2.9375
Ln(Z)	27.0120	15.7068	50.0084	8.0200
LLP/TL	0.0214	0.0123	0.0399	0.0098
ROA	0.0214	0.0123	0.0399	0.0098
Total Asset Growth	0.0142	0.0469	0.1070	−0.0268
BAC Reformador				
TA/C	0.1189	0.0209	0.0942	0.1450
GDP Growth	0.0798	0.0515	0.1528	−0.0358
Inflation	4.3864	2.0459	9.4407	2.9375
Ln(Z)	80.3472	36.9155	140.4834	48.1046
LLP/TL	0.0189	0.0113	0.0332	0.0032
ROA	0.0189	0.0113	0.0332	0.0032
Total Asset Growth	0.0375	0.0525	0.1433	0.0070
Banco Agromercantil de Guatemala, S.A.				
TA/C	0.1012	0.0094	0.0897	0.1181
GDP Growth	0.0798	0.0515	0.1528	−0.0358
Inflation	4.3864	2.0459	9.4407	2.9375
Ln(Z)	397.0611	707.1325	1655.1663	37.2056
LLP/TL	0.0100	0.0025	0.0129	0.0057

Table A.10 Continued

	Mean	Std. Dev	Maximum	Minimum
ROA	0.0100	0.0025	0.0129	0.0057
Total Asset Growth	0.0114	0.0096	0.0284	0.0045
Banco de Guatemala				
TA/C	0.0777	0.0106	0.0689	0.0967
GDP Growth	0.0798	0.0515	0.1528	−0.0358
Inflation	4.3864	2.0459	9.4407	2.9375
Ln(Z)	79.0132	51.9008	168.0055	31.3779
LLP/TL	0.0148	0.0010	0.0156	0.0129
ROA	0.0148	0.0010	0.0156	0.0129
Total Asset Growth	0.0099	0.0030	0.0131	0.0065
Banco Promerica de los Trabajadores				
TA/C	0.1091	0.0111	0.0922	0.1220
GDP Growth	0.0798	0.0515	0.1528	−0.0358
Inflation	4.3864	2.0459	9.4407	2.9375
Ln(Z)	38.3108	17.8418	55.8193	7.4064
LLP/TL	0.0216	0.0028	0.0249	0.0170
ROA	0.0216	0.0028	0.0249	0.0170
Total Asset Growth	0.0187	0.0067	0.0258	0.0111
Banco G y T Continental				
TA/C	0.0838	0.0052	0.0764	0.0916
GDP Growth	0.0798	0.0515	0.1528	−0.0358
Inflation	4.3864	2.0459	9.4407	2.9375
Ln(Z)	226.6392	164.9995	444.9374	54.3636

Table A.10 Continued

	Mean	Std. Dev	Maximum	Minimum
LLP/TL	0.0118	0.0017	0.0148	0.0101
ROA	0.0118	0.0017	0.0148	0.0101
Total Asset Growth	0.0051	0.0185	0.0339	−0.0170
Banco Internacional, S.A.				
TA/C	0.0921	0.0050	0.0871	0.0973
GDP Growth	0.0798	0.0515	0.1528	−0.0358
Inflation	4.3864	2.0459	9.4407	2.9375
Ln(Z)	89.5756	77.5770	219.0181	13.6215
LLP/TL	0.0147	0.0009	0.0160	0.0136
ROA	0.0147	0.0009	0.0160	0.0136
Total Asset Growth	0.0157	0.0026	0.0194	0.0135
Banrural, S.A.				
TA/C	0.1149	0.0016	0.1130	0.1168
GDP Growth	0.0798	0.0515	0.1528	−0.0358
Inflation	4.3864	2.0459	9.4407	2.9375
Ln(Z)	44.6590	9.6045	56.5034	36.1743
LLP/TL	0.0180	0.0040	0.0236	0.0144
ROA	0.0180	0.0040	0.0236	0.0144
Total Asset Growth	0.0114	0.0036	0.0155	0.0058
El Credito Hiotecario Nacional de Guatemala				
TA/C	0.0593	0.0156	0.0444	0.0846
GDP Growth	0.0798	0.0515	0.1528	−0.0358
Inflation	4.3864	2.0459	9.4407	2.9375

Table A.10 Continued

	Mean	**Std. Dev**	**Maximum**	**Minimum**
Ln(Z)	75.0344	65.3609	172.2405	33.3177
LLP/TL	0.0039	0.0010	0.0051	0.0029
ROA	0.0039	0.0010	0.0051	0.0029
Total Asset Growth	0.0095	0.0105	0.0224	−0.0025

