

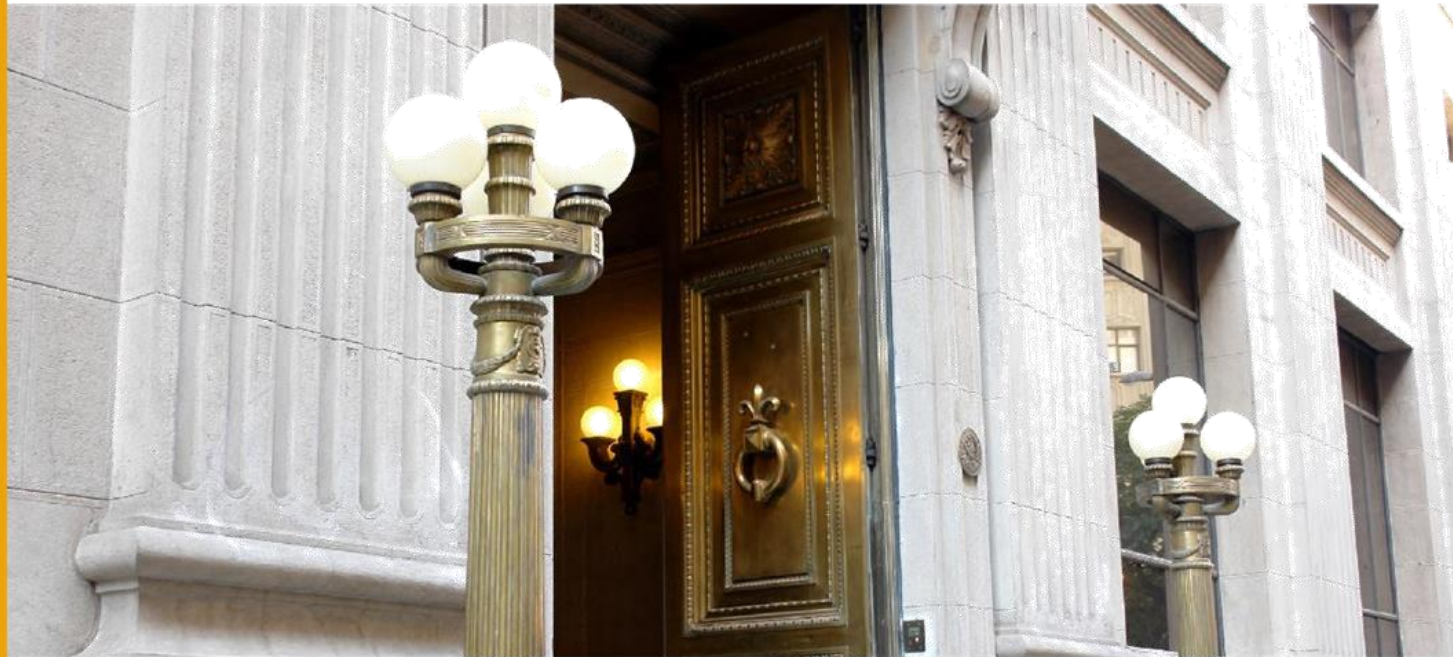
# DOCUMENTOS DE TRABAJO

The evolution of macroprudential policy use in Chile,  
Latin America and the OECD

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## **The evolution of macroprudential policy use in Chile, Latin America and the OECD\***

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### **Abstract**

This study compares the use of macroprudential policies and capital flow management in Chile versus other countries. I find that Chile made a lower net tightening of its macroprudential policies relative to 1990 than the other country groups, whether in terms of its overall index or any of its subcategories. This is explained in part because Chile had already adopted tight macroprudential policies after the Banking Law of 1986; therefore, it started the 1990s with a more conservative level of financial regulation than most countries. However, Chile still presents a restrictive Loan to Value regulation, close to the OECD average. In terms of Financial Openness and Capital Controls, Chile was very closed until the Asian crisis. Chile is more open with respect to capital inflows relative to all the country groups, although it is still more closed than the OECD and Advanced Economies for outflows.

### **Resumen**

Este estudio compara el uso de políticas macroprudenciales y manejo de flujos de capital en Chile con relación a otros países. Se encuentra que Chile implementó una menor contracción neta de sus políticas macroprudenciales desde 1990 con relación a otros grupos de países, en términos de su índice total o de cada una de sus subcategorías individuales. Esto se explica en parte porque Chile ya había adoptado políticas macroprudenciales estrictas con la Ley Bancaria de 1986; por lo tanto, empezó los años 90 con niveles de política financiera más conservadores que otros países. Sin embargo, Chile aun presenta una regulación conservadora de Loan to Value, próxima del promedio de la OCDE. En términos de Apertura Financiera y de Controles de Capital, Chile era una economía muy cerrada hasta el inicio de la crisis asiática. Ahora, Chile es más abierto a la recepción de flujos de capital en relación a todos los otros grupos de países, aunque aun sea más cerrado que los países de la OCDE y Economías Desarrolladas con respecto a los flujos de salida de capitales.

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# 1 Introduction

After several financial crises in the last 30 years - such as the Asian crisis<sup>1</sup> (1997), the Global Financial Crisis (2008) or the European sovereign debt crisis (2010) - regulators across several countries have adopted stronger bank capital requirements and other financial regulations, such as borrower restrictions and liquidity ratios. The use of capital flows controls has also shifted over time (Fernández et al. 2016, Acosta-Henao et al. 2020). Macroprudential policies are increasingly in use by both advanced and emerging economies, especially after the global financial crisis (Cerutti et al. 2017, Akinci and Olmstead-Rumsey 2018, Alam et al. 2019).

This study uses the integrated Macroprudential Policy (iMaPP) database of the International Monetary Fund (IMF) for 134 countries to compare the evolution of 17 different macroprudential policies in Chile and the rest of the world during the period from 1990 to 2020 (Alam et al. 2019). Chile is an interesting case because of its unique development history since the inception of its democracy in 1990 (Berstein and Marcel 2019). During this period Chile developed from a middle income country to a high income country, becoming one of the highest income countries in the Latin American region and a successful development case for several of its regional neighbors<sup>2</sup>. Furthermore, Chile is also an interesting case among emerging markets and Latin American countries because it has avoided currency crises and major financial instability since it started a floating exchange rate regime in 1999 as a reaction to the previous Asian crisis (Berstein and Marcel 1999). Chile achieved this through a combination of a predictable banking regulation (Berstein and Marcel 2019) plus an open economy framework with a floating exchange-rate regime combined with reduced balance sheet mismatches, developed financial markets with available derivatives and hedging contracts, as well as credible monetary and fiscal institutions (Albagli et al. 2020).

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<sup>1</sup>The Asian crisis was the largest crisis experienced by Chile since the early 1990s. Chile entered a recession in 1998 due to its trade dependence on Asia, with 30.5% of Chilean exports going to Asian countries (IMF, Direction of Trade Statistics). As the central bank tried to prevent an exchange rate depreciation and its effects on domestic inflation, interest rates in the interbank market reached 60% (Fuentes and Saravia 2014).

<sup>2</sup>Using data from the World Bank for the GDP per capita in PPP (constant 2017 USD), the Chilean real income grew 253% between 1990 and 2019, just before the Covid pandemic. By 2019 Chile was the fifth highest income economy in Latin America and the Caribbean, with the highest income countries in the Latin America region being the Bahamas, Trinidad and Tobago and Saint Kitts and Nevis which are nations of much smaller population with 4 million, 400 thousand, 1.3 million and 50 thousand residents, respectively (World Bank 2021).

It is therefore interesting to study how Chile evolved in terms of its financial regulation relative to other countries and its Latin American neighbors in particular, which is the contribution of this article. I compare Chile to other economies over time, both in terms of financial and banking regulation (Alam et al. 2019) and in terms of its current account openness (Chinn and Ito 2006, Fernández et al. 2016, Pasricha 2017). Chile is a particularly interesting case, because it is a developing economy that suffered an extreme event of social unrest that questioned its economic regulations even before the Covid pandemic (Madeira 2022a) and, during the pandemic, it experienced significant pension withdrawals and selling of financial assets to a much larger extent than other countries in Latin America and the OECD (Madeira 2022b). Chile also changed its financial regulations with the goals of increasing competition and efficiency (Madeira 2021).

I compare Chile to the current OECD members, the Advanced-Economies (AEs), Low Income Countries (LICs), Emerging Markets (excluding LICs), Latin American and the Caribbean (LAC), and the LA6 (Argentina, Brasil, Chile, Colombia, Mexico, Peru). In 2018, of the 100 countries that have adopted the risk-based capital (RBC) regime, 60 countries were under Basel III, 10 countries were under Basel II, with Chile being one of the 30 countries that kept the Basel I framework, and lagged their peers in terms of modern financial regulation (Hohl et al. 2018)<sup>3</sup>. Between 1990 and 2011, Chile suffered few changes to its banking regulatory framework, but it started tightening its macroprudential policies since 2012.

From 1990 until now Chile tightened its macroprudential policies in a less intensive way than the average of the Advanced Economies (AEs), OECD countries, Emerging Markets (EMs), the Latin American and Caribbean (LAC) or the LA6 countries<sup>4</sup>. However, with the new General Banking Law legislated in January of 2019, Chile advanced to a full Basel III regime and became comparable to the Advanced Economies (AEs) and other countries that adopted Basel III. Therefore, according

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<sup>3</sup>Note that the Basel III accords also discuss many other issues of bank regulation besides capital requirements, liquidity ratios and other macroprudential policies. For instance, the accords elaborate on the relative role of credit risk models, reliance on ratings, the use of internal bank models in risk assessment, or the treatment of derivative contracts. This article's focus is just on the macroprudential policies, such as capital or liquidity requirements.

<sup>4</sup>This is in part explained by the fact that the Banking Law of 1986 included several prudential features. This law included higher reserve requirements for deposits, limits to the concentration of loans among a few borrowers, restricted loans to related companies in the same business group holding of the bank, and leverage ratios limits for the banks. The legislation also included borrower restrictions, such as debt to income and loan to value borrower restrictions (Cifuentes et al. 2017).

to Chile’s agenda of future financial regulations, there should be a significant tightening within the next few years in order to match the standards already existing in other countries.

The iMaPP database includes a wide range of macroprudential policies, which are mostly targeted at the domestic banking sector and its borrowers. However, capital flow management (CFM) policies are also often used to protect financial stability (IMF 2013, 2022). For this reason, I complement the analysis by using datasets specific to capital flow management (CFM) policies, such as the Financial Openness Index (Chinn and Ito 2006), the Capital Inflows Tightening Index (Pasricha 2017), and the Capital Controls Index (Fernández et al. 2016). All these three CFM indexes are based on the IMF’s Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)<sup>5</sup>. These three indexes provide a very different way of summarizing the AREAER information and also look at very different samples of countries, therefore it is difficult to evaluate the differences between the CFM indexes. This study uses all three indexes as a way to complement the comparison of the capital flow management in Chile over the recent decades.

There are differences in how the indicators in these three indexes summarize the AREAER narrative reports. The Financial Openness Index (Chinn-Ito 2006) represents the normalization of 4 indicators available in the AREAER reports since 1970: multiple exchange rates, current account restrictions, capital flows restrictions, taxes or restrictions on exports. This index has little granularity because: i) it does not separate between inflows and outflows restrictions; ii) it does not consider different asset classes. Both the Capital Inflows Tightening Index (Pasricha 2017) and the Capital Controls Index (Fernández et al. 2016) solve these two disadvantages and include much more information from the AREAER in their indexes, but this extra information is available for fewer countries and only for more recent periods. The advantage of the Financial Openness Index (Chinn-Ito 2006) is that it is available since 1970 for 182 countries, which covers almost all the world. The Capital Controls Index (Fernández et al. 2016) is available for 100 countries since 1995. The Capital Inflows Tightening Index (Pasricha 2017) is only available since 2001 for 18 countries, but it captures the intensity of the policy restrictions for the economies.

Chile had very low levels of financial openness between 1970 and 1993. In the mid-1990s Chile

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<sup>5</sup>The Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) tracks the exchange rate and trade regimes of all members of the International Monetary Fund (currently 189 countries). The IMF has published the AREAER annually since 1950. Each country chapter is presented in an easy-to-read tabular format that tracks more than 250 categories.

then opened significantly and currently has levels of financial openness that are slightly lower than the average Advanced Economy (AEs) and OECD country. Emerging Markets (EMs), Latin American countries (LAC and LA6) also opened significantly during this period, although to a smaller extent than Chile. Furthermore, Chile also eased substantially its capital controls since 1995, with its net flows controls being now similar to the average OECD country and just slightly higher than the average Advanced Economy (AEs). Chile has the lowest level for capital inflows controls, but a somewhat higher level of outflow controls than the OECD and Advanced Economies (AEs). Overall, the three CFM indexes show that Chile became more open after the Asian crisis and the end of its exchange-rate band target in 1999, although its Financial Openness decreased somewhat during the period of 2008 to 2012.

This work is related to a substantial literature researching the impact of macroprudential policies (van den End and Kruidhof 2013, Frost and van Stralen 2018), including compliance issues in the UK (Akinbami 2013), interactions with micro behaviours in financial markets (Gray 2016) and its impact on bank performance (Nayak 2021). Previous studies also consider the effects of macroprudential credit policies in specific countries, such as Ireland, the Netherlands (Hof 2017) and India (Ghosh 2015). This work expands on this literature by showing how Chile and Latin America compare in their use of macroprudential policies relative to the advanced economies and the OECD countries. Note that this article provides a description of the use of macroprudential policies in Chile relative to other countries in Latin America and across the world, but I do not provide here a welfare analysis of such policies (unlike, for instance, the work of Svensson 2017, who presents a welfare analysis of the benefits and costs of "leaning against the wind" in the case of the use of monetary policy as a macroprudential tool). Finally, this work expands on recent surveys of the evolution of financial institutions in Chile (Berstein and Marcel 2019, Furche et al. 2017), including a previous version of this article which used an older version of the iMaPP database that was limited to the year of 2016 and, therefore, yielded fewer conclusions (Madeira and Olivares 2021).

This paper is organized as follows. Section 2 provides a brief literature review, while Section 3 summarizes the financial regulation and policy changes in Chile over the last five decades. Section 4 describes the data sources for the Macroprudential policies indexes across different countries. Section 5 shows how Chile compares with other economies across different sets of macroprudential

policies in the iMaPP-IMF dataset. Section 6 summarizes how Chile evolved in terms of its capital controls indexes and how it compares with other countries. Finally, Section 7 concludes with a summary of the findings and their policy implications.

## 2 Literature review

There is a long literature on the role of macroprudential (MaPPs) and capital flow management (CFM) policies. While several studies deal with these two groups separately (IMF 2013), other studies study both types of policy jointly (Ostry et al. 2012, Bruno et al. 2017). The case for studying MaPPs and CFMs jointly is more appropriate in the case that CFMs are used as a preventive measure against the buildup of systemic risk rather than as an ex-post reaction to a crisis (Galati and Moessner 2018). MaPPs and CFMs have a shared goal of correcting a negative externality in financial intermediation in which borrowers (whether borrowing domestically or from foreign sources) do not take into account the negative aspects for others from an increase in financial instability due to leverage (Galati and Moessner 2018, Bilge et al. 2021, IMF 2022). Important progress has been made in the theoretical justification of MaPPs and CFMs based on the negative externality of leverage (Galati and Moessner 2018, Bilge et al. 2021), but macroeconomic model simulation is underdeveloped due to computational limitations of large scale models (Galati and Moessner 2018). This review, therefore, focuses on the empirical literature of MaPPs and CFMs.

Macroprudential measures are useful complements to capital controls and can reduce their costs (IMF 2022), with macroprudential policies being able to target more specifically the source of the systemic instability such as credit booms and real estate excessive growth (Hahm et al. 2012). In emerging markets and advanced economies, Beirne and Friedrich (2017) find that MaPPs are effective in managing cross-border bank flows, especially in a context of stronger regulatory institutions and a higher credit-to-deposit ratio. Furthermore, both CFMs and MaPPs are more successful when they reinforce monetary policy tightening, rather than acting in opposite directions (Bruno et al. 2017, Galati and Moessner 2018). Cerutti et al 2017 find evidence of a weaker effectiveness of MaPPs in more open economies, countries with deeper and more sophisticated financial systems, and those with greater cross-border borrowing, suggesting issues of regulation avoidance. This points to a certain complementarity between MaPPs and CFMs (IMF 2022).



