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Prudential Regulation, Currency Mismatches and Exchange Rates in Latin America and the Caribbean*

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Abstract: This paper gathers and systemizes self-reported information about exchange rate flexibility and FX regulation in Latin America and the Caribbean for a period of twenty years beginning in 1992. The results show that, in countries in which the use of limits, liquidity and reserve requirements on FX positions was more common, the frequency of use of these instruments was particularly high during the transition towards more flexible exchange rate regimes. The exception refers to economies with a long tradition of financial dollarization in which the prudential policies were more spread out over time, possibly due to countercyclical adjustments of the regulatory instruments. Along these lines, policy-makers reported that the first goal in using the regulation was to reduce currency mismatches, but, in the flexible regimes that were adopted during the 2000s the instruments were also used to dampen volatility in the exchange rate.

Keywords: Prudential Regulation; Exchange Rate Regimes; Foreign Currency Positions

JEL Classification: E58, F31

Resumen: Este documento recaba y sistematiza información auto-reportada sobre flexibilidad de regímenes cambiarios y regulación prudencial en América Latina y el Caribe para un período de veinte años que comienza en 1992. Los resultados muestran que en aquellas economías en las cuales el uso de requerimientos de reservas y límites a las posiciones en moneda extranjera fue más común, la frecuencia de uso de estos instrumentos fue particularmente elevada durante la transición hacia regímenes de tipo de cambio más flexibles. La excepción se refiere a economías con una larga tradición de dolarización financiera, en las cuales las políticas prudenciales se encontraron más dispersas en el tiempo, posiblemente debido a ajustes contra-cíclicos en los instrumentos regulatorios. En este sentido, los hacedores de política económica reportaron que el primer objetivo de la regulación fue reducir descalces cambiarios pero que, en los regímenes más flexibles que se adoptaron durante los años 2000, las políticas se implementaron también para aminorar volatilidad en el tipo de cambio.

Palabras Clave: Políticas Prudenciales; Regímenes Cambiarios; Posiciones en Moneda Extranjera

*Although the survey was run under the auspices of CEMLA, its views do not reflect CEMLA's or Banco de México's opinions. I thank Javier Guzman, Fernando Tenjo, Alessandro Rebucci, Daniel Chiquiar, Nicolás Magud, Alberto Ortiz, Gian Maria Milesi-Ferretti, and Alfonso Guerra for support and comments. Above all, I thank the officials of the central banks that participated actively in this work.

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1. Introduction

The Global Financial Crisis (GFC) has redrawn the attention of policy-makers and the international community on prudential regulation. In this context, it is frequently argued that its spirit has changed, that this regulation is currently being used with a new macro-prudential perspective to contain systemic risk and, through this channel, preserve financial stability (Terrier et al., 2012). However, little attention has been paid to FX risk. Thus, the present paper conducts a survey on several dimensions of three regulatory instruments: limits, as well as liquidity and reserve requirements on FX positions. The survey is conducted across seventeen central banks from Latin American and the Caribbean and allows investigating whether the spirit of FX regulation in the private banking sector has changed over time.

The survey contains five sections that study measurement of FX risk, the regulatory policies used by the Latin American and Caribbean countries to minimize it, and the flexibility of their exchange rate regimes (for details, see Appendix 1). Using Sections 1 and 3 of this survey, the paper systematizes information on the three regulatory instruments under consideration and exchange rate regimes. In particular, Section 1 requests policy-makers: i) To identify the status of the limits, as well as the liquidity and the reserve requirements on FX positions in 1992; ii) To track all relevant changes implemented from 1992 to 2012, i.e., hereafter referred to as policies; iii) To describe the implementation characteristics of the policies; and iv) To identify their objective in a list of six potential goals.¹ Section 3 requests them to define the exchange rate regimes their central bank adopted from 1992 to 2012.

Interestingly, the fact that the period covered by the survey is 1992-2012 allows me to perform the investigation in two distinct periods of time: The period preceding the currency crises of the late 1990s and early 2000s, which were associated with abandonments of fixed exchange rate regimes, and the period that followed these crises. A potential disadvantage of the survey is that it does not cover regulatory policies that solely dealt with financial derivatives markets (see Tobal (In press) for a role of financial derivatives in the region).

¹ Refinements and consolidation procedures are not considered as relevant regulatory changes (see Subsection 2.2 for comprehensive explanations of relevant regulatory changes).

The study of differences in the number of policies implemented by country and over time reveals novel facts. Brazil, Colombia, Costa Rica and Peru are the economies that used the three instruments more intensively over 1992-2012. A common pattern emerges across three of these economies, in which there was a tendency of the policies to be concentrated over time. Brazil, Colombia and Costa Rica used the policies more intensively precisely in the transition towards a more flexible exchange rate regime. This conclusion stands whether the transition occurred right after the crises of the late 1990s, such as in Brazil and Colombia, or whether it occurred in the mid-2000s, such as in Costa Rica. Moreover, in Mexico there were also periods in which the intensity of use of the policies increased. However, unlike in Brazil, Colombia and Costa Rica, this increase was particularly evident around the time that Mexico formally adopted its inflation targeting (IT) regime (see Section 3 for further comments).

Turning back to the four economies with the most intensive use, I find that in Peru the policies were much less concentrated over time than in the remaining countries. Peru is a highly dollarized economy in which even small fluctuations of the exchange rate have the potential to create strong balance sheet-effects. In this sense, it could be argued that the lack of concentration of the policies at a particular moment reflects its attempts to avoid such fluctuations at different points in time. Indeed, as noted below, this hypothesis is consistent with self-reported information about the goals of the policies presented in Section 4.

Moreover, one could analyze these results on the frequency of use the instruments from the perspective of their potential change in spirit. In the post GFC era, it has been accepted that regulation could be used with a macro-prudential goal, i.e., to contain systemic risk. Following the FSB, the IMF and the BIS, this risk can be tackled in its cross-sectional or its time-dimension (FSB, IMF, BIS, 2011). While the former refers to the distribution of risk at a given point in time, the time-dimension refers to the behavior of system-wide risk over time and is, therefore, more directly associated with the present paper's results.

Thus, focusing only on the time-dimension of systemic risk, one could argue that policies that are more spread out over time, such as those implemented by Peru, are in principle more consistent with a countercyclical adjustment of the instruments and, therefore, their macro-prudential use (for macro-prudential use of FX regulation, see Ostry, 2012; Ostry et al., 2012). Hence, and always considering that the survey does not explicitly ask whether the

instruments were used with a macro-prudential goal, the result that in several countries FX regulation tended to be concentrated at specific moments is consistent with Fernández et al. (2015). In their seminal work, these authors show that capital controls, i.e., a different forms of financial regulation, are generally not adjusted in a countercyclical manner.

This paper also presents evidence on common patterns and differences in policy-makers' concerns and implementation. The most common policy involved a tightening in limits and requirements rather than a loosening in these instruments. Thus, a common pattern reflects that, over 1992-2012, FX regulation limited the behavior of banks by imposing additional constraints on their optimal FX portfolio choice. In this manner, several countries with a long tradition of financial dollarization tightened the limit on long FX positions, while several of the remaining ones tightened the limit on short FX position, i.e., in economies with a high level of financial dollarization, agents tend to hold long FX positions.

In addition, responding to differences in policy-makers' concerns, countries constrained different types of FX positions and distinct components of the balance sheet. For instance, a large amount of the policies taken in Colombia dealt with short-term FX positions, possibly to avoid maturity mismatches in FX components of the balance sheet. In contrast, a large amount of the policies taken in Brazil aimed at increasing the overall long FX position of banks, possibly to correct the short positions held before the unification of its parallel FX markets in 2005 (see Tobal, 2013).

Furthermore, implementation provides an additional source of heterogeneity across countries. Thus, even policies that constrained the same relationships in the balance sheet exhibited substantial differences in terms of implementation characteristics. For example, while the National Banking and Insurance Commission of Honduras regulated both short and long FX positions by using one limit for each position type, the Central Bank of Costa Rica tended to use single limits on open FX positions, i.e., defined as the absolute value of the difference between FX assets and FX liabilities.

Motivated by this evidence, I study policy-makers' concerns by using their responses to the survey. These responses show that reducing currency mismatch was the main goal when implementing the regulatory instruments under consideration and that achieving exchange rate stability was the second most important goal. Central banks were also interested in

reducing maturity mismatches in FX positions and in reducing financial dollarization to improve the efficiency of conventional monetary policy and to enhance the central bank's power to act as lenders of last resort.

Moreover, two other types of analysis suggest that the instruments under consideration in this paper may have been implemented with an additional goal. In particular, the historical analysis undertaken in Section 3, as well as statistics on policy use by exchange rate regimes, suggests that policy-makers used the policies as a complement to FX controls. In turn, these controls segment FX markets, frequently creating greater opportunities to benefit from regulatory arbitrage and generating additional markets to regulate. In turn, these two features yield further demand for FX regulation and, accordingly, the regulatory instruments considered in this paper seem to have at least partially satisfied this demand.

Finally, this evidence on policy goals is connected with information on the flexibility of the exchange rate regimes from the survey and, ultimately, used to investigate the link between the regulatory instruments, conventional monetary policy and FX market interventions. In particular, the results suggest that: i) Exchange rate regimes in Latin America and the Caribbean were effectively more flexible in the 2000s than in the 1990s (I also check this result using Reinhart and Rogoff's coarse classification of exchange rate regimes); ii) The regulatory policies under consideration in this paper were more strongly motivated by exchange rate stability in the 2000s than in the 1990s; and iii) The higher the degree of flexibility of an exchange rate regime, the more intensively the limits, as well as the liquidity and the reserve requirements are used.