A.2.10 Honduras

Table A.11: Descriptive Statistics for Banks in Honduras

	Mean	Std. Dev	Maximum	Minimum
Banco del Pais				
TA/C	0.1028	0.0147	0.0774	0.1233
GDP Growth	0.0626	0.0364	0.1234	−0.0015
Inflation	5.1395	2.3948	7.8072	1.3740
Ln(Z)	85.7764	56.2270	218.1380	38.3949
LLP/TL	0.0155	0.0018	0.0176	0.0130
ROA	0.0155	0.0018	0.0176	0.0130
Total Asset Growth	0.0112	0.0048	0.0169	0.0039
Banco Atlantida				
TA/C	0.0991	0.0429	0.0207	0.1810
GDP Growth	0.0626	0.0364	0.1234	−0.0015
Inflation	5.1395	2.3948	7.8072	1.3740
Ln(Z)	53.9607	46.7653	122.0724	19.6417
LLP/TL	0.0104	0.0015	0.0118	0.0071
ROA	0.0104	0.0015	0.0118	0.0071
Total Asset Growth	0.0092	0.0027	0.0122	0.0046
Banco Davivienda Honduras				
TA/C	0.1119	0.0095	0.0961	0.1251
GDP Growth	0.0626	0.0364	0.1234	−0.0015
Inflation	5.1395	2.3948	7.8072	1.3740
Ln(Z)	130.2372	85.2719	233.6930	32.5331
LLP/TL	0.0113	0.0041	0.0176	0.0054

Table A.11 Continued

	Mean	Std. Dev	Maximum	Minimum
ROA	0.0113	0.0041	0.0176	0.0054
Total Asset Growth	−0.0014	0.0251	0.0158	−0.0549
Banco de America Central Honduras BAC Bamer				
TA/C	0.1333	0.0207	0.1185	0.1917
GDP Growth	0.0626	0.0364	0.1234	−0.0015
Inflation	5.1395	2.3948	7.8072	1.3740
Ln(Z)	123.5167	140.6609	420.8838	24.4331
LLP/TL	0.0259	0.0029	0.0311	0.0216
ROA	0.0259	0.0029	0.0311	0.0216
Total Asset Growth	0.0141	0.0180	0.0477	−0.0226
Banco de Desarrollo Rural Honduras, S.A.				
TA/C	0.1320	0.0569	0.0659	0.2042
GDP Growth	0.0626	0.0364	0.1234	−0.0015
Inflation	5.1395	2.3948	7.8072	1.3740
Ln(Z)	89.2712	85.0189	253.5704	17.2546
LLP/TL	−0.0080	0.0135	0.0061	−0.0254
ROA	−0.0080	0.0135	0.0061	−0.0254
Total Asset Growth	0.0675	0.1252	0.3474	−0.0059
Banco de Occidente, S.A.				
TA/C	0.1024	0.0192	0.0581	0.1252
GDP Growth	0.0626	0.0364	0.1234	−0.0015
Inflation	5.1395	2.3948	7.8072	1.3740
Ln(Z)	101.6679	43.5960	140.4926	48.3030

Table A.11 Continued

	Mean	Std. Dev	Maximum	Minimum
LLP/TL	0.0144	0.0024	0.0189	0.0108
ROA	0.0144	0.0024	0.0189	0.0108
Total Asset Growth	0.0096	0.0097	0.0251	−0.0096
Banco Financiera Centroamericana, S.A.				
TA/C	0.1143	0.0075	0.1021	0.1254
GDP Growth	0.0626	0.0364	0.1234	−0.0015
Inflation	5.1395	2.3948	7.8072	1.3740
Ln(Z)	135.7872	86.8983	268.0218	31.7998
LLP/TL	0.0101	0.0024	0.0144	0.0068
ROA	0.0101	0.0024	0.0144	0.0068
Total Asset Growth	0.0080	0.0099	0.0218	−0.0065
Banco Financiera Comercial Hondurena, S.A.				
TA/C	0.1236	0.0173	0.1063	0.1473
GDP Growth	0.0626	0.0364	0.1234	−0.0015
Inflation	5.1395	2.3948	7.8072	1.3740
Ln(Z)	52.2931	23.4867	73.3157	5.6681
LLP/TL	0.0038	0.0014	0.0056	0.0021
ROA	0.0038	0.0014	0.0056	0.0021
Total Asset Growth	−0.0097	0.0408	0.0153	−0.0568
Banco Laifse (Honduras)				
TA/C	0.0748	0.0118	0.0589	0.0869
GDP Growth	0.0626	0.0364	0.1234	−0.0015
Inflation	5.1395	2.3948	7.8072	1.3740

Table A.11 Continued

	Mean	Std. Dev	Maximum	Minimum
Ln(Z)	72.3131	33.7749	98.3695	5.9185
LLP/TL	0.0048	0.0035	0.0102	0.0008
ROA	0.0048	0.0035	0.0102	0.0008
Total Asset Growth	0.0065	0.0112	0.0238	−0.0119
Banco Promerica Honduras				
TA/C	0.0944	0.0159	0.0595	0.1136
GDP Growth	0.0626	0.0364	0.1234	−0.0015
Inflation	5.1395	2.3948	7.8072	1.3740
Ln(Z)	67.1741	50.3849	178.2866	36.3875
LLP/TL	0.0128	0.0034	0.0178	0.0082
ROA	0.0128	0.0034	0.0178	0.0082
Total Asset Growth	0.0188	0.0140	0.0434	0.0016