Macroprudential policy (MaPP) is about curbing financial imbalances during a boom and strengthening the resilience of the financial system, with a view to limiting macroeconomic costs from financial distress (Galati and Moessner 2018). The rationale for macroprudential intervention rests on the presence of three externalities (Hahm et al. 2012, IMF 2013, Cerutti et al. 2017): i) the tendency of leverage through collateral to increase economy's procyclicality, particularly in the case of unstable short term debt, ii) macro-financial feedback mechanisms (such as firesales, herd behavior or contagion) that deepen adverse aggregate shocks, and iii) too much opaqueness and interconnectedness, with linkages between financial institutions increasing systemic vulnerabilities. These policies are heavily used in emerging markets (Alam et al. 2019) and Latin America (Tovar et al. 2012) to manage systemic risk and curb excessive credit growth. Previous works find a negative impact of macroprudential policies (MaPPs) on credit booms (Dell'Ariccia et al. 2012), housing prices, mortgages, total credit, household credit, corporate credit (Cerutti et al. 2017, Akinci and Olmstead-Rumsey 2018), and consumption (Alam et al. 2019). Other country specific and international studies, such as those collected by Buch and Goldberg (2017), study how financial variables react to prudential policies at different moments of the business cycle.

Capital market liberalization is often associated with increased financial and macroeconomic instability, which leads policymakers in emerging markets to actively manage external accounts through the use of CFMs (Bilge et al. 2021). As set out in IMF (2013), the prime difference between MaPPs and CFMs is the objective, with CFMs being specifically designed to limit capital flows either as a reaction to a crisis or as preventive measure. However, there can be a substantial overlap and complementarity between MaPPs and CFMs (IMF 2013, Galati and Moessner 2018), particularly in small open economies, since external imbalances (such as current account deficits, volatile capital flows or an overvalued exchange rate) can increase the probability of crises (Kaminsky and Reinhart 1999, Hahm et al. 2012, IMF 2013). Capital controls respond to macroprudential concerns, particularly after strengthening financial stability governance arrangements (Pasricha 2017). Previous literature has found that CFM policies are better at controlling capital inflows rather than capital flows (Ostry et al. 2012, Bruno et al. 2017), therefore being adequate for preventing the growth of imbalances during boom periods but inadequate for ex-post management of crises such as sudden-stops (Eichengreen and Rose 2014, Bilge et al. 2021).

Measures of MaPPs and CFMs can be classified into two categories (Galati and Moessner 2018,

Alam et al. 2019, Bilge et al. 2021): i) de jure measures<sup>6</sup>, which are based on formal rules (Chinn and Ito 2006, Ostry et al. 2012, Fernández et al. 2016), and ii) de facto, which are derived from the financial outcomes that result from the measures, such as the deviation from covered interest rate parity or the sum of gross foreign assets and liabilities as a share of domestic output (Bilge et al. 2021). Since the de facto measures of capital controls are an outcome of the interactions of policy changes with market forces, most empirical studies employ de jure measures to capture policy changes in a more exogenous manner (Bruno et al. 2017, Bilge et al. 2021). Therefore, this study is focused only on de jure measures of both CFMs and MaPPs.

It would be ideal to have measures of the policy intensity of the MaPPs and CFMs, but such evaluation is difficult, therefore datasets with broad coverage across many countries tend to use a sum of dummy type indicators of whether a policy was tightened or restricted (Cerutti et al. 2017, Akinci and Olmstead-Rumsey 2018, Galati and Moessner 2018, Alam et al. 2019). Most of this work is based on the iMaPP indicators which consist of country series of tightening or easing policy decisions. It is important to note that de jure measures are almost always subject to some degree of human subjectivity. Datasets such as the iMaPP (Alam et al. 2019) or the Capital Controls Index (Fernández et al. 2016) are based on questionnaires filled by experts (for instance, the IMF surveys are sent to national central banks). Since experts may have a different understanding on whether some new regulation consists of a change of policy or not, then there is some form of measurement error present in these datasets. Data updates consistently revise values of previous years, as well as adding recent information (Fernández et al. 2016, Alam et al. 2019).

Finally, there is strong evidence that the effects of MaPPs and CFMs have strong cross border effects, impacting economies that receive capital flows (in particular, bank transfers or bond borrowing) from more developed origin countries (Buch and Goldberg 2017). Capital requirements show especially strong spillover effects (Buch and Goldberg 2017, Jara and Cabezas 2017).

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<sup>6</sup>That is, the measures capture legal restrictions, but not the extent to which these are enforced. One difficulty in trying to construct empirically-based de facto indicators of capital account restrictions is that there is not a clear benchmark of the gross capital flows consistent with free capital mobility. Furthermore, de facto indicators based on the equalization of rates of return would require making assumptions about investors' expectations, preferences and a weak form of market efficiency.

### **3 Evolution of the banking laws and capital flows regulations in Chile**

The Chilean financial market has evolved a lot since the 1970s, having faced a large banking crisis in 1980. In the early 1970s, the economy was almost closed to international trade and capital flows, with the state imposing strong regulations on banks. However, the banking system was privatized and deregulated after 1974, with regulators removing banks' restrictions against foreign borrowing and allowing for foreign bank entry (Berstein and Marcel 2019). Chile's fixed exchange-rate with the USD and inefficient supervision increased buildups in systemic risk. The subsequent Chilean 1980 banking crises is listed among the top 25 financial crisis and economic recessions in the world since the early 20th century (Reinhart and Rogoff 2009, 2014), implying a reduction of 19% of the GDP (Reinhart and Rogoff 2009) and a total fiscal cost in terms of the 1985 rescue of the distressed financial institutions around 40% of the GDP (Berstein and Marcel 2019).

The impact of the 1980 crisis was one of the main reasons behind the Chilean General Banking Law of 1986, which was updated in 1997 (with new provisions for subordinated debt) and in 2019 (Berstein and Marcel 2019). The 1986 Banking Law separated financial and non-financial businesses, imposed more rigorous requirements for bank licenses, and tightened the provision expenses requirements for loans and securities according to their risk grade (Berstein and Marcel 2019). These reforms proved to be a successful model with domestic credit increasing from less than 30% of the GDP in 1978 to 142% in 2019. Other changes of the 1986 banking law include higher reserve requirements for deposits, limits to concentrated lending to other financial institutions, leverage ratio requirements and the explicit prohibition of financial institutions to lend money to their managers or societies owned by them (Berstein and Marcel 2019, Cifuentes et al. 2017). Regarding borrower prudential measures, the 1986 banking law included limits to debt to income and loan to value (Cifuentes et al. 2017). In 1993 Chile adopted the Basel I framework, but the Basel II guidelines were never fully adopted in Chile since these would have implied lower banking capital requirements and were deemed by regulators as risky (Jara and Cabezas 2017).

In 1980 Chile also implemented a social security reform, moving to a privately managed defined contribution system, which increased the domestic savings available to banks and capital markets (Opazo et al. 2015, Madeira 2022b, Berstein and Marcel 2019). Other regulations affecting the

asset markets in Chile were the Law of Security Markets of 1981 (revised in 1987), the Law of Public Listed Companies of 1981, the Law of Insurers in 1987, and the Law of Public Acquisitions in 2000, but all these laws were meant for participants in the public listed securities markets and had no macroprudential or capital flows' implications (Berstein and Marcel 2019). Other major reforms to the capital markets were implemented in 2001 (which allowed financial institutions to make international investments more easily and introduced prudential limits for liquidity risk exposures), 2007 (which regulated the corporate governance of companies), and 2010 (which substantially freed the pension asset managers to make a high volume of international investments). Therefore, the 2001 and 2010 capital market reforms represented an easing of capital outflows restrictions.

The 1997 Asian crisis also caused a moderate recession in Chile, since Asia represents its largest export market and it took until 2003 to recover its previous GDP level in USD (Fuentes and Saravia 2014). The Central Bank of Chile tightened monetary policy, increasing the interbank loan rate up to 90% in an effort to defend its exchange-rate target band (Fuentes and Saravia 2014, Berstein and Marcel 2019). The Asian crisis implied a restructuring of the banking system, with several distressed financial institutions having to be acquired by their healthier competitors. In September of 1999, Chile dropped its exchange-rate target band in favor of a floating exchange-rate regime and a flexible inflation targeting framework (Ahumada and Marshall 2001, Fuentes and Saravia 2014, Berstein and Marcel 2019). Direct consequences of the floating exchange-rate regime have been less foreign exchange market interaction between the central bank and commercial banks<sup>7</sup>.

Chile also adopted a structural fiscal balance law in 2000 to strengthen the credibility of its macroeconomic policies. Other changes from the Asian crisis include a reduction in reserve requirements to 0% in 1998, a removal of the minimum one-year period for foreign investments to remain in the country before repatriation of the principal, the creation of peso denominated foreign debt instruments, an increased flexibility for pension funds to make investments abroad, and the expansion of the market for interest rate and credit derivatives both domestically and abroad (Ahumada and Marshall 2001).

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<sup>7</sup>A flexible exchange rate regime can contribute to financial stability by discouraging both speculative capital flows and leveraged positions built on the perception of misaligned asset prices. Furthermore, domestic agents (such as sovereign funds and pension managers with considerable assets abroad) may adjust their foreign assets positions in response to exchange rate movements due to shocks in gross inflows (such as sudden stops and surges) by creating offsetting changes in gross outflows (Cifuentes et al. 2017).

The 2008 Great Financial Crisis had a minor impact on Chile (Jara and Cabezas 2017), with the country recovering its growth path in less than one year (Berstein and Marcel 2019). During the crisis, the Central Bank of Chile accumulated 8 billion USD in international reserves and implemented a swap line to provide USD to domestic banks, increasing market liquidity. Furthermore, spillover effects of changes made after the Great Financial Crisis in the prudential policy of other countries had a relatively weak impact on domestic lending (Jara and Cabezas 2017).

The Chilean Banking Law (legislated in January of 2019) merged the regulators for the securities and insurance markets with the banking authority in order to widen the supervisor's information, creating the Chilean Financial Market Commission (in Spanish, *Comisión del Mercado Financiero*, hence on CMF). The 2019 law also sought to update the banking regulation according to the Basel III guidelines, with new requirements for market, operational, and credit risks (Berstein and Marcel 2019), and increased the regulators' power for the resolution of distressed banks. This law predicts 5 policy tightening changes, which should occur within the next few years: Capital requirements, Conservation buffer, Liquidity requirements, Systemically Important Financial Institutions (SIFI), Leverage ratio (LVR). The General Banking Law also allowed regulators to implement a Countercyclical buffer (CCB). Note that for the international macroprudential policies comparison on which this article is based, the iMaPP dataset considers whether the CCB and other macroprudential instruments are being actively used, that is, tightened or eased. The current Chilean legislation allows for the CCB to be used, but it does not yet imply a capital requirement. Future CCB levels will be determined by the Central Bank of Chile in bi-annual Financial Policy Meetings based on reports from the Chilean Financial Market Commission (CMF).

During the first year of the General Banking Law (see IEF 2018) there was an implementation of: i) increased Capital requirements (which increased from a basic level of 4.5% to 6%, although with an allowance for preferred shares and subordinated bonds as part of the capital requirements during the first three years of the legislation), ii) an introduction of the Conservation buffer (with an increase in additional basic capital of 0.625% and future increases which can sum up to 2.5% of the risk weighted assets), iii) on January of 2019 banks were required to fulfill a Liquidity Coverage Ratio (LCR) above 60% (note that banks were required to report their LCR since January of 2015, but the banks were not required to comply with a restriction on its level), iv) a further restriction of the leverage ratio (LVR) with basic capital as a fraction of total assets being required to be above

3.5%. The Liquidity Coverage Ratio (LCR) requirement was also expected to become increasingly more restrictive between 2019 and 2023 (IEF 2018). Furthermore, the Chilean Financial Market Commission announced in August of 2019 (CMF 2019) its regulation standards for the Systemically Important Financial Institutions (SIFI), which would demand higher capital requirements from the six largest banks in Chile with a date starting on the December 1st of 2021. The 2019 law also kept the capital requirement of 8% of the risk weighted assets. It is important to note that these changes in the 2019 Banking Law were not meant to be implemented immediately, but the specific norms for these regulations and a timetable for the use of these instruments were presented by the Chilean Financial Market Commission until June of 2020.

During the Covid pandemic, after March of 2020 Chile implemented a package of fiscal measures, a delaying by the Financial Market Commission of the Basel III standards for banks, plus a monetary policy rate cut, bank credit lines and liquidity measures of the Central Bank of Chile (Madeira 2022a). Furthermore, the state allowed workers to withdraw a substantial amount from their pension accounts, with the withdrawals summing up to 20% of the GDP (Madeira 2022b).

## 4 Data

The main reference for this study of macroprudential policies is the iMaPP (integrated Macroprudential Policy) database published by the IMF, which is thoroughly described in the work by Alam et al. (2019). The iMaPP dataset provides a set of 17 macroprudential indexes (with values +1,0,-1, for tightening, no change and easing, respectively) for each country  $c$  at time  $t$  since 1990, with the 17 individual policies being: Loan-to-value (LTV), Debt Service to Income (DSTI), Limits on Credit Growth (LCG), Loan Loss Provisions (LLP), Loan restrictions (LoanR), Limits and penalties to the loan-to-deposit (LTD), Limits on foreign currency lending (LFC), Reserve Requirements (RR), Liquidity, Limits on foreign exchange exposure (LFX), Leverage limits or unweighted Leverage Ratio (LVR), Countercyclical buffers (CCB), Conservation buffer, Capital requirements, Tax measures, measures to mitigate risks from Systemically Important Financial Institutions (SIFI), and Other measures (such as stress testing, restrictions on profit distribution and limits on exposures between financial institutions).

These measures can be grouped in 5 categories: Loan Demand (LTV, DSTI), Loan Supply (LCG, LLP, LoanR, LTD, LFC), Supply general (RR, Liquidity, LFX), Supply capital (LVR, CCB, Conservation buffer, Capital requirements), and Institutional (Tax, SIFI, Other). These 5 categories can be further grouped in just 3 broad categories: Loan total (Loan Demand, Loan Supply), Supply total (Supply general, Supply capital), and Institutional. Other ways of grouping policies are possible, with some authors distinguishing between borrower and lender based measures (Cerutti et al. 2017). Borrower policies would be equivalent just to the Loan Demand policies (LTV, DSTI), while the lender based policies would include all the other 15 policies.

Finally, the iMaPP database reports a Total Macroprudential Policy index ( $TPP_{c,t} = \sum_k PP_{c,t}^k$ ), which corresponds to the sum of the individual 17 macroprudential policies ( $PP_{c,t}^k$ ). I build cumulative policy stances (since 1990 until year  $t$ ) for each one of these 17 macroprudential policies, its 5 categories, plus the 3 broader categories and the Total Macroprudential Policy index:  $CPP_{c,t}^k = \sum_{h=1}^t PP_{c,h}^k$ , with the Cumulative Total Macroprudential Policy index being given by  $CTPP_{c,t} = \sum_k CPP_{c,t}^k$ . Although the iMaPP dataset is monthly, for simplicity I show the results at a yearly frequency (that is, December of year  $t$ ).

The iMaPP-IMF dataset is based on source documents and evaluations from the Financial Stability Board (FSB), International Monetary Fund (IMF), academic papers, national sources and IMF surveys sent to the national regulators (Alam et al. 2019).

One problem of this dataset is that there is a substantial degree of subjective judgement influencing the answers given by the employees of the national regulators, such as whether a certain policy change constitutes or not a policy tightening or easing and when such a change was implemented (if it was when the legislation was announced or when the policy was put in actual use). A second problem is that the iMaPP dataset only reports the policy tightening or easing, but not the intensity of the measures. Therefore, it is possible that in a certain country one action of policy tightening more than compensated for two or more easing policy events, but this is not possible to account for in the analysis. Finally, a third problem is that policy tightening and easing is measured relative to each country's situation in 1990, therefore some countries may have started that period with policies that were too conservative or liberal relative to their peers.