The paper is structured as follows. Section 2 presents an overview of the survey, summarizes the data collection process and presents the final set of countries considered in the analysis. Section 3 undertakes an historical analysis of the policies implemented in Latin America and the Caribbean over 1992-2012. Section 4 studies differences in the implementation characteristics and the theoretical impact of the policies. Section 5 reviews the literature on potential goals of FX regulation, links these goals with an experience in Latin America and the Caribbean and presents results on the objectives of the policies. Finally, Section 6 deals with the interaction between exchange rate flexibility, FX market interventions, monetary policy and the use of FX regulation, and Section 7 concludes.

2. The Survey

2.1. Brief Overview

The survey was run across central banks from Latin and the Caribbean and distributed under the auspices of the Center for Latin American Monetary Studies (CEMLA). In this regard it is important to note that, although the central bank of Mexico took an active part in filling the survey and in providing feedback on its responses, it did not participate in the design of the survey or of the data collection process. Hence, this bank did not have access to every piece of collected information, just as any of the other surveyed central banks (for more information on what central banks did get access to, see Tobal (In press)).

The goal of the survey was twofold. First, it aimed at creating a dataset with comparable information on FX assets and FX liabilities that would allow undertaking cross-country comparative studies (a description of this dataset can be found in Tobal (In press)). Second, the survey aimed at collecting comparable information on financial risks associated with exchange rate movements, and on the policy responses implemented to mitigate them.

The data collection process comprised two stages that, as explained below, were explicitly designed to fulfill the goals of the survey. In the first stage, which started in November-December of 2012, this survey was sent to the heads of the research and the financial stability departments of every CEMLA's central bank member. Then, they distributed each question within their institution so that each question would be answered by the best qualified person to this end. The second stage of the process comprised a series of contacts made by email or by phone, as well as personal interactions with officials from the central banks. The feedback that I obtained in this second stage allowed me to complement the information provided in the first stage and, therefore, to better understand the context in which policies were taken.

The survey was divided into five sections. Four of these sections covered policies aimed at mitigating financial risks that arise from movements in the exchange rate, while the remaining one collected data on FX assets and FX liabilities (for a detailed description of the survey, see Appendix 1). As noted above, the present paper focuses on the information collected in Sections 1 and 3, which study prudential policies that regulate FX positions and exchange rate regimes, respectively.

2.2. Data Collection Process

The two stages of the data collection process were designed to ensure that: (i) the collected data was informative on FX risks and on the policies taken to dampen it; and (ii) I could use these data to generate information that is comparable across countries. Fulfilling these conditions required that I specify the set of prudential policies on which the data would be reported, as well as an exchange rate regime classification that is able to capture all relevant information provided by the central banks.

2.2.1 Prudential Policies

Defining the set of policies on which the data would be reported brought about important challenges. On the one hand, this set had to be sufficiently small that the policies thereby included could be thought of as constraining similar components of the balance sheet and, ultimately, as having similar economic impacts. Under this condition, policy-makers would think of a relatively small group of instruments when responding the survey, and this in turn would facilitate cross-country comparability in the collected data. On the other hand, the set had to be sufficiently large that the countries would include all instruments that, having affected similar components of the balance sheet, had been implemented to minimize FX risks. Under this condition, the data would be comprehensive. Finally, I only considered policies that, according to the central banks, had had relevant impacts, excluding regulatory changes associated with consolidation procedures and refinements of existing regulation (see Appendix 2 for refinements and consolidation procedures).

Joint fulfillment of these conditions was complicated for two reasons. First, defining any set of policies with common characteristics is difficult because there are numerous dimensions over which regulatory instruments and their implementation characteristics can differ. Second, given that countries have different contexts and heterogeneous financial systems, it is likely that they implement similar regulatory instruments with a different end, as well as different instruments with a similar end.

In light of this heterogeneity, I decided to count with the two stages of the process to define the set of policies on which the data would be reported. In the first stage, I requested policy makers to provide information on a large set of instruments and, in Section 1 of the survey, included a box referred to “Other instruments” used to limit, deter and incentivize any sort

of FX position. This ensured that central banks provided information on all instruments they had used to this end, i.e., and, thus, that the set of policies on which the data would be reported was sufficiently large. In the second stage the interactions that I maintained with the central banks allowed better understanding their motivations and, thus, helped me narrow down the group of instruments under consideration.

To be more precise, in the first stage I requested policy-makers to identify the status of each instrument in 1992; to track every change they introduced until 2012; to describe their implementation characteristics and to link each change to one or more objectives in a list of six potential goals (for this list, see Subsection 4.2). When asking for the data, I considered a sample that began in June of 1992 and ended in June of 2012, and divided the 20-year period into 80 quarters. In the first stage, the answers confirmed that countries used heterogeneous instruments to limit, deter and incentivize FX positions. For instance, Brazil used reserve requirements on FX positions, Mexico, Chile and Colombia applied liquidity requirements on them, and Uruguay used deposit insurance premia differentiated by currency.²

Taking this heterogeneity into account, I used the second stage to narrow down the group of instruments. I asked policy-makers which of the policies they had mentioned in the first stage had had relevant impacts according to them, and discarded those policies that were considered as being non-relevant i.e., policies that induced significant changes in FX positions were considered as relevant.³ Moreover, given that some of the policies left in the group were still not sufficiently homogeneous, i.e., the set of policies was still not sufficiently small, I further cut the sample by imposing an additional condition: I excluded policies that did not directly affect the two sides of the balance sheet, i.e., FX assets and FX liabilities.

Having imposed all conditions, I came up with a set of policies that included three types of instruments: direct limits, as well liquidity and reserve requirements. Limits frequently impose direct constraints on FX positions as a percentage of capital and, thus, significantly

² Chile and Colombia restricted the difference between short-term FX liabilities and short-term FX assets but named this instrument as a limit on short current FX positions. However, I refer to them as liquidity requirements.

³ Whereas I could made that judgement myself, no one was better informed to address this issue than the officials from the central banks.

affect them and consider both sides of the balance sheet. As for the liquidity requirements, such as those used in Mexico, Chile and Colombia, they restrict the gap between short-term FX liabilities and short-term FX assets. Moreover, given that they directly constraint the choice of FX portfolios, their impacts must also be thought of as being relevant. Finally, I consider reserve requirements on FX positions, which fulfill all conditions mentioned above.

In contrast, some of the policies reported in the first stage were excluded from the final set. Notably, policies that affected only a single side of the balance sheet, such as the deposit insurance used by Uruguay or the reserve requirements on FX deposits implemented in Chile, were not considered. Imposing this condition allowed me to consider policies with an impact on similar components of the balance sheet at a relatively low costs: it led me to through only few policies away from the sample, i.e., generating only a small loss of information.

2.2.2 Exchange Rate Regimes

Just as the policies implemented by the Latin American and Caribbean countries differed over several dimensions, their exchange rate regimes exhibited variability in terms of flexibility. In turn, this raised the challenge of defining a classification of exchange rate regimes that could capture the responses of the central banks. On the one hand, the categories used in this classification had to be sufficiently narrow that they would capture the heterogeneity contained in these responses. On the other hand, the categories had to be sufficiently broad that each of them would group a relatively large amount of responses and I could, thus, make meaningful comparisons both across countries and over time.

Taking this challenge into account, I used the two stages of the process to define the classification. In the first stage, I requested information on the exchange rate regimes that central banks had adopted from the second quarter of 1992 to the second quarter of 2012 (hereafter, 1992/Q2 and 2012/Q2, respectively). As expected, the responses referred to regimes within a wide range of flexibility, going from hard pegs and crawling bands to managed and fully floating regimes, i.e., see Table 1 for the reported regimes.

In the second stage of the collection process, I used these responses and the interactions that I maintained with the central banks to define the final classification. In particular, their feedback allowed me to understand exactly what they meant when referring to a specific regime. This, in turn, enabled me to group their responses according to the flexibility of their

regimes. Table 1 shows the final classification that resulted from this strategy and, in particular, the three categories it contains: “Fixed,” “Intermediate,” and “Floating,” which I labeled “1;” “2;” and “3,” where 3 refers to a higher degree of flexibility.

TABLE 1. CLASSIFICATION OF EXCHANGE RATE REGIMES

Broad categories for exchange rate regimes (Final Classification)	Exchange rate regimes reported by central banks
Fixed	Fixed
	Hard peg
	Quasi-currency board
Intermediate	Crawling band
	Crawling peg
	Pegged float
	Target zone
Floating	Managed Floating
	Floating

Source: National authorities.

Furthermore, the second stage allowed me to obtain further information on whether the countries had implemented FX controls. Section 5 employs this information to add a fourth category to the final classification, acknowledging that FX controls segment FX markets and thus hamper the use of traditional categories of exchange rate regimes. Among other episodes considered in this fourth category, there is the elimination of free access to FX in Argentina in 2011; the prohibition of purchasing FX without prior approval in the Eastern Caribbean Countries (ECCU) since 1996; and the implementation of controls leading to dual FX markets in Brazil before the 3rd quarter of 2005.