A.2.11 Mexico

Table A.12: Descriptive Statistics for Banks in Mexico

	Mean	Std. Dev	Maximum	Minimum
Banco del Pais				
Banco Inbursa				
TA/C	0.2464	0.0231	0.2158	0.2913
GDP Growth	0.0190	0.1054	0.1753	−0.1891
Inflation	4.6120	1.5233	6.7608	1.5297
Ln(Z)	63.3809	52.7205	183.6513	4.2255
LLP/TL	0.0308	0.0103	0.0469	0.0153
ROA	0.0308	0.0103	0.0469	0.0153
Total Asset Growth	0.0075	0.0205	0.0553	−0.0202
Banco Interacciones				
TA/C	0.0618	0.0113	0.0407	0.0803
GDP Growth	0.0190	0.1054	0.1753	−0.1891
Inflation	4.6120	1.5233	6.7608	1.5297
Ln(Z)	72.6486	38.6864	126.5935	19.2524
LLP/TL	0.0115	0.0015	0.0142	0.0091
ROA	0.0115	0.0015	0.0142	0.0091
Total Asset Growth	0.0146	0.0238	0.0701	−0.0155
Banco Mercantil del Norte				
TA/C	0.0888	0.0146	0.0640	0.1118
GDP Growth	0.0190	0.1054	0.1753	−0.1891
Inflation	4.6120	1.5233	6.7608	1.5297
Ln(Z)	66.6220	31.3909	106.5991	19.9967

Table A.12 Continued

	Mean	Std. Dev	Maximum	Minimum
LLP/TL	0.0140	0.0033	0.0210	0.0093
ROA	0.0140	0.0033	0.0210	0.0093
Total Asset Growth	0.0079	0.0236	0.0689	−0.0202
Banco Nacional de Mexico				
TA/C	0.1446	0.0232	0.1270	0.2121
GDP Growth	0.0190	0.1054	0.1753	−0.1891
Inflation	4.6120	1.5233	6.7608	1.5297
Ln(Z)	68.3277	58.5776	170.3556	14.0447
LLP/TL	0.0159	0.0030	0.0197	0.0117
ROA	0.0159	0.0030	0.0197	0.0117
Total Asset Growth	0.0021	0.0122	0.0309	−0.0163
Banco Santander de Mexico				
TA/C	0.1077	0.0171	0.0796	0.1304
GDP Growth	0.0190	0.1054	0.1753	−0.1891
Inflation	4.6120	1.5233	6.7608	1.5297
Ln(Z)	73.1477	40.4499	136.2524	26.4919
LLP/TL	0.0176	0.0055	0.0254	0.0114
ROA	0.0176	0.0055	0.0254	0.0114
Total Asset Growth	0.0058	0.0197	0.0492	−0.0327
Banco Mext				
TA/C	0.0614	0.0078	0.0462	0.0768
GDP Growth	0.0190	0.1054	0.1753	−0.1891
Inflation	4.6120	1.5233	6.7608	1.5297

Table A.12 Continued

	Mean	Std. Dev	Maximum	Minimum
Ln(Z)	61.7788	57.3354	216.6607	21.5320
LLP/TL	0.0015	0.0061	0.0055	−0.0161
ROA	0.0015	0.0061	0.0055	−0.0161
Total Asset Growth	0.0106	0.0191	0.0448	−0.0183
Deustche Bank Mexico, S.A.				
TA/C	0.1094	0.0135	0.0959	0.1275
GDP Growth	0.0190	0.1054	0.1753	−0.1891
Inflation	4.6120	1.5233	6.7608	1.5297
Ln(Z)	36.0369	19.8774	79.9688	19.3461
LLP/TL	0.0123	0.0048	0.0227	0.0075
ROA	0.0123	0.0048	0.0227	0.0075
Total Asset Growth	0.0086	0.0106	0.0243	−0.0099
HSBC Mexico				
TA/C	0.0779	0.0269	0	0.1022
GDP Growth	0.0190	0.1054	0.1753	−0.1891
Inflation	4.6120	1.5233	6.7608	1.5297
Ln(Z)	73.6257	47.8667	143.7459	11.8448
LLP/TL	0.0032	0.0030	0.0082	−0.0012
ROA	0.0032	0.0030	0.0082	−0.0012
Total Asset Growth	0.0023	0.0156	0.0201	−0.0290
Scotiabank Inverlat, S.A.				
TA/C	0.1255	0.0251	0.0947	0.1603
GDP Growth	0.0190	0.1054	0.1753	−0.1891