The first problem of the iMaPP dataset cannot be solved, because all the international datasets of macroprudential policies must depend on the inputs given by experts of each country's legislation,

but sometimes experts may disagree on when a policy was implemented or not. The second and third problems, however, can be attenuated by the use of the Loan-to-Value (LTV) information in the iMaPP dataset, because that policy can be more precisely quantified, therefore researchers can use the policy's intensity and also do not need a comparison point such as 1990 or another year. Furthermore, I also use other datasets such as the Financial Openness Index (Chinn-Ito 2006), the Capital Inflows Tightening Index (Pasricha 2017) and the Capital Controls Index (Fernández et al. 2016), which also include a measure of the policy's intensity and do not require an initial year base.

This study also uses another piece of policy information from the iMaPP dataset, which is a continuous measure of the average mortgage Loan-to-Value (LTV) for 66 countries since 2000. This measure includes the intensity of the policy tightening or easing implemented by each country. However, it is available for a smaller number of countries and it is also subject to a significant degree of subjective judgment from the national authorities reporting such an indicator, since some countries may have distinct LTV policies for mortgages of different size, for households paying their first mortgage versus households and investor paying mortgages on secondary properties.

I also use three datasets specific to capital flows policies: i) the Financial Openness Index (Chinn-Ito 2006), ii) the Capital Inflows Tightening Index (Pasricha 2017), iii) the Capital Controls Index (Fernández et al. 2016). The Financial Openness Index (Chinn and Ito 2006) takes the first principal component of the AREAER summary binary codings of controls relating to current account transactions, capital account transactions, the existence of multiple exchange rates, and the requirements of surrendering export proceeds. This index is available for 182 countries since 1970. The Capital Inflows Tightening Policy Index (Pasricha 2017) directly measures policy actions by 18 major emerging market economies since 2000 along six dimensions: 1) Inflow/Outflow, 2) Easing/Tightening, 3) Capital Control/Currency Based, 4) Prudential Type, 5) Index of Industrial Production (IIP) Category (Foreign Direct Investment (FDI), Portfolio Investment, Other investment, Financial Derivatives), 6) Quantitative/Price/Monitoring. These Pasricha (2017) indexes are reported in terms of weighted net flows controls, weighted net inflows and weighted net outflows. The Capital Controls Index (Fernández et al. 2016) measures the restrictions (with 1 representing a restriction and 0 no restriction) on both inflows and outflows of 10 categories of assets for 100 countries since 1995, with the 10 asset classes including: equity, bonds, money market, collective investment, financial credit, foreign direct investment, derivatives, commercial credit, financial guarantees, and



real estate. Note that these capital flows restriction datasets may have similar disadvantages as the iMaPP set of indexes. For instance, the Capital Controls Index (Fernández et al. 2016) is a sum of dummy indicators and therefore does not account for the intensity of the policy measures.

The Capital Inflows Tightening Index (Pasricha 2017) is more detailed than the Financial Openness Index (Chinn-Ito 2006) in at least three aspects: i) it distinguishes between restrictions for capital inflows and outflows; ii) it analyzes both quantitative and price restrictions; iii) it captures the intensity of the policy actions by weighting each restriction by the value of the assets targeted within the economy. In a similar way, the Capital Controls Index (Fernández et al. 2016) also distinguishes for: i) outflows and inflows restrictions; ii) 10 asset classes; iii) restrictions made by residents and non-residents. However, the Capital Controls Index (Fernández et al. 2016) can be seen as less adequate than the Capital Inflows Tightening Index (Pasricha 2017), because it does not capture the policy intensity of each restriction.

Note that all of the capital flow management (CFM) indexes are based on the Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER), which has more than 250 categories for each country regarding their capital account policies. The Financial Openness Index (Chinn-Ito 2006), the Capital Inflows Tightening Index (Pasricha 2017), and the Capital Controls Index (Fernández et al. 2016), are based on different aggregations of the 250 categories available in the AREAER. Since there are many ways in which these categories can be aggregated, then often it is not clear which factor explains the differences between these indexes.

Each one of these datasets has a different number of countries available, therefore, the groups for which Chile is compared against differ among the indexes. The appendix at the end of this article gives a detailed list of the countries in each dataset. The Chinn-Ito (2006), the iMaPP-IMF and Fernández et al. (2016) datasets are quite extensive, including 182, 135 and 100 countries, respectively. The iMaPP mean LTV measure, however, is only available for 66 countries, unlike the dummy type indicators. The Pasricha (2017) dataset is available for only 18 countries and therefore is the one with fewer possibilities for comparison at the international level. The next section compares Chile to the unweighted averages of the OECD, the Advanced-Economies (AEs), Low Income Countries (LICs), Emerging Markets (excluding LICs), Latin American and the Caribbean (LAC), and the LA6 (Argentina, Brasil, Chile, Colombia, Mexico, Peru). The empirical analysis was completely done using a Stata MP 15.1 software package.

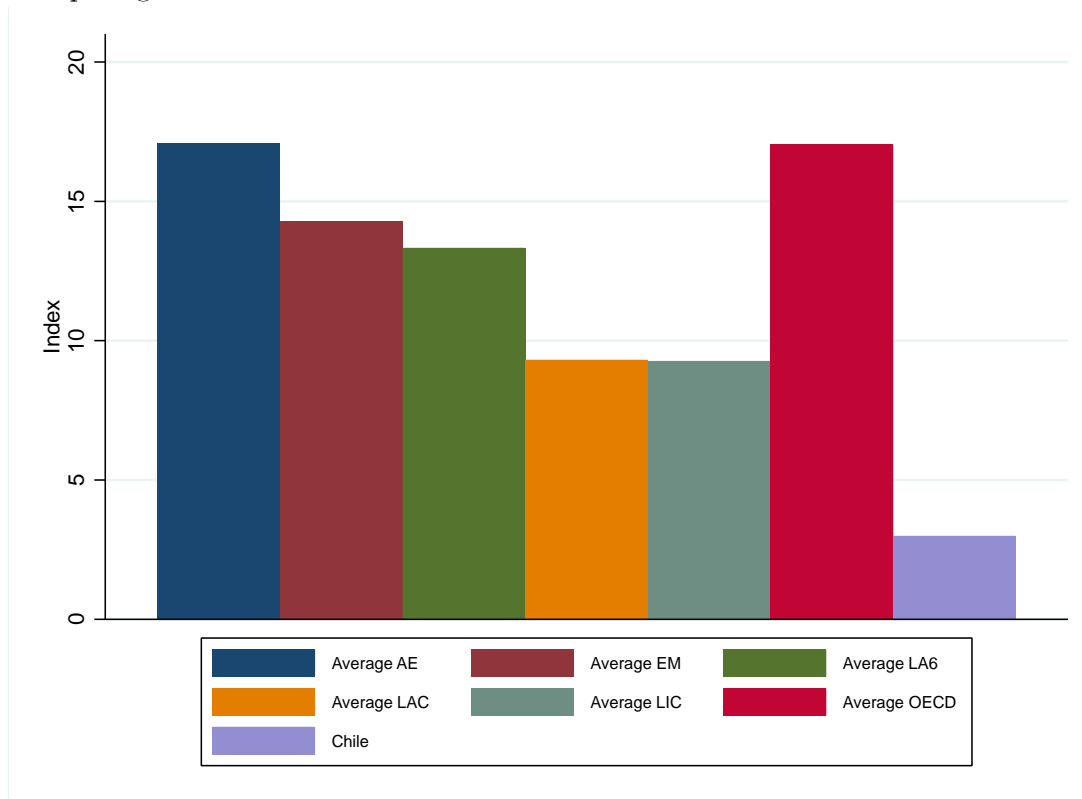
## 5 Comparison of Chile with other economies in terms of macroprudential policies net tightening relative to 1990

### 5.1 Main findings

This section compares how the net tightening of the macroprudential policies evolved in Chile and other countries. By the end of 2019, Chile had a level of overall macroprudential policy net tightening (in relation to 1990) of 3 measures, which is substantially lower than the 17, 17.1, 9.3, 10 and 13.9 values for the average of the OECD, Advanced Economies (AE), Low Income Countries (LIC), Latin America and the Caribbean (LAC) and LA6, respectively (Figure 1). Chile kept a net tightening of 2 between 1992 and 1995, then decreased its stance to just 1 in 1996 and increased it again to 3 in 1997 with the beginning of the Asian crisis (see Figure 2). It then decreased its index to 1 in 1998 and kept it at that level until 2008. Chile reduced its macroprudential index to 0 between 2009 and 2011, then in 2012 the index started tightening until reaching the value of 3 at the end of 2019. Chile has therefore lagged the macroprudential tightening that was observed across all country groups, especially after 2006. All the groups of countries reduced their macroprudential tightening somewhat in 2020 after the Covid pandemic, therefore Chile followed this international trend and reduced its macroprudential index to 2 by the end of 2020.

In 2019, Chile presented a lower value than any of the other group of countries in terms of the overall macroprudential index (Figure 1), overall Loan regulation (Loan Sum, see Figure 4), Loan Demand (see Figure 5), Loan Supply (see Figure 6), Supply Sum (Figure 7), Supply of Capital (see Figure 8), Supply general (see Figure 9) and Institutional (see Figure 10). However, Chile's macroprudential tightness is not below other countries for all the policy dimensions. In terms of the Loan to Value regulation (LTV), Chile has a higher LTV level than the average Emerging Market (EM) since 2014 and higher than the average Advanced Economy (AE) since 2017 (see Figure 3). It is also relevant to note that for the Loan Supply (Figure 6), the index value of Chile is only slightly below the average for Latin America and the Caribbean (LAC).

Figure 1: iMaPP policy Macroprudential net tightening index (cumulative sum of 17 policies since 1990): comparing across countries in 2019

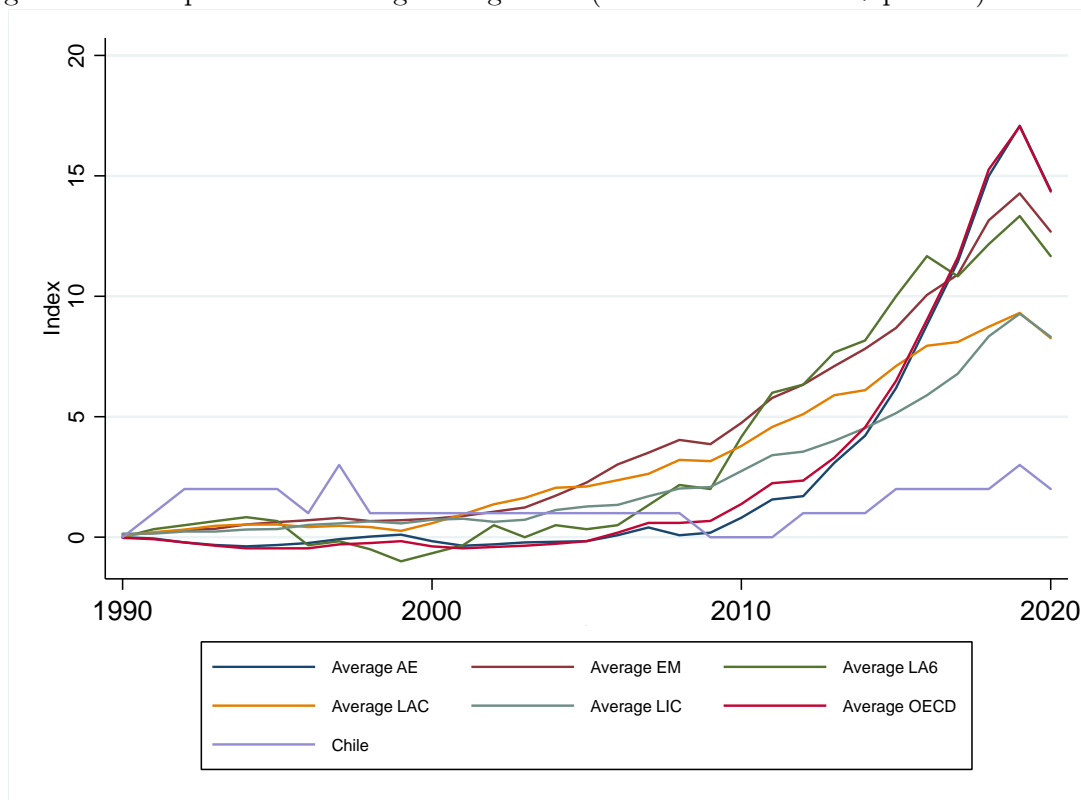


## 5.2 Overall Macroprudential index

I will now focus on the year 2019, which represents the most recent year before the Covid pandemic. I make this option, because the Covid pandemic led to less restrictive policies across several countries and temporarily reversed the trend for macroprudential tightening that followed the Basel III agreement. Figure 1 shows the overall Macroprudential Policy Tightening Index (iMaPP-IMF) in the most recent period. It shows that the net sum of tightening policies was 3 for Chile, indicating a low degree of restrictions implemented since 1990. This value is much lower than the 17, 17.1, 9.3, 10 and 13.9 values for the average of the OECD, Advanced Economies (AE), Low Income Countries (LIC), Latin America and the Caribbean (LAC) and LA6, respectively. Therefore, all the other groups of countries undertook a significantly more conservative stance than Chile since 1990.

Figure 2 shows how Chile and the other groups of countries changed their net tightening policy since 1990. It shows that Chile tightened its policies significantly in 1992, unlike the other groups

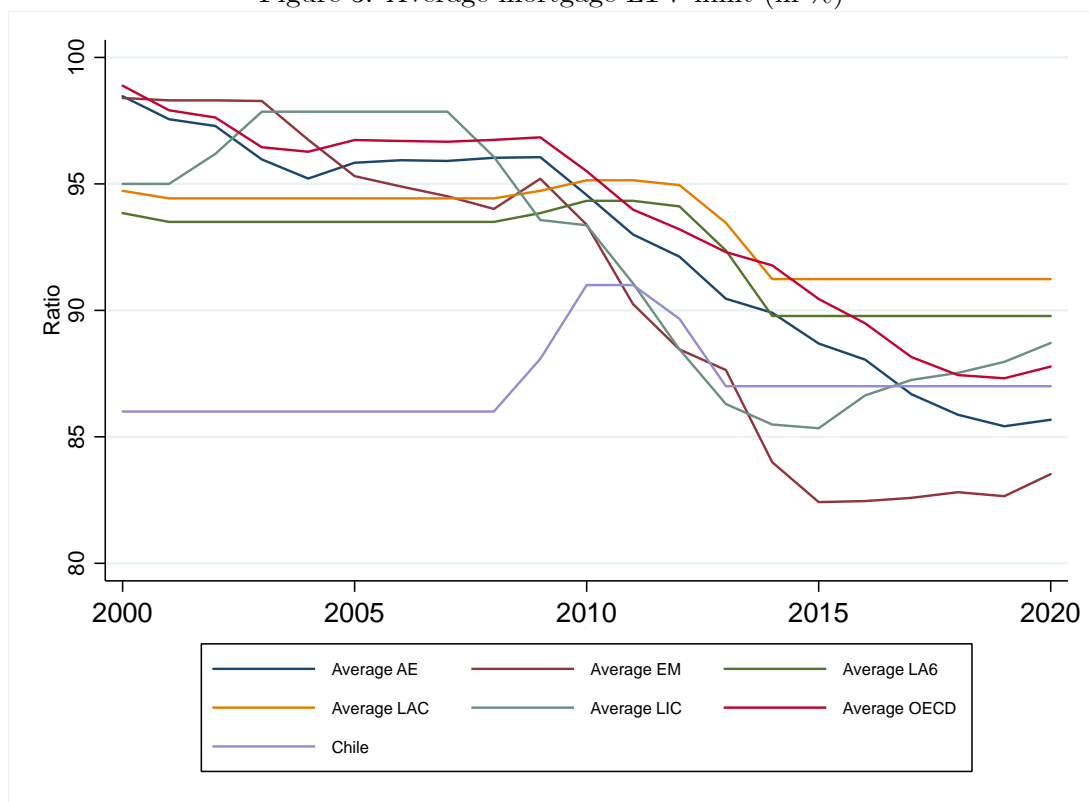
Figure 2: Macroprudential net tightening index (cumulative sum of 17 policies) since 1990



of countries which persisted with few or no macroprudential policy changes until the early 2000s. The OECD, the Advanced Economies (AEs) and the Emerging Markets (EMs) eased their policies somewhat between 1995 and 2000. Chile eased its policies briefly in 1996 and then again in 1998 after the Asian crisis, keeping the same policy stance until the Great Financial Crisis in 2008. All the country groups (OECD, AE, EM, LIC, LAC, LA6) started a clear trend of policy tightening after the Great Financial Crisis in 2008. Emerging Markets (EM) and Latin America (LAC) were the groups with the most intense tightening until 2015, but afterwards the average OECD and Advanced Economy (AE) presented even more restrictive policy stances between 2015 and 2020. Chile went against this international trend by easing macroprudential policies between 2009 and 2011. Only in 2012 did Chile start tightening its financial regulations and with a much slower pace than the other countries. All the country groups eased their policies with the 2020 pandemic.