2.3 Surveyed Countries and Delivered Data

By mid-January of 2013, most central banks responded to my request of information and completed the survey in the first stage of the process. Table 1.A in Appendix 3 provides a list with the central banks of the twenty-three countries that went through this step. Moreover, during the following year, I maintained personal interactions and phone contacts with fifteen out of these twenty-three monetary authorities and obtained feedback from them. In particular, only the central banks of Bahamas, ECCU, Ecuador, El Salvador, Haiti, Suriname, Mexico and Venezuela had not gone through the second step by December of 2013.

However, for different reasons, the information provided by the central banks of ECCU and Mexico ended up being incorporated in the analysis that I undertake in this paper. In the case of ECCU, the reason is that in the first stage of the process its central bank provided information that was sufficiently comprehensive and complete that no additional step was actually needed. To be more precise, all responses provided by ECCU's monetary authority could be easily understood without further information on the economic context, it complied with the standards initially required in the survey, and it could be easily fit in the set of prudential policies and classifications of exchange rate regimes defined for the remaining countries. In the case of Mexico, its central bank provided valuable feedback and interactions that enabled completion of the second step in 2017.

In contrast with the information delivered by ECCU and Mexico, the information provided by the remaining central banks considered above, i.e., Bahamas, Ecuador, El Salvador, Haiti, Suriname, Venezuela, was not incorporated in the analysis. Hence, the final list of countries considered in the analysis is the following: Argentina, Aruba, Bolivia, Brazil, Chile Colombia, Costa Rica, Dominican Republic, ECCU, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Paraguay, Peru and Uruguay.

3. Historical Perspective

This section reviews the policies implemented over 1992-2012. As noted above, it studies policies associated with limits, as well as liquidity and reserve requirements on FX positions taken by the Latin America and the Caribbean countries. In particular, this section deals with the establishment, the elimination and any change in the level of these limits and requirements. As in the remaining of the paper, I indistinguishably refer to their implementation, elimination and to changes in the level of these limits and requirements as "policies."

Using these definitions, I study how the number of policies has changed across countries and over time. This study is motivated by the fact that several countries transitioned towards exchange rate flexibility after the crises of the late 1990s and early 2000s, enabling me to distinguish between two meaningful ten-year periods of time. The first period preceded the currency crises of the early 2000s and was dominated by inflexible regimes (see Frenkel and

Rapetti, 2010).⁴ However, by triggering sudden and large capital outflows, the crises forced the abandonment of pegs and the transition towards more flexible regimes. Hence, as shown in Section 5, the second ten-year period of time was dominated by exchange rate flexibility. Having these two periods in mind is useful when reading the results presented in Table 2.

This table shows that Brazil, Colombia, Costa Rica and Peru are the countries that took policies the highest number of times. For Brazil, the economy that took the highest number of measures, the policies were concentrated over two periods of time, between 1993 and 1997 and in 1999. In this regard, it is worth noting that until 2005 Brazil was characterized by FX controls and the ensuing existence of two FX parallel markets: The free rate foreign exchange market (MCTL) and the floating rate foreign exchange market (MCTF). In turn, these facts may explain the increase in the frequency of use of the policies between 1993 and 1997: by creating two FX parallel markets, and therefore more than a single market to regulate, and by generating greater opportunities to benefit from regulatory arbitrage, the implementation of FX controls seems to have increased the need for additional FX regulation in Brazil.

In contrast, the increase in the frequency of use of the policies in 1999 seems to have been related to the crisis that took place in Brazil during that year and, ultimately, to its transition towards a more flexible exchange rate regime. Just as in other Latin American and Caribbean countries, a crisis led Brazil to adopt a more flexible regime in the late 1990s so that, according to Reinhart and Rogoff's coarse classification of exchange rate regimes, this country went from having a category labeled 2 ("Crawling peg/band, band narrower or equal to +/- 2%") to a category labeled 3 ("Crawling band, managed floating") (see Section 6 for more details about their classification).

In this regard, the case of Colombia, another country that appears in the list of economies with the highest number of policies, is similar to that of Brazil. Table 2 shows that in Colombia the year with the highest frequency of use of the policies was 1999, in which a capital reversal episode generated a crisis and the balance-of-payment collapsed. This crisis also implied a transition towards a more flexible exchange rate regime and thus, according

⁴ For the case of Mexico, this country permitted the exchange rate to float within a band which was widened on a daily basis until December of 1994, right before the crisis broke in.

to the Banco de la República, Colombia went from having a regime classified under the category 2 (“Intermediate”) to a regime classified under the category 3 (“Floating”).

Interestingly, the transition period towards a more flexible exchange rate regime in Costa Rica is also a period with an increase in the frequency of use of the policies. However, in contrast with the cases of Brazil and Colombia, this transition did not occur right after the currency crises of the late 1990s and late 2000s. Costa Rica switched from a crawling peg to crawling bands at the end of 2006, precisely the beginning of the period in which it took the bulk of its regulatory measures (see Table 2).⁵

Along the lines of Brazil, Colombia, and Costa Rica, Mexico featured periods in which the intensity of use of the policies was particularly high. However, in contrast with these countries, Mexico featured the most evident increase around the times it formally established its IT regime (in 2001) i.e., 2 out of its 4 policies were implemented in that period, while the remaining ones were implemented before the transition towards a more flexible regime in 1995 and two years afterwards, respectively. In speculating an explanation for this fact, it cannot go unnoticed that Mexico adopted a pure form of IT in the sense that this monetary regime weakened the link between the interest and the exchange rates for at least two relevant reasons: The IT reduced the exchange rate pass-through to domestic currency prices (Baqueiro et al., 2003; Chiquiar et al., 2010; Capistrán et al., 2012; Cortés Espada, 2013), and exempted the use of the interest rate to affect exchange rate volatility more than in other countries, e.g., Brazil (for evidence, see Tobal and Yslas, 2016).⁶ Given that in the Mexican IT the interest rate was strongly linked to keeping inflation under control, it is natural to think that its establishment fostered regulatory measures that are frequently used to dampen FX risk. This could be the case, for instance, of the tightening in the limit on open FX positions that the Central Bank of Mexico implemented in the beginning of 2002.

⁵ Note that, just as Costa Rica, Argentina transitioned towards more exchange rate flexibility during the 2000s, i.e., in 2002, and took one of its four policies in 2003, i.e., only a few quarters after switching from a fixed exchange rate to a floating regime.

⁶ Baqueiro et al. (2003) note that the exchange rate pass-through may have started to fall due to a low and stable inflation environment over that period. Capistrán et al. (2012) suggest that the Taylor hypothesis (2000) seems to hold in Mexico given that the change in inflation dynamics documented by Chiquiar et al. (2010) reduced the level of exchange rate pass-through. Using a SVAR with short run restrictions, Tobal and Yslas (2016) demonstrate that there is clearer one-to-one mapping between the interest and the inflation rate in Mexico than in Brazil and speculate that this could be due to different models of FX interventions.

Turning back to the four economies with the highest number of policies, note in Table 2 that the case of Peru differs from those of Brazil, Colombia and Costa Rica because its policies did not have a tendency to be concentrated over time. Thus, this country did not exhibit an increase in the intensity of use the policies that could be associated with its transition of exchange rate regimes. In attempting to understand this fact, note that Peru is a highly dollarized economy in which even small fluctuations of the exchange rate could generate strong balance sheet-effects. In this sense, the lack of concentration could reflect its attempts to avoid such fluctuations at different points in time. Indeed, this hypothesis is consistent with the self-reported information on the policy goals presented in Section 4.

Moreover, one could analyze these results on the frequency of use the instruments from the perspective of their potential change in spirit. In the post GFC era, it has been accepted that regulation could be used with a macro-prudential goal, i.e., to contain systemic risk. Following the FSB, the IMF and the BIS, this risk can be tackled in its cross-sectional or its time-dimension (FSB, IMF, BIS, 2011). While the former refers to the distribution of risk at a given point in time, the time-dimension refers to the behavior of system-wide risk over time and is, therefore, more directly associated with the paper's results.

Thus, focusing only on the time-dimension of systemic risk, one could argue that policies that are more spread out over time, such as those implemented by Peru, are in principle more consistent with a countercyclical adjustment of the instruments and, hence, their macro-prudential use (for macro-prudential use of FX regulation, see Ostry, 2012; Ostry et al., 2012). Thus, and always considering that the survey does not explicitly ask whether the instruments were used with a macro-prudential goal, the result that FX regulation tended to be concentrated in several countries is consistent with the findings of Fernández et al. (2015). In their seminal work, these authors show that capital controls, i.e., a different forms of financial regulation, are generally not adjusted in a countercyclical manner.

TABLE 2. NUMBER OF POLICIES ^{/1,2}

<i>Country-year</i>	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	<i>Total</i>	
ARG	1											1		1		1							4
ARU				1																			1
BOL						1											1	1					3
BRA		1	2	2		1		2						1						1			10
CHI								1															1
COL								3	1				1										5
CRC										1					1	2	1						5
DOM																							0
ECCU																							0
GUA										1							1						2
HON													1	1	2								4
JAM																							0
MEX			1			1			1		1												4
NIC																							0
PAR					1	1											1						3
PER							1						1	1						2			5
URU																							0
<i>Total</i>	1	1	3	3	1	4	1	6	2	2	1	1	3	4	3	3	4	1	2	1	0	46	

Source: National Authorities.