Table A.12 Continued

	Mean	**Std. Dev**	**Maximum**	**Minimum**
Inflation	4.6120	1.5233	6.7608	1.5297
Ln(Z)	52.3653	56.4315	176.0583	1.1377
LLP/TL	0.0146	0.0027	0.0196	0.0115
ROA	0.0146	0.0027	0.0196	0.0115
Total Asset Growth	0.0074	0.0112	0.0179	−0.0162

A.2.12 Panama

Table A.13: Descriptive Statistics for Banks in Panama

	Mean	Std. Dev	Maximum	Minimum
BAC International Bank				
TA/C	0.1126	0.0066	0.1015	0.1196
GDP Growth	0.1078	0.0476	0.1813	0.0445
Inflation	4.1497	2.2626	7.5275	0.7451
Ln(Z)	60.5256	50.2795	120.0067	12.4727
LLP/TL	0.0207	0.0047	0.0325	0.0171
ROA	0.0207	0.0047	0.0325	0.0171
Total Asset Growth	0.0122	0.0081	0.0308	0.0023
Banco General, S.A.				
TA/C	0.1100	0.0370	0	0.1316
GDP Growth	0.1078	0.0476	0.1813	0.0445
Inflation	4.1497	2.2626	7.5275	0.7451
Ln(Z)	45.3201	24.5295	92.4977	12.8852
LLP/TL	0.0234	0.0008	0.0245	0.0222
ROA	0.0234	0.0008	0.0245	0.0222
Total Asset Growth	0.0092	0.0037	0.0141	0.0032
Banco Latinoamericano de Comercio Exterior, S.A.				
TA/C	0.1354	0.0217	0.1135	0.1831
GDP Growth	0.1078	0.0476	0.1813	0.0445
Inflation	4.1497	2.2626	7.5275	0.7451
Ln(Z)	290.3955	473.4112	1686.5661	52.9138
LLP/TL	0.0114	0.0037	0.0144	0.0015

Table A.13 Continued

	Mean	Std. Dev	Maximum	Minimum
ROA	0.0114	0.0037	0.0144	0.0015
Total Asset Growth	0.0029	0.0096	0.0181	−0.0090
Banco Nacional de Panama, S.A.				
TA/C	−0.0309	0.3698	−1.1457	0.0910
GDP Growth	0.1078	0.0476	0.1813	0.0445
Inflation	4.1497	2.2626	7.5275	0.7451
Ln(Z)	221.1501	182.0615	621.9565	30.5587
LLP/TL	0.0171	0.0072	0.0364	0.0105
ROA	0.0171	0.0072	0.0364	0.0105
Total Asset Growth	0.0078	0.0468	0.1206	−0.0841
Bancolombia (Panama)				
TA/C	0.0989	0.0242	0.0617	0.1317
GDP Growth	0.1078	0.0476	0.1813	0.0445
Inflation	4.1497	2.2626	7.5275	0.7451
Ln(Z)	76.9222	39.9554	142.4147	36.8802
LLP/TL	0.0115	0.0134	0.0346	−0.0189
ROA	0.0115	0.0134	0.0346	−0.0189
Total Asset Growth	−0.0192	0.1021	0.0377	−0.3248
Banesco				
TA/C	0.0890	0.0124	0.0704	0.1123
GDP Growth	0.1078	0.0476	0.1813	0.0445
Inflation	4.1497	2.2626	7.5275	0.7451
Ln(Z)	146.0935	142.7878	467.7941	3.1551

Table A.13 Continued

	Mean	Std. Dev	Maximum	Minimum
LLP/TL	0.0134	0.0041	0.0194	0.0080
ROA	0.0134	0.0041	0.0194	0.0080
Total Asset Growth	0.0981	0.2422	0.8264	0.0010
Banistmo				
TA/C	0.1120	0.0039	0.1062	0.1165
GDP Growth	0.1078	0.0476	0.1813	0.0445
Inflation	4.1497	2.2626	7.5275	0.7451
Ln(Z)	29.0485	56.0098	127.0543	−88.5120
LLP/TL	0.0096	0.0029	0.0141	0.0050
ROA	0.0096	0.0029	0.0141	0.0050
Total Asset Growth	0.0021	0.0048	0.0078	−0.0054
Caja de Ahorros				
TA/C	0.1113	0.0125	0.0952	0.1314
GDP Growth	0.1078	0.0476	0.1813	0.0445
Inflation	4.1497	2.2626	7.5275	0.7451
Ln(Z)	203.2451	301.4747	1023.7132	3.5450
LLP/TL	0.0100	0.0047	0.0157	0.0011
ROA	0.0100	0.0047	0.0157	0.0011
Total Asset Growth	0.0164	0.0105	0.0414	0.0049
Global Bank Corporation				
TA/C	0.0844	0.0111	0.0632	0.1036
GDP Growth	0.1078	0.0476	0.1813	0.0445
Inflation	4.1497	2.2626	7.5275	0.7451