For the average mortgage Loan-to-Value (LTV) regulation, again Chile differed from the other countries (Figure 3). Note that for the LTV, a higher value implies a less restrictive policy. In

Figure 3: Average mortgage LTV limit (in %)



the early 2000s, all the country groups presented less restrictive LTV levels than Chile, with the average OECD country, Advanced Economy (AE), Emerging Market (EM), Latin America and the Caribbean (LAC), LA6, and Low income country (LIC) presenting values of 98.9%, 98.5%, 98.4%, 94.7%, 93.8%, and 95%, respectively. The LTV stayed roughly the same at a level of 95% for the Latin America (LAC and LA6) countries between 2000 to 2012. Chile kept its LTV at a low value of 86% (the lowest among the country groups) between 2000 and 2008, increasing it to 91% until 2011. By 2011 Chile matched the LTV level observed for the average Low income country and Emerging market (EM). After 2012 all country groups lowered their LTV levels, with the exception of Chile which shows an LTV of 87% (only slightly higher than the 86% value in the early 2000s). By 2020 only the average Advanced Economy (AE) and the average Emerging Market (EM) present lower LTV levels than Chile, with values of 85.7% and 83.5%, respectively. The regional neighbors of Chile, summarized by the average country of the LAC and LA6 groups, present LTV levels of 91.2% and 89.9% by 2020, which is somewhat higher than the other country groups.

### 5.3 Loan demand and supply indexes in 2019

For the overall Loan related policy instruments since 1990, Figure 4 shows that Chile only increased such policies by the value of 1. The average OECD country, Advanced Economy (AE), Emerging Market (EM), Latin America and the Caribbean (LAC), LA6, and Low income country (LIC) increased their Loan Sum indexes by 5.4, 5.4, 3.5, 1.6, 2.5, and 2.5, respectively. Therefore, while Chile was somewhat closer to the average Latin American country (LAC), it was still quite less restrictive than the LA6 and Low income countries (LIC).

In terms of the borrower based restrictions, Chile presented a value of 0 in 2019 (Figure 5), implying no change in their stance over a period of 30 years. However, again we observe a substantial increase in borrower based restrictions for the Advanced Economies and OECD, with a net tightening of 2.8 and 2.5, respectively. The average Emerging Market (EM), Latin America and the Caribbean (LAC), LA6, and Low income country (LIC) presented a more moderate tightening of 1.2, 0.5, 0.8 and 0.6, respectively. For the lender based loan restrictions (Figure 6), Chile presented a low tightening of 1 in 2019, which is slightly lower than the 1.1 average for the Latin America and the Caribbean (LAC) and moderately lower than the 1.7 and 1.9 values for the LA6 and Low income countries (LIC), respectively. The average Advanced Economy (AE), OECD, and Emerging Market (EM), presented substantially higher index levels of 2.6, 2.8, and 2.3, respectively.

### 5.4 Supply of capital in 2019

In terms of the Supply Sum (which equals the sum of Supply general and Supply capital) related policies (Figure 7), Chile increased its index by 2 between 1990 and 2019, which was below the average of all the other country groups. The other country groups' indexes of Supply Sum in 2019 ranged between a low of 5.9 (for the Low Income Countries) and a high of 8.8 (for the Emerging Markets), therefore Chile was quite less restrictive than the other countries in this aspect.

Separating the Supply Sum index into the Supply of capital and Supply general categories, it is shown that all the Supply restrictions implemented by Chile were in terms of Supply of capital and none for Supply general. Figure 8 shows that Chile presented a net tightening of 2 for the Supply of capital (Unweighted Leverage Ratio (LVR) + Countercyclical Buffers (CCB) + Conservation

Figure 4: Loan Sum (Loan Demand + Loan Supply) net tightening (since 1990)

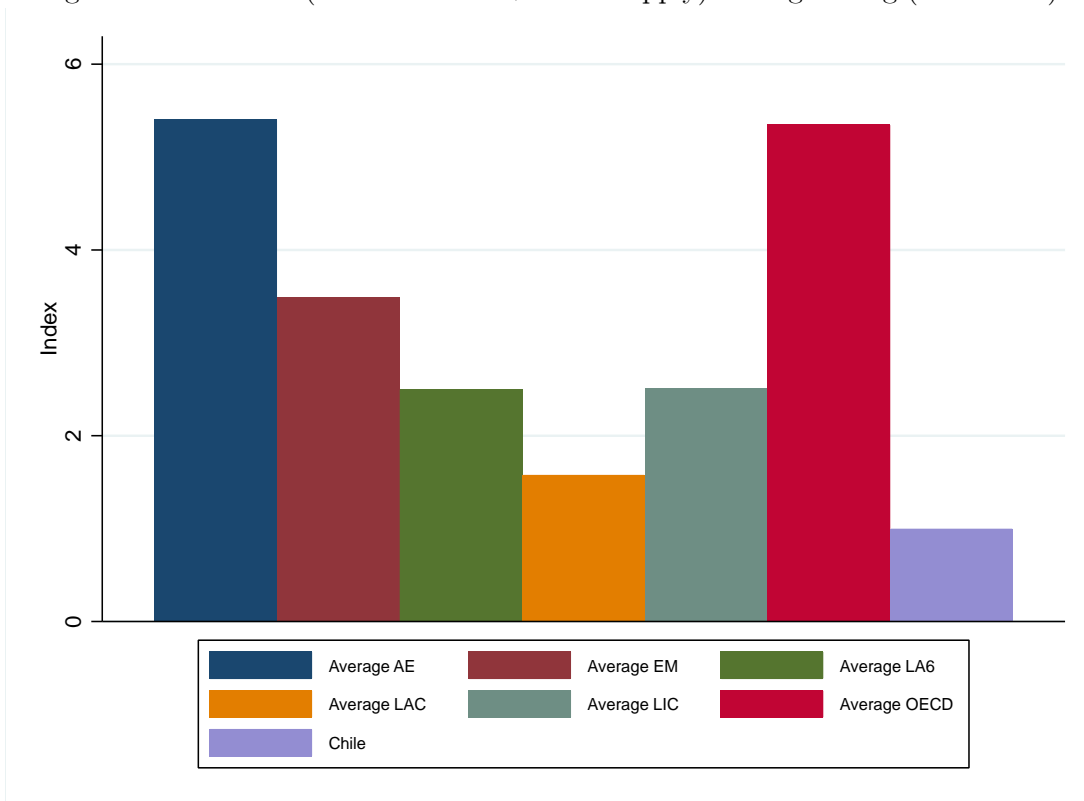


Figure 5: Loan Demand (LTV + DSTI) policy tightening (since 1990) index

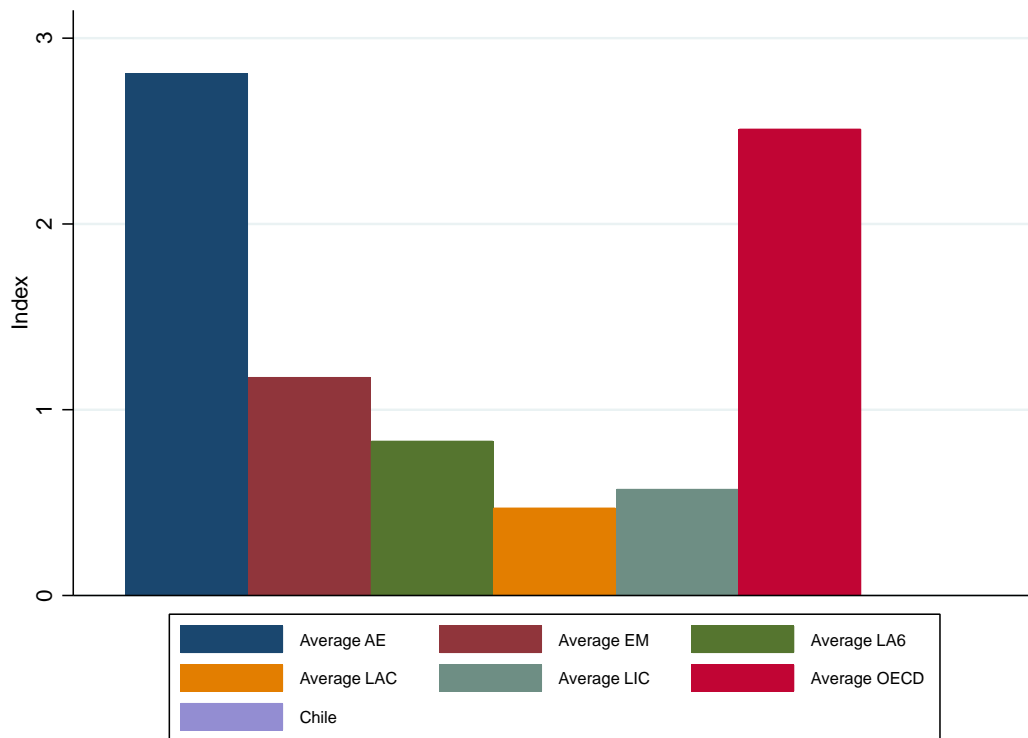




Figure 6: Loan Supply (LCG + LLP + LoanR + LTD + LFC) policy tightening (since 1990) index

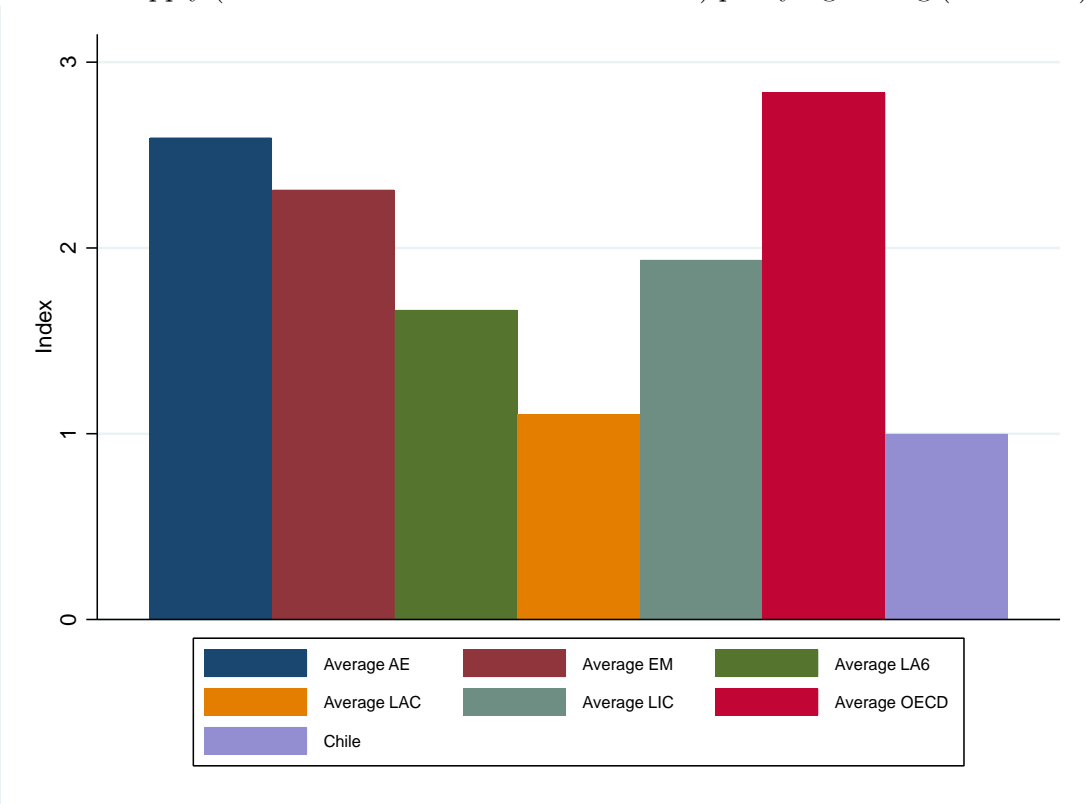
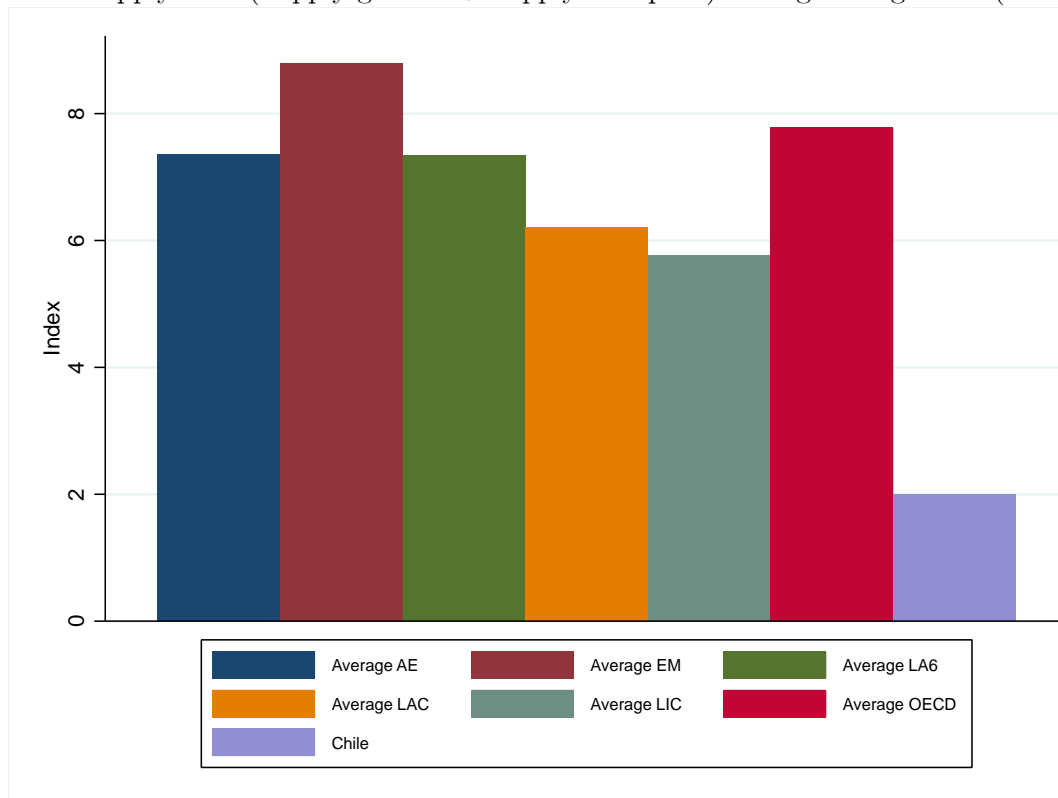


Figure 7: Supply Sum (Supply general + Supply of capital) net tightening index (since 1990)



buffer + Capital requirements). The Chilean index is only slightly lower than the 2.5 value for the Low Income Countries (LIC) and the Latin American and the Caribbean (LAC). But Chile is much lower in Supply of capital than the level 4 presented by the LA6 and Emerging Markets (EM) and even lower than the OECD and Advanced Economies (AE), with values of 5.7 and 5.8, respectively.

For the Supply general (Reserve Requirements + Liquidity + Limits on foreign exchange exposure) policies, Figure 9 shows that Chile has an index of 0, which is much lower than the other country groups. The average for the Advanced Economies (AE), OECD, Low Income Countries (LIC), LA6, LAC, and Emerging Market (EMs), is 1.6, 2.1, 3.3, 3.3, 3.7 and 4.7, respectively. Therefore, Advanced Economies (AE) tend to use these policies less than Emerging Markets (EM).