/1 This table shows the establishment, elimination or any change in the level of limits, as well as liquidity and reserve requirements on FX positions, to which I indistinguishably refer to “policies.” It includes policies that are considered as relevant regulatory changes and that directly affect both the liability and asset side of the FX balance sheet are considered (for details, see Subsection 2.2). Policies taken within the same quarter are considered as the same policy.

/2 Notes: ARG (Argentina); ARU (Aruba); BOL (Bolivia); BRA (Brazil); CHI (Chile); COL (Colombia); CRC (Costa Rica); DOM (Dominican Republic); ECCU (Eastern Caribbean Countries); GUA (Guatemala); HON (Honduras); JAM (Jamaica); MEX (Mexico); NIC (Nicaragua); PAR (Paraguay); PER (Peru) and URU (Uruguay)

4. Implementation Characteristics

In spite of the fact that the Latin America and Caribbean countries share threats common arising from FX risk, their financial systems are heterogeneous. In turn, this heterogeneity justifies a more detailed investigation of the policy experiences mentioned in Section 3. In this context, the present section undertakes a cross-country study of differences in terms of the implementation characteristics of the policies.

Just as in the rest of the paper, in this section I indistinguishably refer to the establishment, the elimination or to any change in limits, liquidity and reserve requirements as “policies.” Moreover, I classify these policies according to two different criteria: i) The type and amount of relations they constrain in the balance sheet; and ii) Their impact on long FX positions and on their volatility. In thinking about this impact, I simply assume that the policies either directly constraint the behavior of banks or modify their incentives in choosing their optimal FX portfolio. Thus, for instance, an increase in the limit on long FX positions will always be assumed to increase them. Whereas the first criterion refers to technical characteristics of the implementation, the second criterion is related to the economic impact of the policies.

Using as a criterion the type and amount of relations they constrain in the balance sheet, I classify the policies into the four groups depicted in Table 3.⁷ The label “long positions” in this table refers to policies that regulate long FX positions, i.e., the difference between FX assets and FX liabilities. Table 3 shows that this type of policy was the most frequently used by the Latin American and Caribbean economies in the sample over the period 1992/Q2-2012/Q2 (they represent 36 percent of the total amount of measures).

The second type of policy that was most frequently used considers policies that regulate short FX positions, that is, the negative difference between FX assets and FX liabilities and is accordingly labeled “short positions,” i.e., this type represents 32 percent of the total amount of measures taken over 1992/Q2-2012/Q2. The remaining types of policy in Table 3 constrain both the positive and the negative differences between FX assets and FX liabilities at the same time. While the policies labeled “open positions” regulate the two differences by the same amount through limits on their absolute value, the policies labeled “short and long

⁷ Consider a country that establishes a limit on short and long positions and years later changes only the former limit. In this case, I compute a policy of type “short and long positions” and a policy of type “short positions.”

positions” regulate these differences by a distinct amount.⁸ Note that the policies of type “open positions” are more frequently used than the policies of type “short and long positions” (they represent 19 percent and 13 percent of the total amount, respectively).

TABLE 3. TYPES OF POLICIES AND FREQUENCY OF USE

Policy-type	<i>The policy constrains:</i>	<i>Number of policies</i>	<i>Percentage over total</i>
Long positions	FX assets – FX liabilities	17	36
Short positions	–(FX assets – FX liabilities)	15	32
Open positions	FX assets – FX liabilities	9	19
Short and long positions	FX assets – FX liabilities; –(FX assets – FX liabilities)	6	13

Sources: National authorities and author’s calculations.

Notes: The table includes policies that are considered as relevant regulatory changes and that directly affect both the liability and asset side of the FX balance sheet are considered (for details, see Subsection 2.2). Policies are classified based on the relations they constrain in the balance sheet. Policies taken within the same quarter are considered as the same policy.

The first classification provides a technical categorization of the policies but is ambiguous about their impact on the sign and on the volatility of FX positions. For instance, a policy that constrains long FX positions may indeed decrease or increase them, depending on whether the limit tightens or loosens: while a tightening of this limit should reduce the difference between FX assets and FX liabilities, a loosening may indeed increase it. Hence, I use a second criterion to classify the policies into four different groups, according to their impact on long FX positions and on their volatility. The types of regulatory changes considered in each group are shown in Table 4 and the frequency of use of the four types of policies are presented in Table 5.

As for Table 5, before proceeding with the result, it is worth making an import remark. This table excludes three of the policies that were considered in Tables 1 and 2. The reason is that, even though these policies fulfill with the requirement of not being mere refinements or consolidation procedures, the sign of their impact on long FX positions is in principle unknown. To be more precise, given that these policies yield opposing impacts on long FX position of unpredictable strength, their net impact cannot be determined. As an example,

⁸ As an example of a policy "short and long positions," consider the measure implemented by the National Banking and Insurance Commission of Honduras in December of 2006. Within the same month, this commission changed the limit on long positions from 75 to 50 percent of banks’ capital and the limit on short positions from 10 to 5 percent.

consider the measure taken by the Central Bank of Argentina in 1992. This central bank raised the limit on short FX positions but, at the same time, shrank the capital base over which this limit was calculated (see Appendix 4 for the policies with ambiguous impacts).

TABLE 4. POLICIES INCLUDED IN EACH POLICY-TYPE

Policy-type	DEC (“Decrease Long Positions”)	INC (“Increase Long Positions”)
Regulatory Policies	Establishment of limits on long positions; elimination of limits on short positions; reductions in limits on long positions; increases in limits on short positions; policies that imply the latter two options.	Establishment of limits on short positions; elimination of limits on long positions; reductions in limits on short positions; increases in limits on long positions; policies that imply the latter two options.
Policy-type	VOL DEC (“Decrease Volatility”)	VOL INC (“Increase Volatility”)
Regulatory Policies	Establishment of limits on open positions; joint establishment of limits on short and long positions; joint reductions in limits on short and long positions.	Elimination of limits on open positions; joint elimination of limits on short and long positions; joint increases in limits on short and long positions.

Sources: National authorities and author’s calculations.

Notes: DEC stands for “decrease long FX positions;” INC stands for “increase long FX positions;” VOL DEC stands for “reduce the volatility of long FX positions;” VOL INC stands for “increase the volatility of long FX positions.”

Turning now to the results of Table 5, let me begin with the policy type labeled DEC. The policies considered in this type are thought of as reducing long FX positions or, alternatively, as increasing short FX positions. Note that 10 of the 19 policies of this type were associated with policies of the type “long positions.” That is, the DEC type of policies were most commonly implemented through a tightening in the limit on long FX positions.

Note in Table 5 that these policies represent 42 percent of the total amount of measures and were taken by 7 countries over the period 1992/Q2-2012/Q2 (Argentina, Bolivia, Brazil, Colombia, Honduras, Paraguay, and Peru). The fact that Peru is one of the economies that has taken these policies the highest number of times (5 policies) is consistent with two facts: i) Peru is among the highest financially dollarized countries in the region and ii) In highly dollarized economies, agents tend to hold long FX positions. Along these lines, Tobal (In press) shows that the DEC type of policies implemented in three highly dollarized countries (Bolivia, Paraguay and Peru) achieved to reduce the long FX position of banks.

The INC-type of policies are thought of as increasing long FX positions and represent 33 percent of the total amount of measures taken over 1992/Q2-2012/Q2. Note that, just as in the case of the DEC-type of policies, most of these measures were implemented through a tightening in the limit on short FX positions or through a loosening in the limit on long FX positions. That is, most of them were implemented by using policies of the “short positions”

type or of the “long positions” type. Brazil is the country that used these policies the highest number of times (5 policies). This is consistent with the evidence provided by Tobal (2013), according to which banks in Brazil held shorter FX positions than in the remaining countries over the period preceding 2005, at the time its two parallel FX markets were unified.

TABLE 5. TWO-WAY CLASIFICACION AND FREQUENCY OF USE

Impact on:		Long FX Positions		Volatility of FX positions	
		DEC	INC	VOL DEC	VOL INC
Relation constrained in balance sheet	Long positions	10	7	0	0
	Short positions	6	7	0	0
	Open positions	0	0	3	6
	Short and long positions	3	1	2	0
	Total	19	15	5	6
	Percentage	42%	33%	11%	13%
	Country with larger use	Peru ¹	Brazil	Mexico ²	Costa Rica

Sources: National authorities and author’s calculations.

Notes: *DEC* stands for “decrease long FX positions;” *INC* stands for “increase long FX positions;” *VOL DEC* stands for “reduce the volatility of long FX positions;” *VOL INC* stands for “increase the volatility of long FX positions.” The table includes policies that are considered as relevant regulatory changes and that directly affect both the liability and asset sides of the FX balance sheet (for details, see Subsection 2.2). Policies taken within the same quarter are considered as the same policy. Moreover, three of the policies included in Tables 1 and 2 are not considered in this table because, even though they could have had a relevant economic impact, the direction of this impact is in principle ambiguous; i.e., whether the policy increased or reduced long FX positions depends on the magnitude of opposing impacts (see Appendix 4). /1 Brazil has taken policies of type *DEC* the same number of times as Peru. 2/ Bolivia, Costa Rica, Guatemala and Honduras have taken policies of type *VOL DEC* the same number of times as Mexico.