Table A.13 Continued

	Mean	**Std. Dev**	**Maximum**	**Minimum**
Ln(Z)	39.1610	20.5239	70.7395	0.3234
LLP/TL	0.0070	0.0020	0.0105	0.0035
ROA	0.0070	0.0020	0.0105	0.0035
Total Asset Growth	0.0195	0.0092	0.0326	0.0025
Multibank				
TA/C	0.1024	0.0048	0.0935	0.1101
GDP Growth	0.1078	0.0476	0.1813	0.0445
Inflation	4.1497	2.2626	7.5275	0.7451
Ln(Z)	79.8954	118.5592	372.8182	5.1789
LLP/TL	0.0128	0.0009	0.0142	0.0116
ROA	0.0128	0.0009	0.0142	0.0116
Total Asset Growth	0.0184	0.0081	0.0283	0.0050

A.2.13 Paraguay

Table A.14: Descriptive Statistics for Banks in Paraguay

	Mean	Std. Dev	Maximum	Minimum
Banco Atlas				
TA/C	0.1157	0.0149	0.1049	0.1515
GDP Growth	0.0870	0.1477	0.3764	−0.1021
Inflation	4.4136	2.8133	12.1939	1.6048
Ln(Z)	58.0809	23.1451	92.6651	34.7848
LLP/TL	0.0179	0.0105	0.0256	0.0010
ROA	0.0179	0.0105	0.0256	0.0010
Total Asset Growth	0.0646	0.1127	0.3169	0.0048
Banco Continental				
TA/C	0.4998	0.4297	0.1565	1.0556
GDP Growth	0.1634	0.2352	0.5975	−0.1580
Inflation	4.4136	2.8133	12.1939	1.6048
Ln(Z)	74.0595	64.4428	163.1179	13.3357
LLP/TL	0.0133	0.0102	0.0239	0.0023
ROA	0.0133	0.0102	0.0239	0.0023
Total Asset Growth	0.0248	0.0292	0.0779	−0.0133
Banco GNB Paraguay				
TA/C	0.1101	0.0164	0.0884	0.1357
GDP Growth	0.0870	0.1477	0.3764	−0.1021
Inflation	4.4136	2.8133	12.1939	1.6048
Ln(Z)	35.5145	18.8699	63.8191	3.2289
LLP/TL	0.0180	0.0034	0.0215	0.0125

Table A.14 Continued

	Mean	Std. Dev	Maximum	Minimum
ROA	0.0180	0.0034	0.0215	0.0125
Total Asset Growth	0.0102	0.0058	0.0171	0.0046
Banco Itau Paraguay				
TA/C	0.1310	0.0129	0.1108	0.1497
GDP Growth	0.0870	0.1477	0.3764	−0.1021
Inflation	4.4136	2.8133	12.1939	1.6048
Ln(Z)	1371.2723	3878.6822	12 402.1631	9.8996
LLP/TL	0.0381	0.0043	0.0450	0.0319
ROA	0.0381	0.0043	0.0450	0.0319
Total Asset Growth	0.0158	0.0244	0.0620	−0.0062
Banco Nacional de Fomento				
TA/C	0.1501	0.0339	0.0769	0.1771
GDP Growth	0.0870	0.1477	0.3764	−0.1021
Inflation	4.4136	2.8133	12.1939	1.6048
Ln(Z)	46.9824	36.7393	119.7848	5.7572
LLP/TL	0.0245	0.0123	0.0434	0.0025
ROA	0.0245	0.0123	0.0434	0.0025
Total Asset Growth	0.0197	0.0164	0.0386	−0.0102
Banco Regional S.A.E.C.A.				
TA/C	0.0967	0.0181	0.0781	0.1306
GDP Growth	0.0870	0.1477	0.3764	−0.1021
Inflation	4.4136	2.8133	12.1939	1.6048
Ln(Z)	88.2412	115.4225	406.8707	15.4957

Table A.14 Continued

	Mean	Std. Dev	Maximum	Minimum
LLP/TL	0.0072	0.0062	0.0157	0.0004
ROA	0.0072	0.0062	0.0157	0.0004
Total Asset Growth	0.0281	0.0393	0.1220	−0.0130
BBVA Paraguay				
TA/C	0.0928	0.0103	0.0737	0.1135
GDP Growth	0.0870	0.1477	0.3764	−0.1021
Inflation	4.4136	2.8133	12.1939	1.6048
Ln(Z)	94.1596	44.9091	186.4141	43.0047
LLP/TL	0.0226	0.0138	0.0493	0.0099
ROA	0.0226	0.0138	0.0493	0.0099
Total Asset Growth	0.0160	0.0261	0.0665	−0.0177
Citibank Paraguay				
TA/C	0.1003	0.0360	0	0.1311
GDP Growth	0.0870	0.1477	0.3764	−0.1021
Inflation	4.4136	2.8133	12.1939	1.6048
Ln(Z)	165.7686	204.8018	562.8681	10.7228
LLP/TL	0.0119	0.0114	0.0334	−0.0011
ROA	0.0119	0.0114	0.0334	−0.0011
Total Asset Growth	−0.0002	0.0237	0.0363	−0.0293
SUDAMERIS BANK S.A.E.C.A.				
TA/C	0.1008	0.0205	0.0796	0.1497
GDP Growth	0.0870	0.1477	0.3764	−0.1021
Inflation	4.4136	2.8133	12.1939	1.6048