Figure 8: Supply of capital (LVR+CCB+Conservation+Capital) net tightening (since 1990)

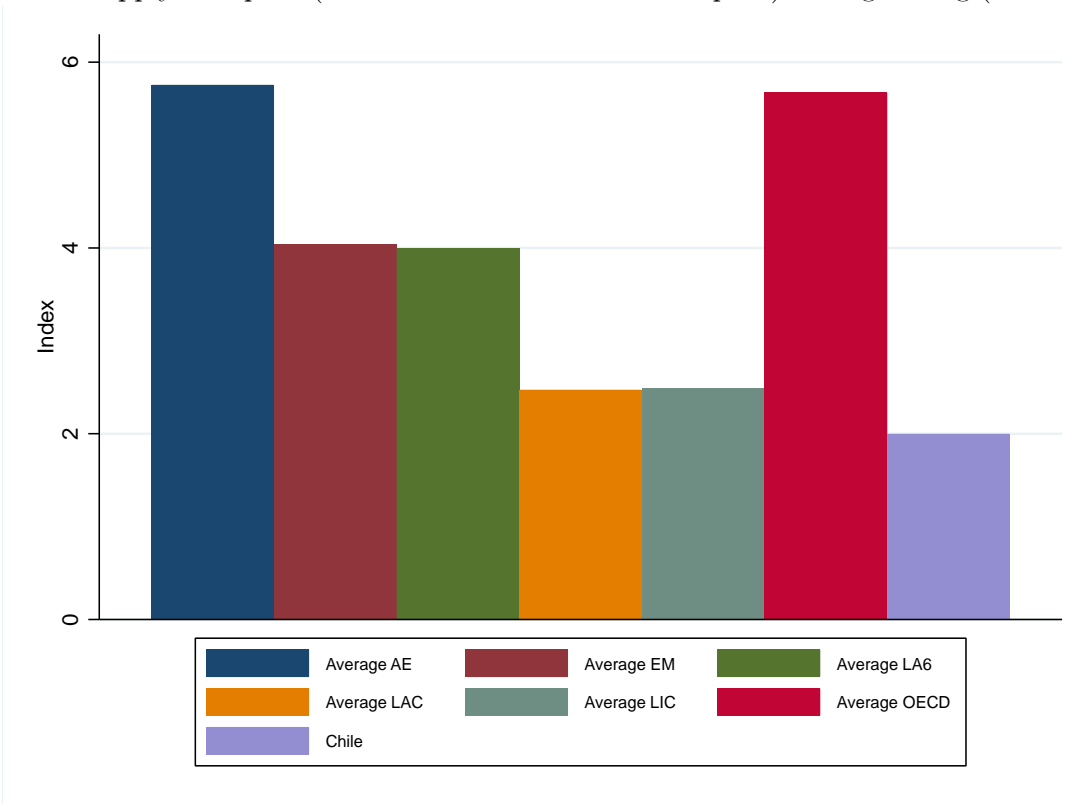


Figure 9: Supply general (RR+Liquidity+LFX) net tightening index (since 1990)

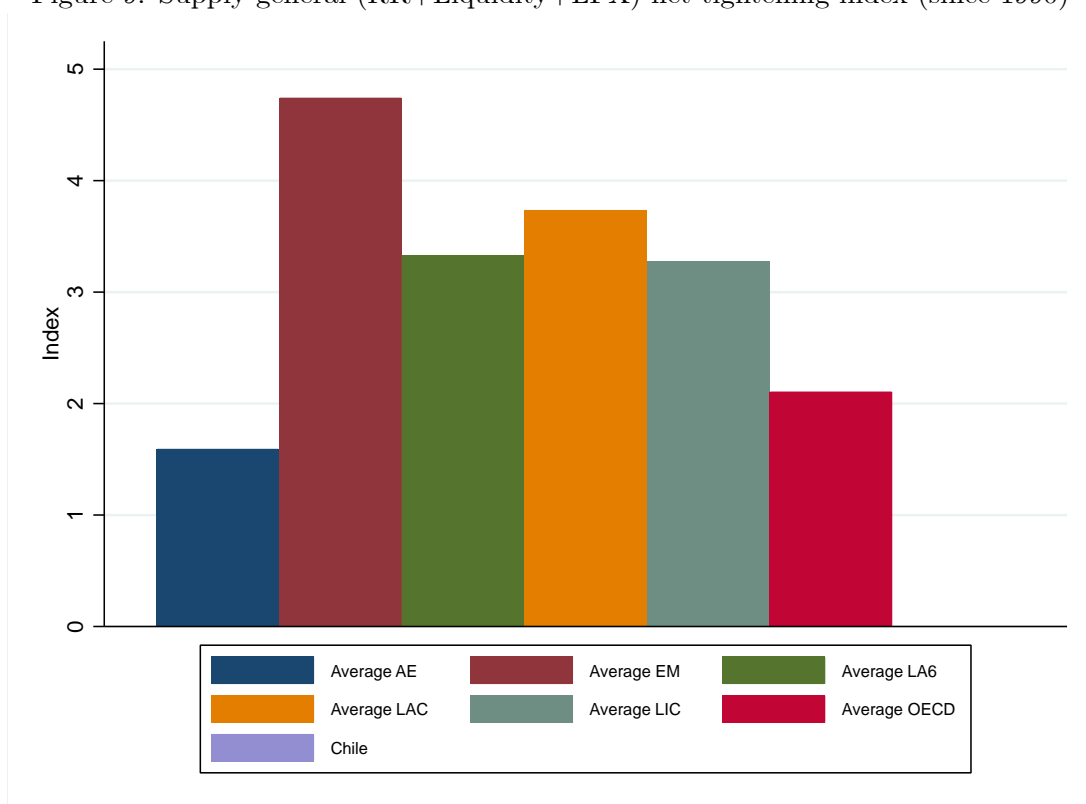
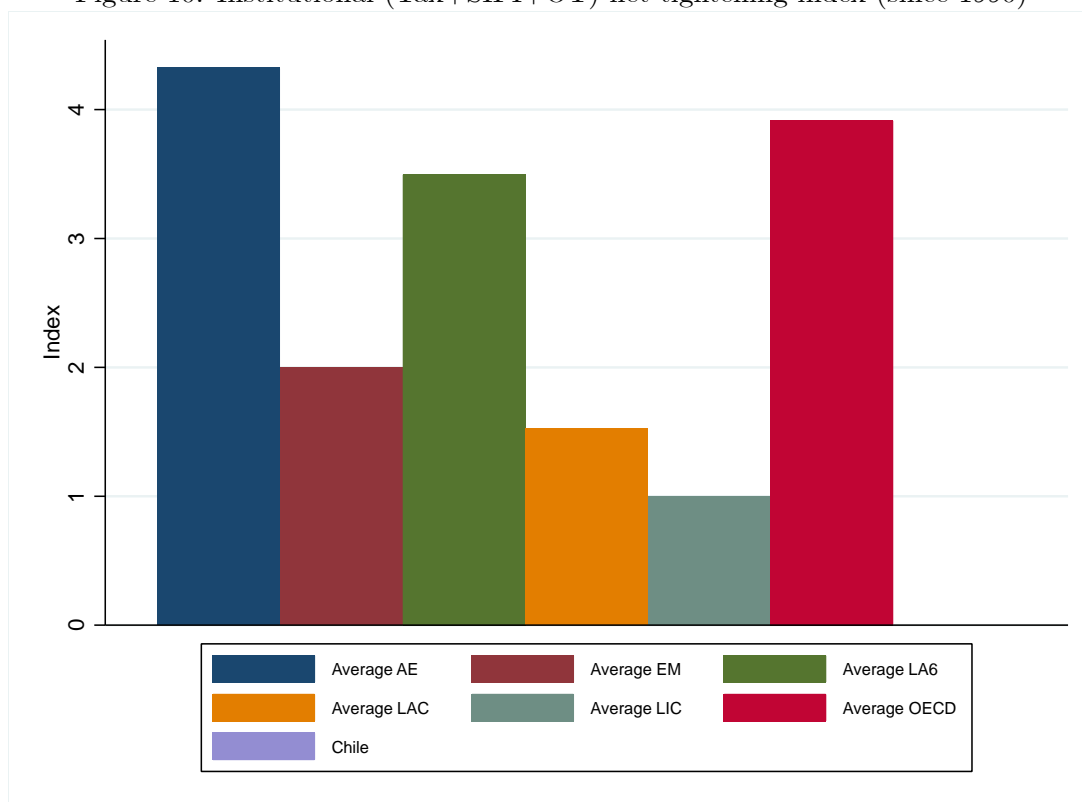


Figure 10: Institutional (Tax+SIFI+OT) net tightening index (since 1990)



## 5.5 Institutional regulations and other policies in 2019

Finally, Figure 10 shows the Institutional (Tax + Systemically Important Financial Institutions surcharges (SIFI) + Other) regulatory framework in 2019 for Chile versus the other countries. Chile implemented none of these policies until the present, therefore being below all the other country groups. The Institutional index in Chile is below the values of 1 and 1.5 presented by the Low Income Countries (LICs) and Latin American and the Caribbean (LAC), respectively. The Chilean index is much lower than the values of 2 and 3.5 presented by the average of the LA6 and Emerging Markets (EM), respectively. In this aspect, the developed countries show the stronger tightness, with values of 3.9 and 4.3 for the OECD and the Advanced Economies (AE), respectively.

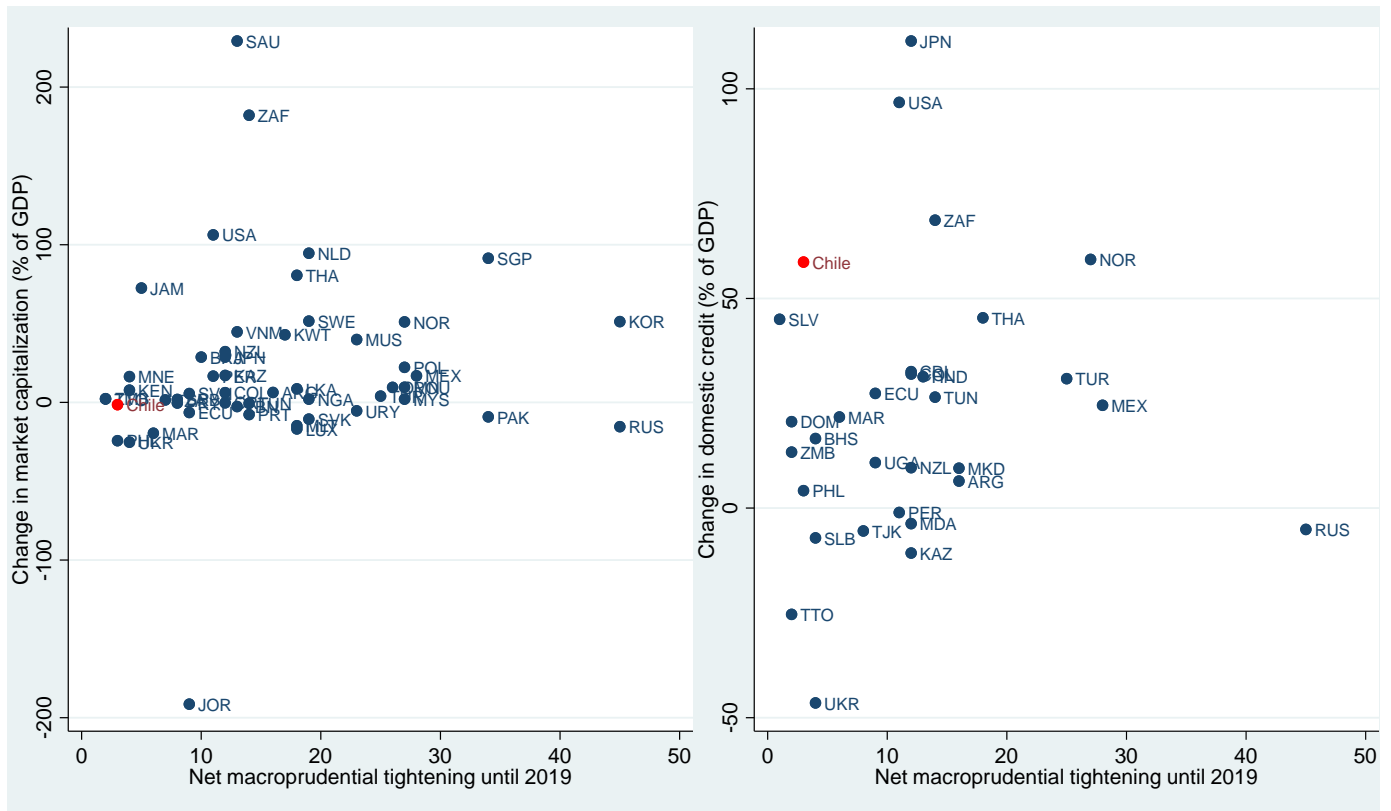
## 5.6 Changes in market capitalization and private sector credit across countries

How is the use of macroprudential policies related to financial markets development? This is a question that is hard to answer, because the aggregate evolution of financial markets is probably an element that regulators take into account before deciding on new macroprudential measures. Therefore, the relationship between financial markets and regulation should be bilateral and the direction of causality is unclear. This sub-section analyzes the coevolution between financial markets and regulation across different countries in the sample, although without instruments and a causality inference. I relate the net macroprudential policy tightening index for each country in 2019 with data from the World Development Indicators (World Bank 2021) for the domestic credit provided by the financial sector (% of GDP) and the market capitalization of listed domestic companies (% of GDP), which are available for 31 and 52 countries, respectively.

Figure 11 presents how the macroprudential index implemented for different countries until 2019 ( $CTPP_{c,t=2019}$ ) is correlated with the change in market capitalization and domestic credit during the same period, with Chile being the red dot of the scatter plot. The Figure shows that Chile had a macroprudential policy index of 3 in 2019 and that this index was among the lowest across all the countries in both of the sub-graphs. Therefore, the Chilean macroprudential index was not just much below the level of the average of all the country groups (Figure 2), but also lower than almost all the countries in the sample. Chile experienced a change of -1.43% in its market capitalization (as a % of the GDP) during this period, which is barely perceptible in the graph and represents a much smaller equity market growth in Chile than in more market oriented economies such as the USA and Singapore. On the other hand, Chile is among the five countries with the strongest growth in domestic credit (as a % of the GDP), having experienced a domestic credit growth of 58.7% of the GDP between 1990 and 2019. The figure also shows that both the growth of market capitalization and the growth in domestic credit are associated with higher values of net macroprudential tightening during this period. However, the causal relationship is unclear, since macroprudential policies are an endogenous decision implemented by regulators and perhaps the regulators are more likely to decide such policies during periods of robust equity and credit growth.

It is possible that the positive relationship between net macroprudential policy growth with domestic credit and market capitalization is clouded by other variables, such as country-specific

Figure 11: Change in market capitalization (% of GDP) and domestic credit (% of GDP) between 1990 and 2019 (World Bank data)



factors and income growth. Therefore I estimate a set of regressions:  $Y_{c,t} = \beta CPP_{c,t}^k + \gamma X_{c,t} + \alpha_c + \varepsilon_{c,t}$ , with the left hand side variable  $Y_{c,t}$  being either the domestic credit provided by the financial sector (% of GDP) or the market capitalization of listed domestic companies (% of GDP) and the right hand side including an index of macroprudential policy ( $CPP_{c,t}^k$ ), a set of controls that vary across time for each country ( $X_{c,t}$ ), fixed-effects by country ( $\alpha_c$ ) and an idiosyncratic term  $\varepsilon_{c,t}$ .

The country fixed-effects control for all the unobservable factors that differ across countries, but which remain constant over time, such as legal origin, geography, natural resources or culture. For the set of controls  $X_{c,t}$ , I choose two different alternatives, with the first one including just the log of the GDP per capita in PPP of each country, measured in constant 2017 international USD:  $\ln(GDPpcPPP_{c,t})$ . The reason for this option is that countries grow their financial sector (whether in terms of market capitalization or domestic credit) according to their overall economic development level. A second alternative also includes the consumer price inflation and the real GDP growth, besides the income per capita ( $\ln(GDPpcPPP_{c,t})$ ). The justification is that inflation and GDP growth can be indicators of overheating in the economy, therefore influencing both the financial growth ( $Y_{c,t}$ ) and the decisions of regulators in terms of macroprudential policy ( $CPP_{c,t}^k$ ).