The remaining two types of policies regulate both the excess of FX assets over FX liabilities and viceversa at the same time, having an impact on the volatility of FX positions. The *VOL DEC* type of policies reduce this volatility and was implemented by eliminating or reducing the limit on open FX positions and by jointly tightening the limits on both the short and the long positions of banks (3 and 2 times, respectively). They represent 11 percent of the total amount of policies and were taken by 5 countries over 1992/Q2-2012/Q2 (Bolivia, Guatemala, Costa Rica, Honduras and Mexico). For instance, in the aftermath of the formal adoption of an inflation targeting regime, in the beginning of 2002, Mexico tightened the limit on open FX positions (for the context in which the policy was taken, see Section 3).⁹

⁹ As a reference, see Section *M.6 Posiciones del Mercado de Divisas* of Circular 2008/94 and Section *M.61 Posiciones de Riesgo Cambiario* of Circular-Telefax 7/2002. These circulars are publicly available at <http://www.banxico.org.mx/disposiciones/normativa/normativa-vigente-agrupada-po.html>.

Finally, the VOL INC type of policies increases the volatility of FX positions and were implemented only through increases in the limit on open FX positions (The 6 measures implied policies of the type “open positions”). Almost all the policies were implemented by Costa Rica. Beginning in 2006, when this country transitioned towards a more flexible exchange rate regime, the Central Bank of Costa Rica adopted a series of related policies; i.e., it started to gradually increase the limit on the variation of daily FX positions.

5. Potential and Actual Uses of the Policies

This section studies potential and actual goals of the policies under study. The first subsection performs a literature review on potential goals of the regulatory policies. The second subsection links these potential goals to policy-makers’ responses in the survey and, ultimately, to an experience in the Latin American and Caribbean countries.

5.1. Potential Uses of Limits

The literature acknowledges that policy-makers may have at least the following five potential goals when implementing the policies under study in this paper.

1. *Reducing Solvency Problems.*

In the presence of open FX positions, adjustments in the exchange rate modify the value of net FX assets, i.e., or net FX liabilities, and this may trigger negative effects on banks’ balance sheets. In turn, these effects may risk banks’ solvency by undermining their capacity to meet FX obligations. Thus, by reducing open FX positions, the instruments under study may help diminish solvency problems in the banking sector, and dampen non-repayment risks (Hartmann, 1994; Goldstein and Turner, 2004; Zettelmeyer et. al., 2011 Lee, 2012).

2. *Reducing FX Liquidity Risks.*

Even when banks’ total FX assets and FX liabilities are matched, they may be exposed to FX liquidity risks. In particular, banks may fund long-term FX assets with short-term FX liabilities. In this context, the policies considered in the present paper can be specifically designed to account for the maturity of assets and liabilities and, therefore, to dampen liquidity risks (Goldstein and Turner, 2004; Lee, 2012).

3. *Avoiding Large and Sudden Fluctuations in the Exchange Rate.*

Policies that constrain FX positions and/or modify incentives to take them restrict bank’s purchases and sales of FX assets and FX liabilities and, though this channel, affect FX market

conditions. Therefore, central banks and financial supervisors can constrain the short or the long FX positions of banks to alter the supply of and demand for foreign currency and, through this channel, enhance exchange rate stability (Canales-Kriljenko and Habermeier, 2004; Lee, 2012; Rodriguez and Wu, 2013).

4. *Encouraging De-Dollarization to Improve the Transmission Mechanism of Monetary Policy.*

The greater the degree of financial dollarization is, the more difficult it becomes for monetary authorities to affect domestic liquidity conditions by means of conventional monetary policy (Ize and Levy-Yeyati, 2003; Rennhack and Nozaki, 2006). Thus, by deterring financial dollarization, policies that constrain FX positions or alter incentives to take them may help central banks improve the transmission mechanisms of conventional monetary policy.

5. *Encouraging De-Dollarization to Recover the Role of Lender of Last Resort.*

Financial dollarization dampens the capacity of central banks to counteract banking difficulties by using lender-of-last-resort financing activities. In this context, by diminishing the degree of financial dollarization, the regulatory instruments considered in the present paper may help monetary authorities recover their role as a lender of last-resort and, through this channel, enhance financial stability in times of stress (Rennhack and Nozaki, 2006).

5.2. Actual Uses of Limits on Foreign Currency Positions

In the survey, central banks were asked what goals they pursued when implementing the policies. In particular, they were asked to associate each of the policies with one or more of the objectives included within the following list of six possible actual goals: 1) Controlling Credit Growth; 2) Achieving Exchange Rate Stability; 3) Reducing Currency Mismatches; 4) Reducing Maturity Mismatches in Foreign Currency Positions; 5) Correcting Current Account Imbalances and 6) Others. Moreover, they were requested to specify which goals they pursued when choosing the option “Other.”

Eight out of the twelve countries having taken policies over 1992/Q2-2012/Q2 answered to this question. In recording these answers, I proceeded in the following manner: for each policy, I assigned a value equal to 1 to the goal or to the goals that policy-makers mentioned in their responses and a value equal to 0 to those that they did not. Then, I took the mean across all policies corresponding to the same country and obtained a mean per country-goal

pair that I displayed in Table 6. Finally, I took the cross-country average of all means associated with the same goal and displayed the results in the last row of this table.

Regarding this table, note in the second column that “Reducing Currency Mismatches” was the main purpose when establishing, eliminating or changing limits, as well as liquidity and reserve requirements on FX positions: policy-makers mentioned this goal on average 51 percent of the times. Argentina, Honduras and Bolivia are the economies that more intensively pursued this objective; moreover, the former two countries implemented these regulatory measures exclusively to achieve this goal. Thus, for instance, the Central Bank of Argentina eliminated the limits on long FX positions in 2005. In contrast, Bolivia implemented the policies to reduce currency mismatches only 60 percent of the times. Note that to the extent that “Reducing Currency Mismatches” was considered by the policy-makers as one of their objectives when implementing the policies it can be considered as an “actual goal.” Moreover, as for its connection with the list given in Subsection 5.1, “Reducing Currency Mismatches” most closely relates to the potential goal number 1, i.e., “Reducing Solvency Problems.”

The second most important purpose when implementing the policies was “Achieving Exchange Rate Stability,” as evidenced by the third column in Table 6. Policy-makers pursued this objective on average 36 percent of the times, with Aruba, Costa Rica, Paraguay and Peru being the countries that more intensively pursued this objective. As noted above, Peru, a financially dollarized economy whose policies are spread out over time, appears in this list. In terms of the goals of Subsection 5.1, the actual objective “Achieving Exchange Rate Stability” most closely resembles the potential goal number 3: “Avoiding Large and Sudden Fluctuations in the Exchange Rate.” Therefore, the experience of Paraguay in 1997 illustrates the pursuit of this goal. After a period of relative stability, the Guarani depreciated by 5.4 percent in December of 1997 and, in response, the Central Bank of Paraguay reduced the limits on long FX positions from 100 to 50 percent of banks’ effective patrimony.

The fourth column in Table 6 shows that the third goal that I proposed to policy-makers, “Controlling Credit Growth,” was not pursued any of the times, as it was not the goal of “Correcting Current Account Imbalances” (see the sixth column in Table 6). In contrast, the objective “Reducing Maturity Mismatches in FX Positions” was mentioned on average 6

percent of the times. In terms of the list of Subsection 5.1, “Reducing Maturity Mismatches in FX Positions” most likely resembles the goal “Reducing FX Liquidity Risks.”

TABLE 6. POLICY GOALS

<i>COUNTRY</i>	GOALS					
	Reducing currency mismatches	Achieving exchange rate stability	Controlling credit growth	Reducing maturity mismatches in FX positions	Correcting current account imbalances	Others
ARG	100%	0%	0%	0%	0%	0%
ARU	0%	100%	0%	0%	0%	0%
BOL	60%	0%	0%	0%	0%	40%
BRA	NA	NA	NA	NA	NA	NA
CHI	NA	NA	NA	NA	NA	NA
COL	56%	0%	0%	44%	0%	0%
CRC	17%	67%	0%	0%	0%	17%
DOM	–	–	–	–	–	–
ECCU	–	–	–	–	–	–
GUA	NA	NA	NA	NA	NA	NA
HON	100%	0%	0%	0%	0%	0%
JAM	–	–	–	–	–	–
MEX	NA	NA	NA	NA	NA	NA
NIC	–	–	–	–	–	–
PAR	25%	75%	0%	0%	0%	0%
PER	50%	50%	0%	0%	0%	0%
URU	–	–	–	–	–	–
AVERAGE	51%	36%	0%	6%	0%	7%

Sources: National authorities and author’s calculations.

Notes: The table includes policies that are considered as relevant regulatory changes and that directly affect both the liability and asset sides of the FX balance sheet (for details, see Subsection 2.2). Policies taken within the same quarter are considered as the same policy. For each policy, I assigned a value equal to 1 to the goal or to the goals that policy-makers mentioned in their responses and a value equal to 0 to those that they did not. Then, I took the mean across all policies corresponding to the same country and obtained a mean per country-goal pair. ARG (Argentina); ARU (Aruba); BOL (Bolivia); BRA (Brazil); CHI (Chile); COL (Colombia); CRC (Costa Rica); DOM (Dominican Republic); ECCU (Eastern Caribbean Countries); GUA (Guatemala); HON (Honduras); JAM (Jamaica); MEX (Mexico); NIC (Nicaragua); PAR (Paraguay); PER (Peru) and URU (Uruguay)

Among the central banks that provided information on their goals, Banco de la República, Colombia, was the only having mentioned “Reducing Maturity Mismatches in FX Positions.” However, research by other central banks seems to suggest that they may have also attempted

to reduce maturity mismatches in FX positions. For instance, O'Dogherty and Schwartz (2001) argue that the establishment of liquidity requirements on FX operations by the Central Bank of Mexico in 1997 attempted to strengthen the liquidity position of banks by compelling them to maintain adequate liquid assets and by promoting long-term FX financing.¹⁰

Finally, the seventh column labeled “Others” considers the answers provided by the Central Bank of Bolivia. This central bank claimed to have implemented policies to reduce banks’ FX positions and referred to this goal as “remonetization of the banking system.” According to the monetary authority, the goals of this remonetization process were primarily three a) to improve the efficiency of the central bank as a lender of last resort and b) to promote financial stability by reducing currency mismatches; c) to facilitate the conduct of monetary policy. In terms of the list of potential goals in 5.1, these goals resemble the most the objectives of “Encouraging De-Dollarization to Improve the Transmission Mechanism of Monetary Policy;” “Encouraging De-Dollarization to Recover the Role of Lender of Last Resort;” and “Reducing Solvency Risks.”