Table A.14 Continued

	Mean	Std. Dev	Maximum	Minimum
Ln(Z)	51.6748	43.2937	140.1001	12.0496
LLP/TL	0.0160	0.0048	0.0248	0.0103
ROA	0.0160	0.0048	0.0248	0.0103
Total Asset Growth	0.0198	0.0215	0.0630	−0.0085
Vision Banco S.A.E.C.A.				
TA/C	0.0906	0.0102	0.0771	0.1112
GDP Growth	0.0870	0.1477	0.3764	−0.1021
Inflation	4.4136	2.8133	12.1939	1.6048
Ln(Z)	61.1750	59.5286	200.4245	10.0750
LLP/TL	0.0124	0.0063	0.0210	0.0027
ROA	0.0124	0.0063	0.0210	0.0027
Total Asset Growth	0.0377	0.0490	0.1511	−0.0138

A.2.14 Peru

Table A.15: Descriptive Statistics for Banks in Peru

	Mean	Std. Dev	Maximum	Minimum
Banco Continental				
TA/C	0.4998	0.4297	0.1565	1.0556
GDP Growth	0.1634	0.2352	0.5975	−0.1580
Inflation	4.4136	2.8133	12.1939	1.6048
Ln(Z)	74.0595	64.4428	163.1179	13.3357
LLP/TL	0.0133	0.0102	0.0239	0.0023
ROA	0.0133	0.0102	0.0239	0.0023
Total Asset Growth	0.0248	0.0292	0.0779	−0.0133
Banco de Credito del Peru				
TA/C	0.1585	0.2174	0.0781	0.8128
GDP Growth	0.0764	0.0875	0.2210	−0.0558
Inflation	2.8909	1.8421	6.7458	1.0572
Ln(Z)	192.9801	310.8595	881.1748	10.4415
LLP/TL	0.0180	0.0052	0.0235	0.0049
ROA	0.0180	0.0052	0.0235	0.0049
Total Asset Growth	−0.0012	0.0494	0.0436	−0.1425
Banco Financiero				
TA/C	0.0860	0.0106	0.0717	0.1114
GDP Growth	0.0764	0.0875	0.2210	−0.0558
Inflation	2.8909	1.8421	6.7458	1.0572
Ln(Z)	42.7913	44.3256	132.9733	5.6032
LLP/TL	0.0113	0.0065	0.0210	0.0024

Table A.15 Continued

	Mean	Std. Dev	Maximum	Minimum
ROA	0.0113	0.0065	0.0210	0.0024
Total Asset Growth	0.0274	0.1566	0.4355	−0.2467
Banco Interamericano de Finanzas				
TA/C	0.0729	0.0079	0.0536	0.0862
GDP Growth	0.0764	0.0875	0.2210	−0.0558
Inflation	2.8909	1.8421	6.7458	1.0572
Ln(Z)	88.2410	81.0772	256.9988	12.3392
LLP/TL	0.0106	0.0024	0.0138	0.0070
ROA	0.0106	0.0024	0.0138	0.0070
Total Asset Growth	0.0179	0.0154	0.0530	−0.0050
Banco Internacional del Peru				
TA/C	0.0927	0.0127	0.0642	0.1126
GDP Growth	0.0764	0.0875	0.2210	−0.0558
Inflation	2.8909	1.8421	6.7458	1.0572
Ln(Z)	119.9204	96.5595	365.1546	33.1613
LLP/TL	0.0226	0.0028	0.0270	0.0185
ROA	0.0226	0.0028	0.0270	0.0185
Total Asset Growth	0.0153	0.0167	0.0540	−0.0049
Banco Santander Peru, S.A.				
TA/C	0.0942	0.0205	0.0672	0.1284
GDP Growth	0.0764	0.0875	0.2210	−0.0558
Inflation	2.8909	1.8421	6.7458	1.0572
Ln(Z)	49.0324	36.2133	99.0412	8.7199