Table 1 shows that the cumulative macroprudential policy of each country until time  $t$  ( $CPP_{c,t}^k$ ) for both the overall macroprudential index (SUM-17) and its sub-categories (except for Loan supply) are significantly associated with a stronger growth in domestic credit. This is true also when we account for inflation and GDP growth, as seen in Table 2, except that the Supply general coefficient is no longer statistically significant. The macroprudential indexes are also associated with a bigger change in market capitalization, except for the Loan supply and Institutional policy (which has an ambiguous sign, being negative in Table 1 and then positive in Table 2 after controlling for inflation and GDP growth). However, only the Loan Demand policies are statistically significant for the market capitalization regressions. Both Table 1 and Table 2 show that domestic credit and market capitalization changes increase with the income per capita. This relationship is statistically significant for all the market capitalization regressions, although only the coefficient of Loan Demand is statistically significant for domestic credit.

Table 2 shows that the real GDP growth is unrelated to domestic credit and market capitalization fluctuations. Inflation, however, is negatively related to domestic credit and positively related to market capitalization in a statistically significant way. During times of higher inflation, interest



Table 1: Empirical relationship between domestic credit and market capitalization with macroprudential policies and GDPpc (OLS-FE): 1990-2020

Domestic credit provided by financial sector (% of GDP) <sup>a)</sup>									
Controls	SUM-17	Loan	Sum	Supply	Loan	Loan	Insti-	Supply	Supply
			Sum	Demand	Supply	tutional	capital	general	
$CPP_{c,t}^k$	1.469*** (0.326)	3.016*** (0.984)	2.056*** (0.528)	6.778*** (1.474)	2.058 (1.856)	6.607*** (2.254)	4.695*** (0.900)	1.743* (1.000)	
$\ln(\text{GDPpc PPP}_{c,t})$	23.93 (20.70)	31.69 (22.15)	26.05 (20.87)	35.36* (21.23)	34.46 (23.22)	26.90 (20.40)	24.14 (20.04)	33.04 (21.79)	
Constant	-155.1 (189.9)	-224.3 (203.0)	-173.8 (191.7)	-257.6 (195.9)	-248.0 (212.8)	-179.1 (188.1)	-156.5 (184.4)	-235.7 (200.2)	
Observations	534	534	534	534	534	534	534	534	
Countries	31	31	31	31	31	31	31	31	
Market capitalization of listed domestic companies (% of GDP) <sup>a)</sup>									
Controls	SUM-17	Loan	Sum	Supply	Loan	Loan	Insti-	Supply	Supply
			Sum	Demand	Supply	tutional	capital	general	
$CPP_{c,t}^k$	0.298 (0.291)	0.314 (0.731)	0.729 (0.675)	1.768* (0.915)	-0.731 (1.333)	-0.178 (1.239)	1.172 (1.492)	0.984 (0.782)	
$\ln(\text{GDPpc PPP}_{c,t})$	30.06*** (8.529)	32.53*** (8.807)	30.01*** (9.104)	29.65*** (7.993)	36.62*** (9.129)	34.84*** (7.121)	30.48*** (9.001)	31.75*** (8.687)	
Constant	-241.1*** (80.50)	-264.2*** (82.17)	-240.9*** (86.52)	-236.9*** (75.01)	-302.5*** (85.35)	-285.9*** (67.03)	-245.1*** (85.51)	-257.2*** (82.49)	
Observations	1,055	1,055	1,055	1,055	1,055	1,055	1,055	1,055	
Countries	52	52	52	52	52	52	52	52	

Robust Standard-errors in (). \*\*\*, \*\*, \* denote 1%, 5% and 10% statistical significance.

a) These variables are in % value (that is, a value of 1% corresponds to 0.01).

All the regressions include fixed-effects by country.

$CPP_{c,t}^k$  from IMF data. Domestic credit, market capitalization, GDPpc from World Bank data.

rates tend to increase, reducing the demand for credit and also the supply of credit due to higher risks of default for the lenders. But market capitalization of the equity of listed companies is an asset that is naturally protected from inflation due to its positive effect on the sales and value of the firms, therefore it can benefit from the higher growth associated with periods of inflation.

It is important to note that, even with country fixed effects and controlling for income per capita, inflation and GDP growth, it is possible that these relationships are biased due to the endogeneity of the macroprudential policies ( $CPP_{c,t}^k$ ). It is difficult to find appropriate instruments for these policy variables. Regulators are concerned about domestic credit and capital markets, therefore the relationships shown in Table 1 and Table 2 can simply imply that regulators implement more macroprudential policies during periods of exuberant growth in financial markets.

Table 2: Empirical relationship between domestic credit and market capitalization with macroprudential policies, GDPpc, inflation and GDP growth (OLS-FE): 1990-2020  
Domestic credit provided by financial sector (% of GDP)<sup>a)</sup>

Controls	SUM-17	Loan	Sum	Supply	Loan	Loan	Insti-	Supply	Supply
			Sum	Sum	Demand	Supply	tutional	capital	general
$CPP_{c,t}^k$	1.340*** (0.351)	2.762** (1.073)	1.886*** (0.592)	6.572*** (1.301)	1.641 (1.989)	6.288*** (2.371)	4.397*** (0.913)	1.465 (1.136)	
ln(GDPpc)	28.65 (23.04)	35.89 (24.36)	30.30 (23.35)	39.63* (23.19)	39.14 (25.66)	32.80 (22.30)	29.11 (22.21)	37.39 (24.42)	
Consumer <sup>a)</sup>	-1.045*** (0.269)	-1.172*** (0.269)	-1.065*** (0.274)	-1.185*** (0.259)	-1.191*** (0.273)	-0.996*** (0.258)	-0.986*** (0.259)	-1.170*** (0.273)	
Real GDP <sup>a)</sup>	0.000395 (0.00083)	0.000396 (0.00084)	0.000251 (0.00086)	0.000117 (0.00094)	0.000330 (0.00081)	0.000482 (0.00089)	1.34e-05 (0.00089)	0.000294 (0.00086)	
Constant	-193.8 (211.4)	-258.0 (223.4)	-208.3 (214.3)	-292.0 (214.2)	-285.9 (235.3)	-229.2 (205.9)	-198.0 (204.6)	-270.6 (224.3)	
Observations	502	502	502	502	502	502	502	502	
Countries	30	30	30	30	30	30	30	30	
Market capitalization of listed domestic companies (% of GDP) <sup>a)</sup>									
Controls	SUM-17	Loan	Sum	Supply	Loan	Loan	Insti-	Supply	Supply
			Sum	Sum	Demand	Supply	tutional	capital	general
$CPP_{c,t}^k$	0.409 (0.283)	0.368 (0.803)	0.925 (0.697)	1.932** (0.985)	-0.832 (1.496)	0.388 (1.253)	1.592 (1.474)	1.164 (0.841)	
ln(GDPpc)	31.82*** (8.980)	34.90*** (8.896)	32.33*** (9.915)	31.96*** (8.320)	39.01*** (9.295)	36.12*** (7.733)	32.55*** (9.808)	34.38*** (9.450)	
Consumer <sup>a)</sup>	1.106** (0.450)	1.005** (0.502)	1.117** (0.439)	1.049** (0.506)	0.936* (0.493)	1.008** (0.481)	1.137*** (0.413)	1.035** (0.474)	
Real GDP <sup>a)</sup>	0.110 (0.111)	0.0843 (0.122)	0.119 (0.105)	0.0683 (0.115)	0.0519 (0.130)	0.0825 (0.119)	0.113 (0.104)	0.104 (0.112)	
Constant	-262.0*** (86.38)	-290.0*** (83.97)	-267.3*** (95.45)	-262.3*** (79.19)	-327.9*** (87.96)	-301.5*** (74.49)	-269.1*** (94.60)	-286.1*** (90.86)	
Observations	1,003	1,003	1,003	1,003	1,003	1,003	1,003	1,003	
Countries	51	51	51	51	51	51	51	51	

Robust Standard-errors in (). \*\*\*, \*\*, \* denote 1%, 5% and 10% statistical significance.

a) These variables are in % value (that is, a value of 1% corresponds to 0.01).

All the regressions include fixed-effects by country.  $CPP_{c,t}^k$  from IMF data.

Domestic credit, market capitalization, inflation, GDP growth, GDPpc from World Bank data.

## 6 Openness indexes

Figure 12 presents that Chile was a financially closed economy until the mid 1970s and then became closed again after the banking crisis of 1982 (Berstein and Marcel 2019), one of the largest ones in financial history (Reinhart and Rogoff 2009). Chile opened again briefly in 1995, before closing again until 1999 when the country decided to end its fixed exchange-rate bands due to the negative experience of the Asian crisis (Berstein and Marcel 2019). The period after the Asian crisis started a liberalization of the capital account and the country opened itself to outside financial flows after 2001. The country experienced again a small reduction in openness between 2008 and 2012 after the Great Financial Crisis, remaining without further changes until the present.

This evolution contrasts with the Advanced Economies (AEs) and the OECD, which steadily became more financially open after the end of Bretton Woods in 1973, with only a small reduction in openness during the Asian crisis of 1997. Both the OECD and the Advanced Economies (AE) have presented a higher Financial Openness Index than Chile after 2008. The Emerging Markets (EMs), Latin America (LAC and LA6) and Low Income Countries (LICs), however, decreased their financial openness significantly in the early 1980s, which coincided with several financial crises caused by a sudden increase in the USD interest rates (Reinhart and Rogoff 2014). These regions then started a gradual process of re-opening again in the early 1990s, although with a small reduction in financial openness after the Great Financial Crisis of 2008.

To plot more clearly the differences between Chile and other groups of countries, I plot the Financial Openness Index (Chinn-Ito 2006) across a few selected years (Figure 13). It shows that Chile was an entirely closed economy in 1997, but by 2006 it presented a higher level of financial openness than any other group of countries. In the recent decade, Chile has presented a substantially lower degree of financial openness than the Advanced Economies (AE) and the OECD.

Between 2000 and 2015, the Capital Inflows Tightening Policy Index (Pasricha 2017) shows that the average of the Emerging Markets (EMs), Latin American (LA6) and the OECD became more restrictive in terms of the total (FDI and non-FDI) net capital inflows (Figure 14), the FDI (Foreign Direct Investment) net inflows (Figure 15) and the non-FDI net inflows (Figure 16). Chile introduced even more restrictive measures during this period than the average of all the other country groups, whatever the type of inflows (total capital net inflows, FDI, and non-FDI). The

Figure 12: Financial Openness Index (Chinn-Ito 2006), normalized

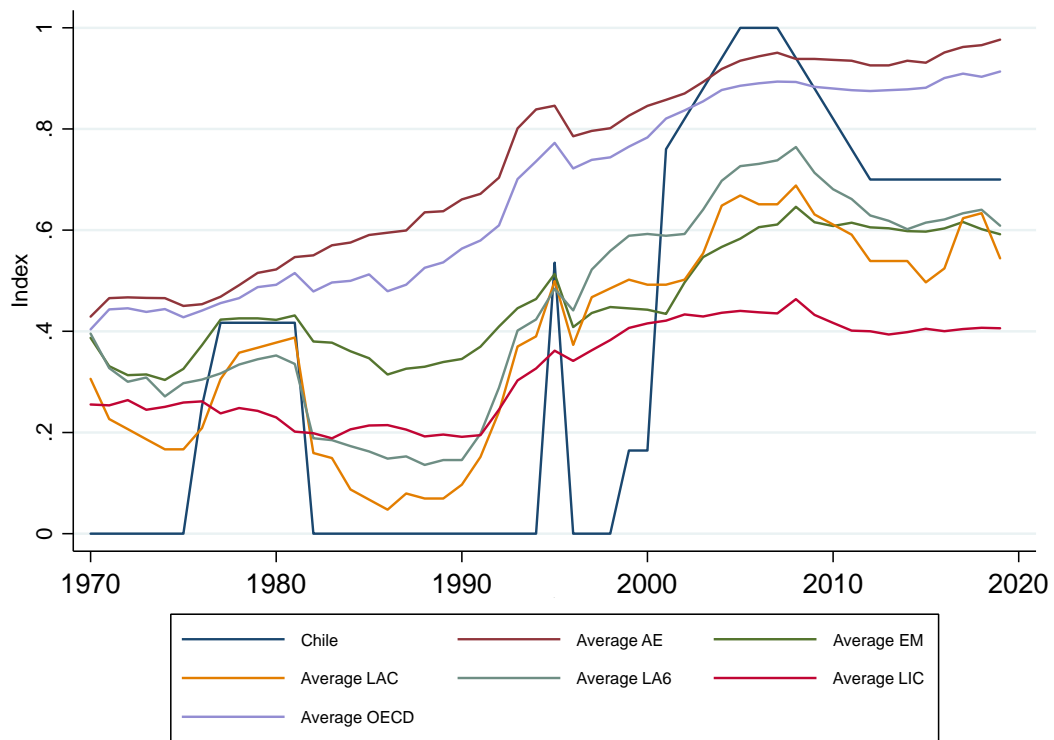


Figure 13: Financial Openness Index (Chinn-Ito 2006) across country groups in selected years (1997, 2006, 2012, 2016, 2019)