6. Advantages and Disadvantages of the Regulatory Policies: Interaction with Conventional Monetary Policy and FX Market Interventions

This section studies advantages and disadvantages of using the three regulatory instruments under consideration, with a focus on their interaction with conventional monetary policy, FX market interventions and exchange rate flexibility. The first subsection reviews the literature on potential advantages and disadvantages. The second subsection uses the information contained in the survey to investigate the relationship between the policies and exchange rate flexibility in Latin America and the Caribbean.

6.1. Potential Advantages, Disadvantages and Interactions

When referring to the potential advantages of using limits, or liquidity and reserve requirements on FX positions, the literature mentions at least the following three items:

1. *Substituting for Conventional Monetary Policy in Dampening Imbalances*

To dampen the build-up of financial imbalances, such as excessive leverage or maturity mismatches, central banks could tighten monetary conditions. In contrast, they could use any

¹⁰ On the basis of its implementation characteristics, one could argue that the limits differentiated by the maturity of FX positions put in place by Chile in 1999 may have been implemented with the same goal.

of the three regulatory instruments considered in this paper. These instrument have the advantage that they can be tailored to dampen risks of specific sectors or loan portfolios without causing a generalized reduction of economic activity (Lim et al., 2011).

2. *Substituting for Conventional Monetary Policy in Curbing Credit*

In countries with inflation targeting, the policy rate is tied up with anchoring expectations on future inflation (Park, 2011). In this context, and particularly in financially dollarized economies in which credit is granted in foreign currency and/or their expansions are largely financed with foreign financial resources, the three regulatory instruments considered in this paper can serve at curbing its pro-cyclical behaviour freeing the interest rate to anchor inflation expectations.

3. *Substituting for FX Market Interventions in Avoiding Large and Frequent Fluctuations in the Exchange Rate*

When performing sterilized FX market interventions to mitigate currency appreciations, central banks purchase foreign currency with domestic currency and, then, withdraw the excess liquidity by selling government securities This entails costs because the monetary authority acquires relatively low-yield foreign exchange reserves and issue relatively high-yield sterilization bonds, and these costs for them rise over time. In fact, the rise in the relative supply of government bonds could lead to a rise in domestic interest rates, potentially inducing further capital inflows and appreciation pressures, magnifying the initial impact (Reinhart and Reinhart, 1998; Magud et. al., 2011). In this context, the regulation studied in this paper could replace FX market interventions in the pursuit of exchange rate stability.

Regarding the potential disadvantages of the regulatory instruments under consideration, the literature mentions at least the following three items.

1. *Conflict of Goals with Exchange Rate Target.*

There could exist a fundamental goal conflict between the implementation of prudential FX regulations and certain exchange policies. If, for example, domestic currency depreciation is more likely than appreciation, then prudential considerations require limiting the short FX position of banks. However, this strategy gives them more scope to sell the domestic currency, possibly implying depreciation pressures on the former (Hartmann, 1994).

2. *Limiting the Development of FX Markets and Dampening Economic Growth.*

By constraining economic agents' activities, prudential regulations may hamper the development of FX markets. For instance, limits on FX positions increase the costs of holding FX assets and FX liabilities, discouraging their acquisition and/or their maintenance in the balance sheet. This, in turn, could diminish the supply of FX credit and dry-up liquidity in FX markets, thereby preventing its development and, through this channel, dampening economic growth. In the long run, however, limits on FX positions could have benefits. By making the financial sector more resilient, limits could provide FX markets with a sounder ground for its development and therefore promote economic growth (Ranciere et. al., 2010).

3. *Distorting Resource Allocation.*

Compliance with FX regulation may induce disproportionately large FX lending to those with revenues denominated in foreign currency, among which firms in the tradable sector stand out. Under these circumstances, regulation could exclude customers whose income is denominated in local currency from FX borrowing. This, in turn, may distort resource allocation and retard the development of the non-tradable sector (Park, 2011).

6.2. Regulatory Instruments and Exchange Rate Regimes

Motivated by the historical analysis, this subsection uses the survey and Reinhart and Rogoff's classification of exchange rate regimes to validate the statement that several Latin American and Caribbean countries transitioned towards exchange rate flexibility. Moreover, using the results, it explores the relationship of limits, as well as reserve and liquidity requirements with other policies by investigating whether they were more intensively used over the last ten years of the sample period, when countries adopted flexible regimes.

The classification of exchange rate regimes that resulted from the survey contains the three categories mentioned in Section 3: "Fixed," "Intermediate," and "Floating." I also consider an extension with the additional category for FX controls. Regarding Reinhart and Rogoff's classification, I retrieved monthly data until 2010 from Professor Reinhart's webpage (<http://www.carmenreinhart.com/data/browse-by-topic/>). Thus, I transformed this monthly classification into a quarterly one by assigning to each quarter the regime that was in place for a higher number of months.¹¹ Their classification features the following six categories:

¹¹ Only a few quarters had months with two regimes, and there was no quarter with more than two regimes.

“Peg;” “Crawling Peg/Band, Band Narrower or Equal to +/- 2%;” “Crawling Band, Managed Floating;” “Freely Floating;” “Freely Falling” and “Dual Parallel Markets.”

Using the survey, Tables 7 calculates the percentage of quarters with “Floating” regimes in the two periods (1992-2001 and 2002-2012). Table 8 repeats the exercise but reclassifying some quarters as FX controls.¹² Tables 9 and 10 perform the same exercises as Table 7 and 8 by considering as “floating” the regimes “Crawling Band and Managed Floating Regimes” in Reinhart and Rogoff’s classification.¹³ Table 9 includes the quarters classified as “Freely Falling” and Table 10 excludes this group (no quarters is classified as “Dual Parallel Markets”). Note that in all tables the percentage of quarters with flexible exchange rate regimes is greater in 2002-2012 than in 1992-2001. In turn, this suggests that there was a tendency to transition towards exchange rate flexibility, as speculated above.

Having established differences in exchange rate flexibility between the two periods, I investigate the sign of the relationship between this flexibility and the intensity with which FX regulation was used. Given that FX regulation was used to reduce currency mismatches, as noted in the previous section, one could search in the literature how these mismatches and exchange rate flexibility are linked and, on this basis, draw inference on the relevant sign. Thus, for instance, if exchange rate flexibility were negatively linked to currency mismatches, one could argue that it is also expected to be negatively linked to the frequency of use of the policies. However, a problem with this strategy is that the literature does not have a clear prediction for how currency mismatches and exchange rate flexibility are linked.

On the one hand, there is a strand of research arguing that currency mismatches are greater in rigid exchange rate regimes (see Mishkin, 1996; Obstfeld, 1998; Burnside et al., 2001; Goldstein, 2002; and Areta, 2005 for a review). The argument is that a central bank’s commitment to defend a peg makes agents believe themselves immune to FX risk, generating moral hazard. On the other hand, a different strand claims that currency mismatches increase with the flexibility of an exchange rate regime. The argument is that currency mismatches

¹² The following events are considered as FX controls: the elimination of free access to FX by non-residents in Argentina in the 4th quarter of 2011, the prohibition of purchasing foreign currency without prior approval in the Eastern Caribbean Countries after the 1st quarter of 1996, the existence of two regulated FX markets in Brazil prior to the 3rd quarter of 2005, and the restrictions on foreign exchange transactions prior to the approval of the Law for the Free Negotiation of Foreign Exchange in Guatemala in the 4th quarter of 2000.

¹³ See Ilzetzki, E., Reinhart, C., and Rogoff, K. (2008) for further use of the coarse classification of regimes.

rise with insurance costs, which are in turn increasing in exchange rate volatility and therefore greater in flexible regimes (e.g. Eichengreen and Hausmann, 1999; McKinnon, 2001).

TABLE 7. EXCHANGE RATE FLEXIBILITY OVER TIME (I)

Period	Quarters with “floating”	Quarters with available data	Percentage of quarters with “floating”
1992-2001	159	608	26%
2002-2012	472	743	64%

Sources: National authorities and author’s calculations.

Note: The exchange rate systems result from central banks’ answers to the survey.

TABLE 8. EXCHANGE RATE FLEXIBILITY OVER TIME (II)

Period	Quarters with “floating”	Quarters with available data	Percentage of quarters with “floating”
1992-2001	127	624	20%
2002-2012	454	743	61%

Sources: National authorities and author’s calculations.

Notes: The exchange rate systems result from central banks’ answers to the survey.