Table A.15 Continued

	Mean	Std. Dev	Maximum	Minimum
LLP/TL	0.0075	0.0079	0.0146	−0.0110
ROA	0.0075	0.0079	0.0146	−0.0110
Total Asset Growth	0.0640	0.1316	0.4517	−0.0161
Citibank del Peru				
TA/C	0.1427	0.0310	0.0996	0.1999
GDP Growth	0.0764	0.0875	0.2210	−0.0558
Inflation	2.8909	1.8421	6.7458	1.0572
Ln(Z)	21.0983	16.9504	51.3266	4.4624
LLP/TL	0.0195	0.0130	0.0495	0.0061
ROA	0.0195	0.0130	0.0495	0.0061
Total Asset Growth	0.0097	0.0241	0.0567	−0.0229
HSBC Bank Peru, S.A.				
TA/C	0.1042	0.0177	0.0784	0.1284
GDP Growth	0.0764	0.0875	0.2210	−0.0558
Inflation	2.8909	1.8421	6.7458	1.0572
Ln(Z)	64.4471	78.6226	252.4720	7.3090
LLP/TL	−0.0035	0.0147	0.0100	−0.0301
ROA	−0.0035	0.0147	0.0100	−0.0301
Total Asset Growth	0.0257	0.0407	0.1182	−0.0110
Mi Banco				
TA/C	0.1117	0.0193	0.0846	0.1380
GDP Growth	0.0764	0.0875	0.2210	−0.0558
Inflation	2.8909	1.8421	6.7458	1.0572

Table A.15 Continued

	Mean	Std. Dev	Maximum	Minimum
Ln(Z)	101.5459	81.4845	265.3396	25.4235
LLP/TL	0.0191	0.0134	0.0348	−0.0118
ROA	0.0191	0.0134	0.0348	−0.0118
Total Asset Growth	0.0248	0.0311	0.0918	−0.0119
Scotiabank Peru				
TA/C	0.1283	0.0135	0.1010	0.1466
GDP Growth	0.0764	0.0875	0.2210	−0.0558
Inflation	2.8909	1.8421	6.7458	1.0572
Ln(Z)	170.6435	185.4473	512.0992	25.1580
LLP/TL	0.0229	0.0031	0.0277	0.0177
ROA	0.0229	0.0031	0.0277	0.0177
Total Asset Growth	0.0124	0.0163	0.0466	−0.0106

A.2.15 Puerto Rico

Table A.16: Descriptive Statistics for Banks in Puerto Rico

	Mean	Std. Dev	Maximum	Minimum
Banco Popular de Puerto Rico				
TA/C	0.1125	0.0214	0.0731	0.1428
GDP Growth	0	0	0	0
Inflation	0	0	0	0
Ln(Z)	75.5169	52.1530	171.5394	28.6943
LLP/TL	0.0052	0.0098	0.0250	−0.0095
ROA	0.0052	0.0098	0.0250	−0.0095
Total Asset Growth	0.0004	0.0053	0.0078	−0.0075
Oriental Bank				
TA/C	0.1157	0.0313	0.0504	0.1527
GDP Growth	0	0	0	0
Inflation	0	0	0	0
Ln(Z)	116.0447	139.6461	452.3369	9.0246
LLP/TL	0.0070	0.0051	0.0127	−0.0005
ROA	0.0070	0.0051	0.0127	−0.0005
Total Asset Growth	7.0446×10^{-5}	0.0090	0.0202	−0.0075
hline				

A.2.16 Uruguay

Table A.17: Descriptive Statistics for Banks in Puerto Rico

	Mean	Std. Dev	Maximum	Minimum
Banco de la Republica de Uruguay				
TA/C	0.0897	0.0093	0.0815	0.1074
GDP Growth	0.0941	0.1166	0.2971	−0.0692
Inflation	7.4904	1.6822	9.3722	4.7064
Ln(Z)	14.0293	11.3877	36.3354	7.0187
LLP/TL	0.0144	0.0071	0.0265	0.0046
ROA	0.0144	0.0071	0.0265	0.0046
Total Asset Growth	0.0060	0.0070	0.0164	−0.0056
Banco Hipotecario de Uruguay				
TA/C	0.4500	0.0193	0.4111	0.4666
GDP Growth	0.0941	0.1166	0.2971	−0.0692
Inflation	7.4904	1.6822	9.3722	4.7064
Ln(Z)	21.8739	17.2261	48.0362	6.4666
LLP/TL	0.0286	0.0177	0.0490	0.0020
ROA	0.0286	0.0177	0.0490	0.0020
Total Asset Growth	0.0068	0.0105	0.0215	−0.0064
Banco Itau de Uruguay				
TA/C	0.0828	0.0113	0.0641	0.1011
GDP Growth	0.0941	0.1166	0.2971	−0.0692
Inflation	7.4904	1.6822	9.3722	4.7064
Ln(Z)	22.0253	7.7554	31.8777	13.7920
LLP/TL	0.0162	0.0072	0.0264	0.0030