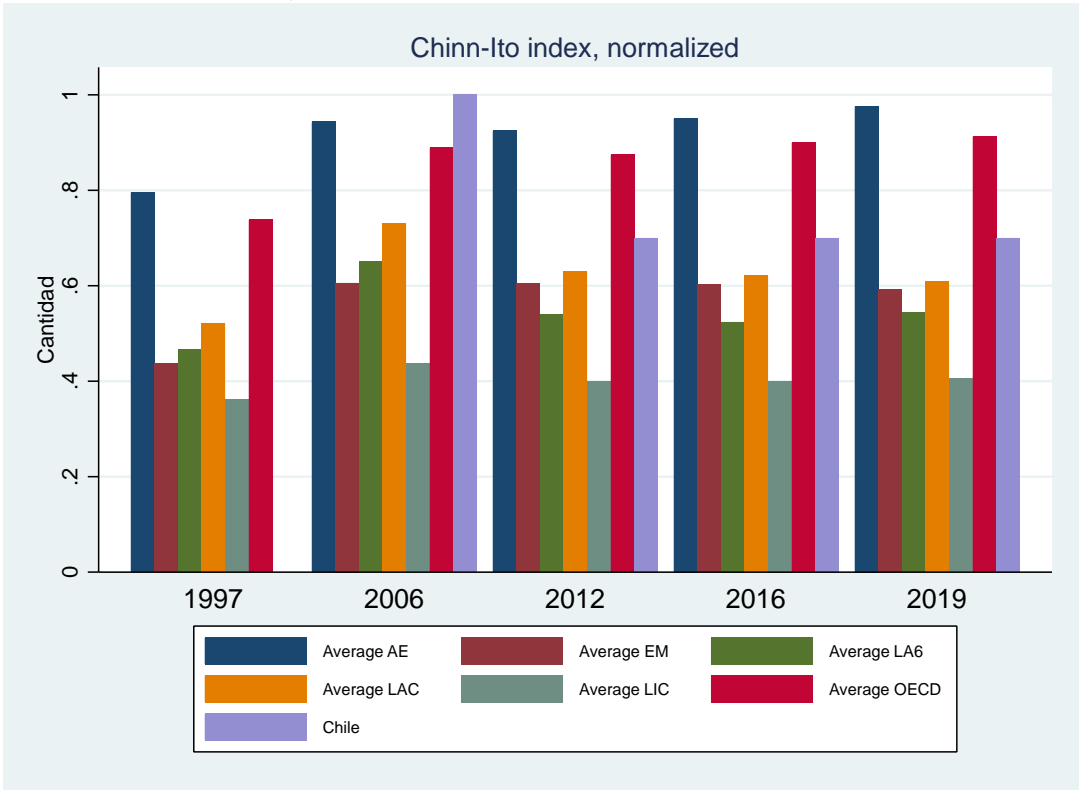
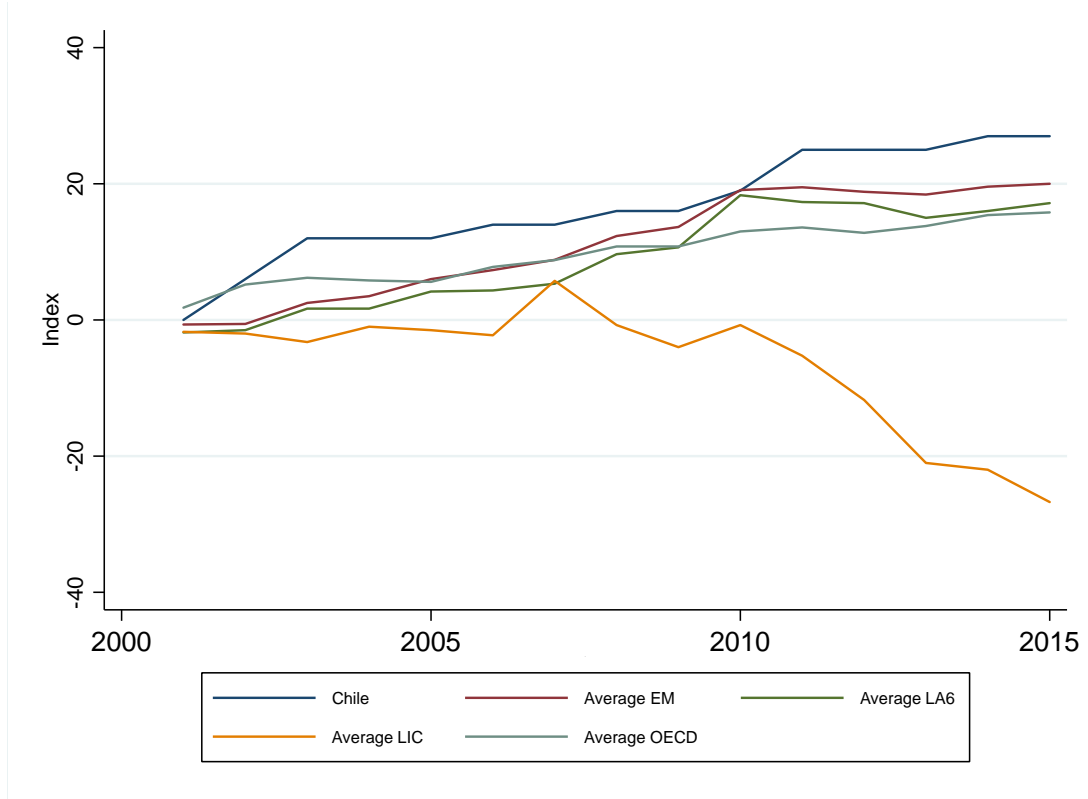


Figure 14: Capital Inflows Tightening Index (Pasricha 2017): cumulative number of net capital inflows (NKI) restrictive measures



Low Income Countries (LIC) were the only country group to reduce its Capital Flows Tightening, which happened for all the types of inflows (total capital net inflows, FDI, and non-FDI), perhaps because such countries started the period with a high level of restrictions<sup>8</sup>.

The Capital Controls Index (Fernández et al. 2016) includes more asset classes, it starts in 1995 and it includes more countries relative to Pasricha (2017). Between 1995 and 1999, Chile implemented a moderate loosening of its capital controls framework, which was very restrictive with an index value of 0.90, whether in terms of net flows (Figure 17), inflows (Figure 18) and outflows (Figure 19). This high degree of restrictions in the Capital Controls Index for Chile

<sup>8</sup>Note that both the Capital Inflows Tightening Policy Index (Pasricha 2017) and the Capital Controls Index (Fernández et al. 2016) are a sum of dummy indicators and therefore do not take into account the intensity of the policy measures. These measures also do not account the initial differences at the beginning of 2000 and that some countries already started that period with more conservative policies than the others. Therefore, it can also be misleading to conclude that Chile was more restrictive than the other Latin American countries during this period.

Figure 15: Capital Inflows Tightening Index (Pasricha 2017): cumulative number of Net FDI inflows restrictive measures

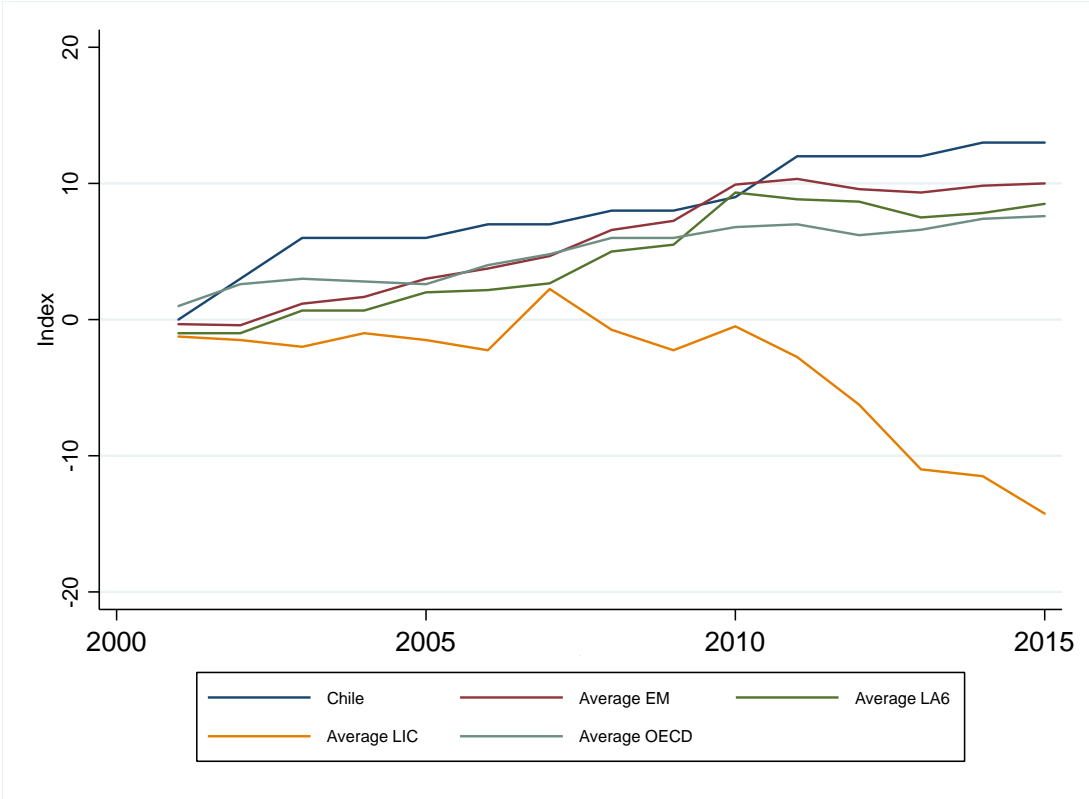
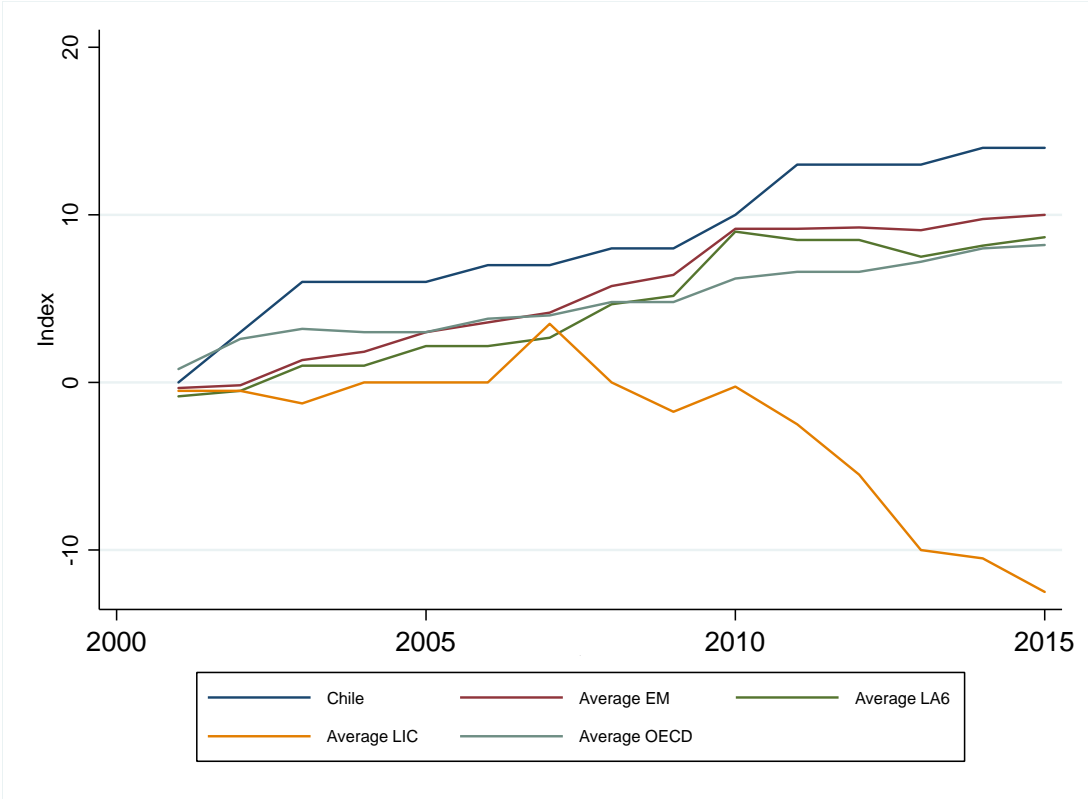


Figure 16: Capital Inflows Tightening Index (Pasricha 2017): cumulative number of non-FDI inflows restrictive measures





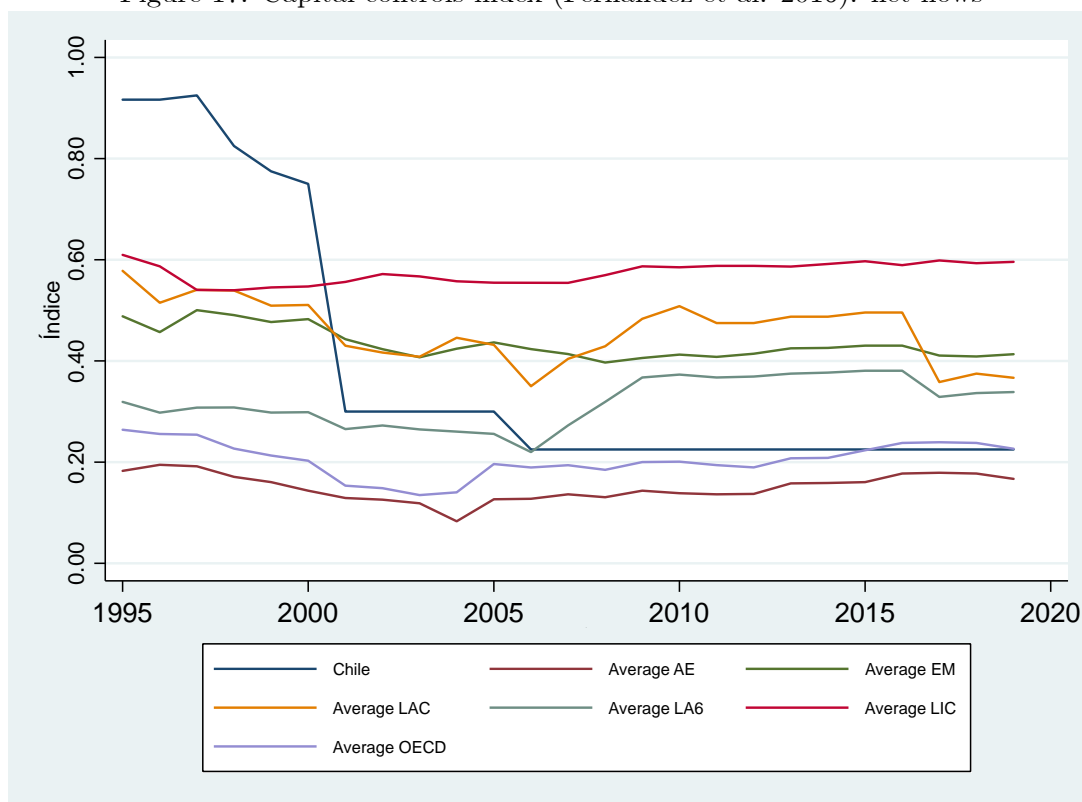
matches well the low level of Financial Openness shown by the Chinn-Ito Index before 1999.

Figure 17 shows that Chile eased substantially its capital controls restrictions between 1999 and 2001. It eased its index again in 2006 and stabilized at 0.22 afterwards. The Latin American countries (LAC and LA6) also became gradually less restrictive between 1995 and 2006. However, unlike Chile, the LAC and LA6 increased their restrictions again between 2007 and 2009, and only eased their policies after 2016. The average Advanced Economy (AE), OECD country, and Emerging Market (EM) also experienced a small reduction in capital controls between 1995 and 2004, and then made a small and gradual increase in capital controls until 2016. The Low Income Countries had a stable index close to 0.60 for the entire period. The results for inflows (Figure 18) and outflows (Figure 19) are very similar to the ones for net flows (Figure 17).

Between 1995 and 1997, Chile was much more restrictive than the other regions, whether for net flows (Figure 17), inflows (Figure 18) or outflows (Figure 19). In 1997 Chile presented a Capital Controls Index above 0.90 for net flows, much higher than the values of 0.60 in the Low Income Countries (LICs), 0.59 for the LAC, 0.50 in Emerging Markets (EMs), 0.34 for the LA6, 0.25 in the OECD and 0.19 in the Advanced Economies (AEs). Chile only started opening its capital account after the Asian crisis, which matches well with its zero degree of financial openness shown by the Chinn-Ito index before then (Figure 12). Only in 2006 did Chile match the Capital Controls Index value of the LA6, although it still remained slightly higher than the values presented by the average OECD country and somewhat higher than the Advanced Economies (AE). This is due to the Chilean restrictions on outflows.

In terms of the capital inflows restrictions (Figure 18), Chile became more open than any of the other groups of countries after 2001, lowering its index to a value of 0.10. Even the OECD and the Advanced Economies (AE) started tightening their inflows policies after 2008, although Chile remained the same with a low level of restrictions. Chile also reduced its restrictions on outflows until 2006 (Figure 19), presenting a value of 0.35 since then. The LA6 started tightening their capital controls on outflows in 2006, presenting a degree of outflows controls above Chile since 2009 (Figure 19). The OECD and the Advanced Economies (AE) also tightened slightly their capital controls on outflows since 2012, but their index levels remain below 0.30 and 0.20 at the present, therefore substantially more open than Chile and all the other country groups. The Low Income Countries (LIC) at the present are the group of nations with higher degree of capital controls,

Figure 17: Capital controls index (Fernández et al. 2016): net flows



whether for net flows (Figure 17), inflows (Figure 18), or outflows (Figure 19).