Some quarters were reclassified as FX controls base (for details, see Subsection 2.2).

TABLE 9. EXCHANGE RATE FLEXIBILITY OVER TIME (III)

Period	Quarters with “crawling band and managed floating”	Quarters with available data	Percentage of quarters with “crawling band and managed floating”
1992-2001	150	680	22%
2002-2010	239	612	39%

Sources: National authorities and author’s calculations.

Notes: The exchange rate systems result from Reinhart and Rogoff’s coarse classification.

“Freely falling” is considered. No quarter is classified as “Dual Parallel Markets.”

TABLE 10. EXCHANGE RATE FLEXIBILITY OVER TIME (IV)

Period	Quarters with “crawling band and managed floating”	Quarters with available data	Percentage of quarters with “crawling band and managed floating”
1992-2001	150	636	24%
2002-2010	239	601	40%

Sources: National authorities and author’s calculations.

Notes: The exchange rate systems result from Reinhart and Rogoff’s coarse classification.

“Freely falling” is not considered. No quarter is classified as “Dual Parallel Markets.”

In understanding the link between exchange rate flexibility and the frequency of use of the policies, one could also rely on their second most important goal. In particular, as noted in Section 5, the second most important goal when implementing the policies was to achieve exchange rate stability. In this regard, it is useful to note that, as mentioned in the list of potential advantages of the instruments provided in Subsection 6.1, the policies can also substitute for FX market interventions in affecting the exchange rate. Following this logic, one could at first argue that, given that flexible regimes feature higher exchange rate volatility, they give greater incentives to implement FX regulation. Nonetheless, one could

also argue in the opposite direction and claim that, under some circumstances, conventional monetary policy is not strong enough to sustain pegs and that this may, in turn, create a greater demand for FX regulation in fixed exchange rate regimes.

TABLE 11. FX FLEXIBILITY AND LIMITS ON FX POSITIONS (I)

Exchange rate regime	Total policies	Total quarters	Frequency of use
Fixed	2	257	0.008
Intermediate	21	463	0.045
Floating	22	631	0.035

Sources: National authorities and author's calculations.

Notes: The exchange rate systems result from central banks' answers to the survey. The table considers relevant regulatory changes and policies that directly affect both the liability and asset sides of the balance sheet denominated in foreign currency (see Subsection 2.2). Policies taken within the same quarter are considered as the same policy.

TABLE 12. FX FLEXIBILITY AND LIMITS ON FX POSITIONS (II)

Exchange rate regime	Total policies	Total quarters	Frequency of use
Fixed	2	190	0.011
Intermediate	15	435	0.034
Floating	20	581	0.034
FX controls	8	161	0.050

Sources: National authorities and author's calculations.

Notes: The exchange rate systems result from central banks' answers to the survey. It considers relevant regulatory changes and policies that directly affect both the liability and asset sides of the balance sheet denominated in foreign currency (see Subsection 2.2). Policies taken within the same quarter are considered as the same policy.

Tables 11 and 12 explore empirically the relationship between exchange rate flexibility and the frequency of use of the policies. These tables use the survey to calculate the frequency with which the limits, as well as the liquidity and the reserve requirements on FX positions were used across different regimes, i.e., by dividing the total number of policies taken in a regime through the total number of quarters with available data. Table 11 considers the three categories mentioned in Section 2 and Table 12 adds to these categories "FX controls."

The results in both tables show that the policies were more frequently used in the "Intermediate" and the "Floating" regimes than in the "Fixed" regimes. That is, the evidence suggests that the most flexible regimes are associated with a more frequent use of the regulatory instruments under consideration. In addition, the results in Table 12 suggest that FX controls were frequently implemented in hand with the regulatory instruments under consideration, reinforcing the evidence in this regard provided in the historical analysis undertaken in Section 3.

Linking these results to the conceptual discussion presented above, one could speculate that either of the following two facts or both are plausible: (i) currency mismatches are greater in more flexible exchange rate regimes; and/or (ii) in flexible exchange rate regimes policy-makers have a stronger tendency to substitute FX market interventions with FX regulation. Digging deeper into this point, Table 13 shows the percentage of answers corresponding to the two main policy goals for each of the sample periods considered in Tables 11 and 12. Interestingly, the results show that achieving exchange rate stability was a more relevant goal when implementing the policies over the period 2002-2012 than over the period 1992-2001.

TABLE 13. POLICY GOALS OVER TIME

Period	Goal CM ¹	Goal FX ²	Others
1992-2001	47%	27%	27%
2002-2012	56%	33%	11%

Sources: National authorities and author's calculations.

Notes: The table considers only those policies that are considered relevant regulatory changes and that directly affect both the liability and asset sides of the balance sheet denominated in foreign currency (see Subsection 2.2).

Policies taken within the same quarter are considered as the same policy.

¹ The goal is to reduce currency mismatches.

² The goal is to achieve exchange rate stability.

7. Conclusions

Much has been said about the use of prudential regulation and their potential use as a macro-prudential tool. However, little attention has been paid to its relationship with exchange rate flexibility. In this paper, I have conducted a survey to collect information on policy-makers' concerns and policy goals when implementing limits, as well as liquidity and reserve requirements on FX positions. The time span of the survey is sufficiently long that I can investigate the impact of transitioning towards more flexible exchange rate regimes.

The results suggests that these regulatory instruments are primarily used in the transition towards flexible regimes. However, policy-makers' concerns and therefore implementation characteristics differ significantly across countries. Moreover, even when the concerns are similar, policy-makers in different economies implement distinct policies to achieve similar results; for instance, while Costa Rica tended to impose limits on open FX positions, Honduras opted for limiting short and long positions separately.

Along these lines, policy goals differ across countries and over time. Most countries seem to be primarily interested in reducing mismatches and in achieving exchange rate stability. However, other countries establish and change limits, liquidity and reserve requirements to

reduce financial dollarization and, therefore, to improve the efficiency of conventional monetary policy and regain their role as lenders of last resort. At the same time, some countries seem to have used prudential FX regulation as a complement to FX controls. Interestingly, there seems to have been a change in policy-makers' goals after the late 1990s: after have transitioned towards exchange rate flexibility, policy-makers seems to be more concerned about exchange rate volatility.

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Appendix Section

Appendix 1: Survey Description

The survey was split up into five sections, four of which deal with prudential regulation and capital flow management measures, and the remaining one collects data on FX assets and FX liabilities. I proceed by describing each section in detail.

Section 1 focuses on prudential policies aimed at regulating FX positions such as, for instance, limits, liquidity and reserve requirements. In particular, this section requested information about four different dimensions of these policies. First, the status of the regulatory measures at the beginning of the sample, set at June of 1992. Second, all the changes that occurred in these measures over the entire sample, spanning from June 1992 to June 2012. Third, the implementation characteristics of the regulatory measures such as, for instance, if limits on foreign currency positions were established as a percentage of banks' capital. Fourth, the implementation goals of the prudential policies. Regarding these goals, central banks were requested to identify them within a list that included the following six potential goals: Controlling Credit Growth, Achieving Exchange Rate Stability, Reducing Currency Mismatches, Reducing Maturity Mismatches in Foreign Currency Positions, Correcting Currency Account Imbalances, and Other. When choosing the option "Other", the section requested to provide a brief explanation about the goals of the policy.

Section 2 covers regulatory policies dealing with capital flows such as, for example, taxes, reserve requirements and limits to external assets and liabilities or to capital flows. As in the case of Section 1, the information requested in this section focused on four dimensions of the capital management measures; i.e., their initial status at the beginning of the sample (i.e. June 1992), all their changes until June 2012, their implementation characteristics, and their implementation goals. With respect to these goals, the section requested, for each policy, to select one or more of the following potential goals: Managing Capital Flows to Control Credit Growth; Achieving Exchange Rate Stability; Tilting the Composition of Inflows towards Longer Maturity; Correcting Current Account Imbalances; and Other. Again, when choosing the option "Other", the section asked for a brief explanation.

Section 3 deals with FX market interventions and exchange rate regimes. In particular, this section requested the number of operations in the FX market performed by central banks (or

the corresponding authority) each quarter between 1992/Q2-2012/Q2. In addition, the section requested central banks to identify the exchange rate regime under which these operations were performed, the type of these interventions and their goals. Regarding the type of the interventions, the section requested to choose between two options; i.e., Following a Pre-established Rule and Discretionary Interventions. With respect to goals, the section requested to select one or more of the following potential goals: Achieving Exchange Rate Stability to Avoid Sudden Stops; Achieving Exchange Rate Stability to Reduce the Impact of its Variations on Financial Wealth; Changing Exchange Rate to Correct Current Account Imbalances; Achieving Exchange Rate Stability for Others Reasons; and Other. As in the cases of Section 1 and 2, this last option should be accompanied by a brief explanation.

Section 4 studies policies aimed at regulating credit and deposits denominated in foreign currency such as, for instance, reserve and capital requirements over these credits/deposits. As in Sections 1 and 2 of the survey, this section requested to identify the initial status of each of these prudential measures at the beginning of the period (i.e. June 1992) and, from that date, to track all the changes in these measures until the end of the sample (i.e. June 1992). The implementation characteristics and the implementation goals of the policies were also requested. To identify these policy goals, the section asked central banks to select one or more goals of a list conformed by five potential goals; i.e. Reducing the Volatility of the Credit Cycle; Achieving Exchange Rate Stability; Reducing Loans to Borrowers Un-hedged from Exchange Rate Variations; Correcting Current Account Imbalances; and Other. A brief explanation should be provided when choosing the option “Other.”