Table A.17 Continued

	Mean	Std. Dev	Maximum	Minimum
ROA	0.0162	0.0072	0.0264	0.0030
Total Asset Growth	0.0113	0.0201	0.0500	−0.0086
Banco Santander Uruguay				
TA/C	0.0793	0.0074	0.0714	0.0888
GDP Growth	0.0941	0.1166	0.2971	−0.0692
Inflation	7.4904	1.6822	9.3722	4.7064
Ln(Z)	31.5206	21.1715	66.5142	8.0956
LLP/TL	0.0075	0.0052	0.0157	0.0027
ROA	0.0075	0.0052	0.0157	0.0027
Total Asset Growth	0.0024	0.0091	0.0159	−0.0114
Citibank N.A. Uruguay				
TA/C	0.0637	0.0033	0.0591	0.0680
GDP Growth	0.0941	0.1166	0.2971	−0.0692
Inflation	7.4904	1.6822	9.3722	4.7064
Ln(Z)	161.0443	303.8022	704.2236	14.9388
LLP/TL	0.0111	0.0108	0.0276	0.0014
ROA	0.0111	0.0108	0.0276	0.0014
Total Asset Growth	−0.0055	0.0265	0.0250	−0.0300
HSBC Bank Urugay, S.A.				
TA/C	0.0600	0.0052	0.0550	0.0700
GDP Growth	0.0941	0.1166	0.2971	−0.0692
Inflation	7.4904	1.6822	9.3722	4.7064
Ln(Z)	72.9830	91.9209	254.4106	23.8958

Table A.17 Continued

	Mean	Std. Dev	Maximum	Minimum
LLP/TL	0.0010	0.0052	0.0068	−0.0063
ROA	0.0010	0.0052	0.0068	−0.0063
Total Asset Growth	0.0007	0.0237	0.0291	−0.0317
Scotiabank Uruguay				
TA/C	0.0637	0.0076	0.0506	0.0718
GDP Growth	0.0941	0.1166	0.2971	−0.0692
Inflation	7.4904	1.6822	9.3722	4.7064
Ln(Z)	37.7036	34.2125	102.7834	11.7989
LLP/TL	0.0003	0.0041	0.0056	−0.0050
ROA	0.0003	0.0041	0.0056	−0.0050
Total Asset Growth	0.0141	0.0326	0.0735	−0.0248

A.2.17 Venezuela

Table A.18: Descriptive Statistics for Banks in Venezuela

	Mean	Std. Dev	Maximum	Minimum
Banco del Caribe				
TA/C	0	0	0	0
GDP Growth	0	0	0	0
Inflation				
Ln(Z)	11.2463	121.1520	162.4321	−330.9750
LLP/TL	0.0243	0.0083	0.0321	0.0099
ROA	0.0243	0.0083	0.0321	0.0099
Total Asset Growth	0.0593	0.0501	0.1455	−0.0056
Banco Mercantil Venezuela				
TA/C	0.1596	0.2967	0.0006	0.9993
GDP Growth			0	0
Inflation			0	0
Ln(Z)	21.6882	13.2033	45.0296	9.2481
LLP/TL	0.0325	0.0330	0.1224	0.0079
ROA	0.0325	0.0330	0.1224	0.0079
Total Asset Growth	0.0236	0.1792	0.2369	−0.4038
Banco Nacional de Credito				
TA/C	0.0264	0.2794	−0.7488	0.2739
GDP Growth				
Inflation				
Ln(Z)	59.3113	135.3244	419.5896	4.3127
LLP/TL	0.0341	0.0174	0.0543	0.0089

Table A.18 Continued

	Mean	Std. Dev	Maximum	Minimum
ROA	0.0341	0.0174	0.0543	0.0089
Total Asset Growth	0.0095	0.1904	0.2746	−0.4398
Banco Venezolano de Credito				
TA/C	0.0952	0.0359	0.0238	0.1237
GDP Growth			0	0
Inflation			0	0
Ln(Z)	16.6712	22.8480	74.6310	1.9527
LLP/TL	0.0382	0.0202	0.0543	0.0008
ROA	0.0382	0.0202	0.0543	0.0008
Total Asset Growth	0.0155	0.0352	0.0584	−0.0398
Banesco, S.A.				
TA/C	0.0718	0.0179	0.0280	0.0848
GDP Growth			0	0
Inflation			0	0
Ln(Z)	29.7561	24.0823	67.5467	7.8301
LLP/TL	0.0252	0.0144	0.0478	1.6288×10^{-7}
ROA	0.0252	0.0144	0.0478	1.6288×10^{-7}
Total Asset Growth	0.0344	0.0739	0.2094	−0.1033
BBVA Banco Provincial, S.A.				
TA/C	0.0967	0.0509	0.0239	0.2282
GDP Growth			0	0
Inflation			0	0
Ln(Z)	15.6034	8.8159	31.1832	4.0978

Table A.18 Continued

	Mean	Std. Dev	Maximum	Minimum
LLP/TL	0.0338	0.0116	0.0463	0.0111
ROA	0.0338	0.0116	0.0463	0.0111
Total Asset Growth	0.0364	0.0606	0.1853	−0.0650