## 7 Conclusions

Based on the iMaPP-IMF dataset (Alam et al. 2019), this study compares the use of financial regulations in Chile versus other countries. I find that by the end of 2019, Chile had a macroprudential policy tightening index relative to 1990 that was much lower than for any other group of countries, including the Advanced Economies (AE), OECD, Low Income Countries (LIC), Latin America and the Caribbean (LAC) and the LA6. In fact, Chile was below the net macroprudential tightening of all the country groups, both for the overall index and also for all its subcategories. However, Chile was close to the Loan Supply policy tightening shown by its peers of Latin America and the Caribbean (LAC). Even in terms of more recent policy measures, such as the Institutional macroprudential policies (expressed by the sum of taxes, SIFI requirements, and other unclassified

Figure 18: Capital controls index (Fernández et al. 2016): inflows

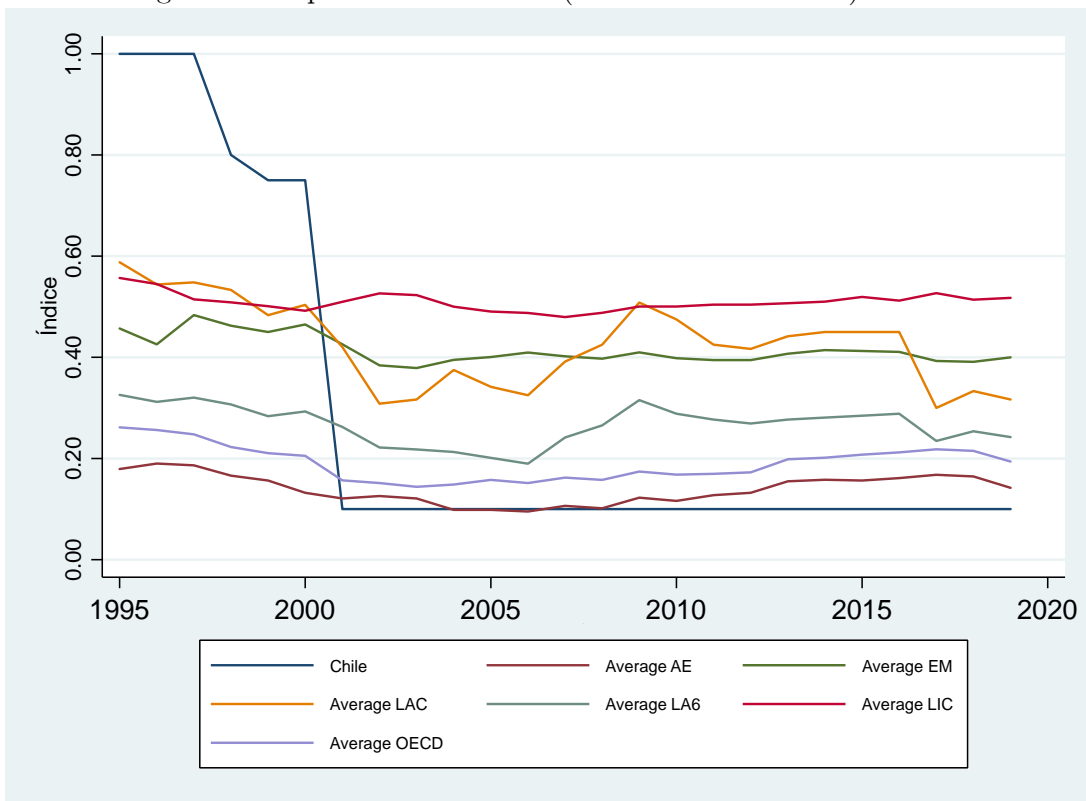
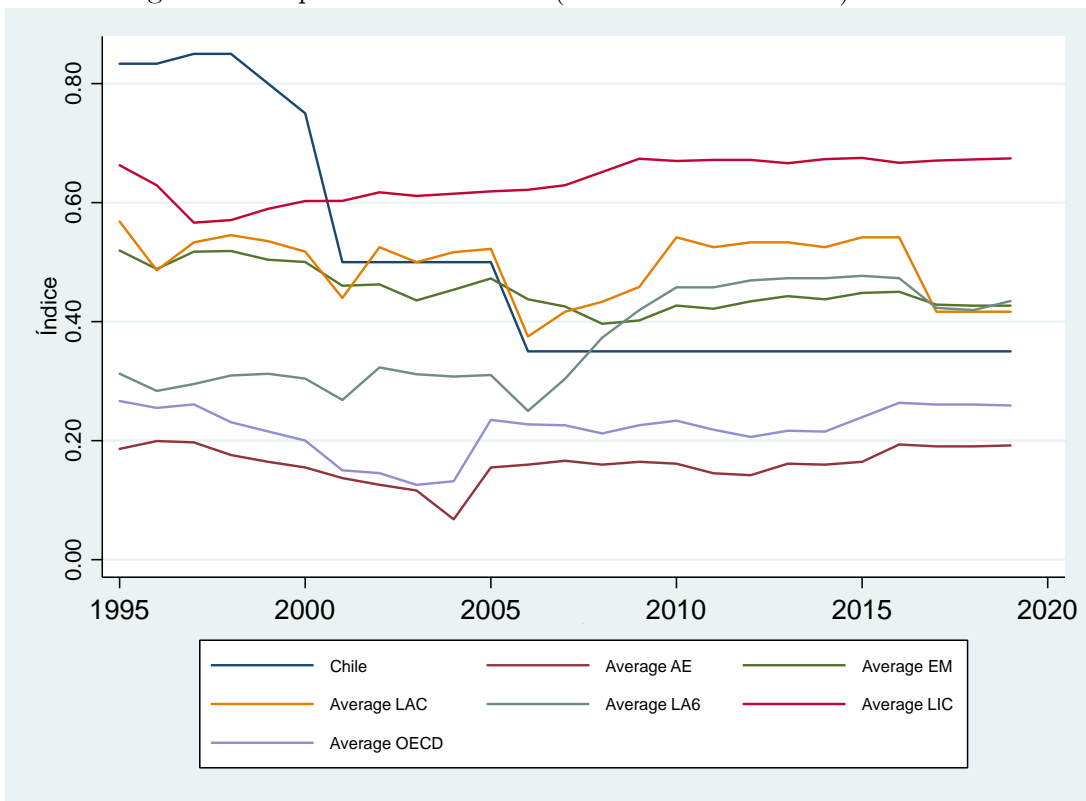


Figure 19: Capital controls index (Fernández et al. 2016): outflows



measures), Chile has been lagging all the other country groups, including the Low income countries (LIC) which already present an average of one policy measure in this subcategory.

Over time Chile decreased its macroprudential stance after the Asian crisis, followed by a second easing after the Great Financial Crisis. Chile only started tightening its macroprudential framework again after 2012. This could be explained by the tight initial prudential framework implied in the 1986 banking law, with Chile having started the 1990s with a more conservative financial framework than most countries<sup>9</sup>. All the groups of countries reduced their macroprudential tightening somewhat in 2020 after the Covid pandemic, therefore Chile followed this international trend and reduced its macroprudential index to 2 by the end of 2020.

One reason for this smaller degree of macroprudential tightening since 1990 could be that Chile started the 1990s with very restrictive policies already. This view can be shown from the average mortgage Loan-to-Value (LTV) regulation. In the early 2000s, all the country groups presented less restrictive LTV levels than Chile. After 2012 all country groups lowered their LTV levels, with the exception of Chile which kept its LTV at 87%. By 2020 only the average Advanced Economy (AE) and the average Emerging Market (EM) present lower LTV levels than Chile, but Chile is still tighter in this regulation relative to the other country groups, such as the Latin American (LAC, LA6) and the Low income countries (LIC). In terms of the mortgage LTV regulation, Chile is currently very close to the average OECD country.

Another aspect confirming that Chile started the 1990s with policies already too restrictive comes from the capital flow management (CFM) regulations. Both the Financial Openness Index (Chinn and Ito 2006) and the Capital Controls Index (Fernández et al. 2016) show that its capital account was very closed until the late 1990s, whether for net flows, inflows or outflows. Between 1995 and 1999, there was a moderate loosening of its capital controls framework, according to the Capital Controls Index. In terms of the capital inflows policies, Chile became more open than any of the other groups of countries after 2001. It also reduced its restrictions on outflows until

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<sup>9</sup>For instance, Cifuentes et al. 2017 show that between 2000 and 2013, for the set of 12 macroprudential policies in the dataset of Cerutti et al (2017), Chile presented a tighter prudential level than 90% of the other Advanced Economies and Emerging Markets countries. Furthermore, the same study shows that, among the sample of Emerging Markets countries, Chile is close to the median of the GDP growth volatility, but it is below the percentile 25 of the countries with the lowest bank credit growth volatility. Therefore, Chile is deemed to be a country with low financial volatility, even if it exhibits median macroeconomic volatility.

2006, but its capital controls for outflows are still tighter nowadays relative to the OECD and the Advanced Economies (AE). In terms of the Financial Openness Index, the country started opening its regulations in 1999, when it ended its fixed exchange-rate bands due to the negative experience of the Asian crisis (Berstein and Marcel 2019). It experienced again a small reduction in openness between 2008 and 2012 after the Great Financial Crisis, remaining without further changes until the present. Again, the OECD and the Advanced Economies (AE) are substantially more open than Chile in this aspect, presenting a higher Financial Openness Index over the last 15 years.

There are several unanswered questions regarding macroprudential policies, which are left as part of a future research agenda. One issue is the impact of macroprudential policies on the real economic growth. This question is partially studied by Madeira (2020), although its results are limited to the GDP of the manufacturing sector. This is a relevant topic because most studies so far have focused only on the benefits of financial regulations in terms of curbing excessive credit growth or overheated real estate markets (Dell’Ariccia et al. 2012, Cerutti et al. 2017, Akinci and Olmstead-Rumsey 2018, Alam et al. 2019,). Other similar questions can be made regarding the effects of macroprudential policies on employment, firm investment (Opazo et al. 2015) and trade (Raddatz 2010). Overall, several implications of macroprudential policy must be studied before a welfare analysis of its benefits and costs can be adequately made.

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## 8 Appendix: List of countries in each region

### 8.1 iMaPP dummy indicators data (135 countries)

OECD - Australia, Austria, Belgium, Canada, Chile, Colombia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

Advanced Economies (AEs) - Australia, Austria, Belgium, Canada, Curacao, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Taiwan, United Kingdom, United States.

Emerging Markets (EMs, excluding Low Income Countries) - Algeria, Argentina, Azerbaijan, Bahamas, Bahrain, Belarus, Benin, Bhutan, Botswana, Brazil, Brunei Darussalam, Bulgaria, Chile, China, Colombia, Congo Democratic Republic, Costa Rica, Croatia, Dominican Republic, Guinea Bissau, Hungary, Kazakhstan, Kosovo, Kuwait, Kyrgyz Republic, Lebanon, Macedonia, Malaysia, Mali, Mauritania, Mauritius, Mexico, Montenegro, Oman, Peru, Poland, Romania, Russia, Saint Kitts And Nevis, Saudi Arabia, Serbia, Solomon Islands, South Africa, Sudan, Thailand, Timor Leste, Togo, Trinidad and Tobago, Turkey, United Arab Emirates, Uruguay.

Low Income Countries (LICs, countries with less than 10,000 USD of GDPpc-PPP in 2010) - Albania, Angola, Armenia, Bangladesh, Bosnia and Herzegovina, Burkina Faso, Burundi, Cambodia, Cape Verde, Côte d'Ivoire, Ecuador, El Salvador, Ethiopia, Fiji, Gambia, Georgia, Ghana, Haiti, Honduras, India, Indonesia, Jamaica, Jordan, Kenya, Laos, Lesotho, Moldova, Mongolia, Morocco, Mozambique, Nepal, Niger, Nigeria, Pakistan, Paraguay, Philippines, Senegal, Sri Lanka, Tajikistan, Tanzania, Tonga, Tunisia, Uganda, Ukraine, Vietnam, Yemen, Zambia.

Latin America and the Caribbean (LAC) - Argentina, Bahamas, Brazil, Chile, Colombia, Costa Rica, Curacao, Dominican Republic, Ecuador, El Salvador, Haiti, Honduras, Jamaica, Mexico, Paraguay, Peru, Saint Kitts And Nevis, Trinidad and Tobago, Uruguay.

LA6 (the six largest Latin American countries by population) - Argentina, Brasil, Chile, Colombia, Mexico, Peru.

## **8.2 iMaPP mean LTV data (66 countries)**

OECD - Australia, Austria, Belgium, Canada, Chile, Colombia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

Advanced Economies (AEs) - Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Taiwan, United Kingdom, United States.

Emerging Markets (EMs, excluding Low Income Countries) - Argentina, Brazil, Bulgaria, Chile, China, Colombia, Croatia, Hungary, Kuwait, Lebanon, Malaysia, Mexico, Peru, Poland, Romania, Russia, Saudi Arabia, Serbia, South Africa, Thailand, Turkey, United Arab Emirates, Uruguay.

Low Income Countries (LICs, countries with less than 10,000 USD of GDPpc-PPP in 2010) - India, Indonesia, Mongolia, Nigeria, Philippines, Ukraine, Vietnam.

Latin America and the Caribbean (LAC) - Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay.

LA6 (the six largest Latin American countries by population) - Argentina, Brazil, Chile, Colombia, Mexico, Peru.

## **8.3 Chinn and Ito 2006 data (182 countries)**

OECD - Australia, Austria, Belgium, Canada, Chile, Colombia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia,

Lithuania, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

Advanced Economies (AEs) - Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, China, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Malta, Netherlands, New Zealand, Norway, Portugal, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States.

Emerging Markets (EMs, excluding Low Income Countries) - Algeria, Argentina, Azerbaijan, Bahamas, Bahrain, Belarus, Botswana, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Croatia, Dominican Republic, Hungary, Kazakhstan, Lebanon, Macedonia, Malaysia, Mauritius, Mexico, Oman, Peru, Poland, Romania, Russian Federation, Saudi Arabia, South Africa, Thailand, Trinidad and Tobago, Turkey, United Arab Emirates, Uruguay.

Low Income Countries (LICs, countries with less than 10,000 USD of GDPpc-PPP in 2010) - Albania, Angola, Armenia, Bangladesh, Bosnia and Herzegovina, Burkina Faso, Burundi, Côte d'Ivoire, Cambodia, Cape Verde, Ecuador, El Salvador, Ethiopia, Fiji, Gambia, Georgia, Ghana, Haiti, Honduras, India, Indonesia, Jamaica, Jordan, Kenya, Laos, Lesotho, Moldova, Mongolia, Morocco, Mozambique, Nepal, Niger, Nigeria, Pakistan, Paraguay, Philippines, Senegal, Sri Lanka, Tajikistan, Tanzania, Tonga, Tunisia, Uganda, Ukraine, Vietnam, Yemen, Zambia.

Latin America and the Caribbean (LAC) - Argentina, Bahamas, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Haiti, Honduras, Jamaica, Mexico, Paraguay, Peru, Trinidad and Tobago, Uruguay.

LA6 (the six largest Latin American countries by population) - Argentina, Brazil, Chile, Colombia, Mexico, Peru.

#### **8.4 Pasricha 2007 data (18 countries)**

OECD - Chile, Colombia, Korea, Mexico, Turkey.

Emerging Markets (EMs, excluding Low Income Countries) - Argentina, Brazil, Chile, China, Colombia, Malaysia, Mexico, Peru, Russian Federation, South Africa, Thailand, Turkey.

Low Income Countries (LICs, countries with less than 10,000 USD of GDPpc-PPP in 2010) - Egypt, India, Indonesia, Morocco, Philippines.

Latin America and the Caribbean (LAC) - Argentina, Brazil, Chile, Colombia, Mexico, Peru.

LA6 (the six largest Latin American countries by population) - Argentina, Brazil, Chile, Colombia, Mexico, Peru.

## **8.5 Fernández et al. 2016 data (100 countries)**

OECD - Australia, Austria, Belgium, Canada, Chile, Colombia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

Advanced Economies (AEs) - Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Malta, Netherlands, New Zealand, Norway, Portugal, Singapore, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States.

Emerging Markets (EMs, excluding Low Income Countries) - Algeria, Argentina, Bahrain, Brazil, Brunei Darussalam, Bulgaria, Chile, China, Colombia, Costa Rica, Dominican Republic, Hungary, Kazakhstan, Lebanon, Malaysia, Mauritius, Mexico, Oman, Peru, Poland, Romania, Russia, Saudi Arabia, South Africa, Thailand, Turkey, United Arab Emirates, Uruguay.

Low Income Countries (LICs, countries with less than 10,000 USD of GDPpc-PPP in 2010) - Angola, Bangladesh, Burkina Faso, Côte d'Ivoire, Ecuador, El Salvador, Ethiopia, Georgia, Ghana, India, Indonesia, Jamaica, Kenya, Moldova, Morocco, Nigeria, Pakistan, Paraguay, Philippines, Sri Lanka, Tanzania, Tunisia, Uganda, Ukraine, Vietnam, Yemen, Zambia.

Latin America and the Caribbean (LAC) - Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Jamaica, Mexico, Paraguay, Peru, Uruguay.

LA6 (the six largest Latin American countries by population) - Argentina, Brazil, Chile, Colombia, Mexico, Peru.

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