Finally, Section 5 requested data on foreign currency assets and liabilities which was used to construct a comprehensive dataset available only to the cooperating central banks. The data were requested on a quarterly frequency, only for the banking sector (excluding the government), and disaggregated by asset/liability category. For the disaggregation of the data at the category level, central banks were provided with a table listing the categories in which data should be provided. Being aware that the information required is not available for a long period of time, the beginning of the sample was set at the “earliest date for which the data is available.” Furthermore, when the information requested was not available at the quarterly frequency and/or disaggregated by asset/liability type, central banks were asked to provide the data at the highest frequency available and/or for many categories as possible.

Appendix 2: Refinements and Consolidation Procedures

This section describes in detail the policies that were considered as relevant regulatory changes but, rather, as part of refinements and consolidation procedures. Two countries implemented this type of policies: Brazil and Mexico

Brazil

Unification of foreign currency positions held in the two parallel markets

The Central Bank of Brazil determined, as from February 1st of 1999, to unify FX positions held by banks in the two parallel markets; the positions held by banks in the floating exchange rate market (MCTF) and in the free rate foreign exchange market (MCTL) were unified and calculated as the sum of both. Notwithstanding, this unification did not alter the level of limits on banks' short or long foreign currency positions. Indeed, for instance, the limit on short positions for banks which operated in both markets was set equal to the sum of the limit in the MCTF and the limit in the MCTL in force at the time.

However, this change was part of a more comprehensive policy taken on February 1st of 1999. More precisely, the unification of foreign currency positions in both markets was accompanied by the establishment of new limits on long positions; on that date, the central bank tightened these limits both for banks that operated in both markets and for banks that operated only in the MCTF. In this sense, even though the unification did not alter the level of limits and the constraints faced by banks per se, it was considered implicitly as part of a more comprehensive policy that tightened the limits on long positions on February 1st of 1999. Since this last policy changed limits on long positions and thus modified bank's constraints, it was considered economically relevant and included in the final set of policies systemized in the present paper.

Consolidation of the rules for limits on foreign currency positions

On May 25th of 1999, there were already in place limits on both short and long foreign currency positions in Brazil. Regarding short positions, the limit was equal to 100% of adjusted bank's net worth. The limit on long positions, in turn, was set depending on whether the bank was authorized or not to operate in the two parallel FX markets existent at that time. In particular, for banks operating in both the MCTF and the MCTL, the excess amount to 6

million US dollars in long positions had to be deposited in the central bank. For banks operating only in the MCTF, this limit was equal to 1 million US dollars.

The Central Bank of Brazil consolidated the rules concerning the abovementioned limits on May 25th of 1999. Regarding the limits on long foreign currency positions, for instance, the central bank specified the accounting rules to determine these positions, as well as the rules and conditions under which deposits in the central bank had to be made. As for the limits on short positions, the central bank specified the penalties for not complying with the limits. However, this consolidation procedure did not include any change in the level of limits on foreign currency positions and, as a result, it did not modify banks' constraints. Hence, this regulatory change was not considered economically relevant and it was excluded from the final set of regulatory policies the present paper focuses on.

Refinement and consolidation of the rules for reserve requirements on FX positions

The Central Bank of Brazil introduced, on January 6th of 2011, a reserve requirement on short foreign currency positions of banks that exceeded the smaller between 3 billion US dollars and their capital base. This requirement could reach 60% of the excess amount in short positions.

On July 8th of 2011, the Brazilian authorities decided to redefine and consolidate the rules regarding these reserve requirements. This redefinition and consolidation of the regulation, however, focused only on the way in which the requirements on short positions were calculated. In contrast to the previous regulation, for instance, this new regulation stipulated that the requirement should be calculated over the five-day moving average of short positions. Given that this regulatory change did not change the level of limits, it did not alter banks' constraints and, therefore, it was not considered economically relevant. Thus, it was not included in the final set of policies.

Mexico

Refinement of liquidity requirements for foreign currency operations

By October 31st of 2000, there was already in place a liquidity requirement on foreign currency operations in Mexico. According to this regulation, the weighted sum of foreign currency liabilities with maturity equal to or shorter than 60 days could not be larger than foreign currency liquid assets. In addition, the regulation established that banks' foreign

currency liabilities with a maturity equal to or shorter than 60 days could not surpass foreign currency assets of the same maturity. In this sense, the regulation implicitly imposed a limit on short foreign currency positions which involved only short-term components of the balance sheet; i.e., these short positions were not allowed by the regulation.

The Central Bank of Mexico refined this liquidity requirement on October 31st of 2000. This refinement changed the way in which the requirement should be determined. In contrast to the previous regulation, for instance, the central bank determined that foreign currency liabilities with maturity equal to or shorter than 60 days that had no corresponding assets of the same or shorter maturity must be entirely matched by liquid foreign currency assets. In addition, the weighted sum of liabilities with maturity equal to or shorter than 60 days that were not covered by liquid or non-liquid foreign currency assets of the same or shorter maturity must be entirely matched by liquid foreign currency assets.

However, the refinement did not change the level of the limit on short positions implicitly imposed by the requirement; short positions which involved short-term components of the balance sheet denominated in foreign currency was still prohibited. In this sense, this regulatory change did not modify banks' constraints and, therefore, it was not considered economically relevant. Moreover, this change in the regulation was implemented on the same date as other policies; i.e., on the same date as the limit on net foreign currency liabilities was established. Given that the refinement of the liquidity requirement on October 31st of 2000 was not considered economically relevant and that it was taken on the same date as other regulatory measures, it was excluded from the final set of regulatory policies on which the present paper focuses.

Appendix 3: Additional Tables

TABLE A1. COUNTRIES THAT DELIVERED INFORMATION

Country	Stages of the information collection process	
	First stage	Second stage
Argentina	Yes	Yes
Aruba	Yes	Yes
Bahamas	Yes	No
Bolivia	Yes	Yes
Brazil	Yes	Yes
Chile	Yes	Yes
Colombia	Yes	Yes
Costa Rica	Yes	Yes
Dominican Republic	Yes	Yes
Eastern Caribbean Countries	Yes	No
Ecuador	Yes	No
El Salvador	Yes	No
Guatemala	Yes	Yes
Haiti	Yes	No
Honduras	Yes	Yes
Jamaica	Yes	Yes
Mexico	Yes	Yes
Nicaragua	Yes	Yes
Paraguay	Yes	Yes
Peru	Yes	Yes
Suriname	Yes	No
Uruguay	Yes	Yes
Venezuela	Yes	No

Source: National authorities.

Appendix 4: Policies with Ambiguous Impact on Long FX Positions

This subsection describes the policies that exerted ambiguous impacts on the FX position of banks and, as a result, were considered in all tables of the manuscript but Table 5.

Argentina, 1992

In 01/12/1992, limits on short positions in foreign currency changed relative to previous regulation. Before December 1992, the positive difference between short global positions and the “financial” net sell positions could not exceed the larger between 5 percent of computable equity capital and 15 percent of the non-immobilized own resources. The regulation of December 1992 established that short global positions could not be greater than 25 percent of computable equity. Therefore, there were two changes in 01/12/1992. First, it were no longer allowed to subtract the “financial” sell position from global short positions. In this sense, this change make the limit more restrictive. Second, given that non-immobilized own resources represent a component of computable equity, the limit increased in absolute terms. Because the two changes pointed out in different directions, it could not be determined the direction of the change; i.e. if the limit became more or less restrictive. Hence, this policy were not taken into account in the elaboration of Table 5.

Brazil, 1994

In contrast to the previous regulation, the Central Bank of Brazil did not allow neither short nor long foreign currency positions solely on July 29th and 30th of 1994. Although it could argued that this policy is relevant, the direction of its impact is not clear since it entailed two opposite changes within the same quarter; i.e., in the third quarter of 1994 the central bank reduced, first, limits to zero and, then, it increased them to its previous level. Hence, it is not clear whether the policy taken in the third quarter of 1994 turned out the limits more or less restrictive. Furthermore, this policy was taken along other policies within the same quarter. Given that policies taken within the same quarter are considered as the same policy and that the policy taken on July 29th and 30th of 1994 has an ambiguous impact, this last policy was not considered in the elaboration of the tables presented in this paper.

Mexico, 2000

In 31/10/2000 Mexico introduced a limit equal to 1.83 times the Tier 1 capital on net foreign currency liabilities, defined as the positive difference between the sum of foreign currency

liabilities weighted by its term and the sum of liquid foreign currency assets weighted by their credit risk. This change could be interpreted as the introduction of a limit on foreign currency positions that consider the weighted sums of assets and liabilities abovementioned and, therefore, as a tightening of these limits. However, the potential effect of this limit on foreign currency positions is not clear.

The previous regulation imposed a limit equal to 1.83 times Tier 1 capital on the weighted foreign currency liabilities; i.e. on the sum of all FX obligations weighted by its term. Under this regulation, banks' foreign currency short positions must have been between zero and the equivalent to 1.83 times their Tier 1 capital (if the bank acquired foreign currency obligations equal to the 183 percent of their Tier 1 capital and it did hold liquid foreign currency assets). In this sense, the change in the regulation on 31/10/2000 did not modify the limits relative to the previous regulation.

Notwithstanding, this policy is in principle economically relevant. By allowing banks to subtract liquid foreign currency assets from their weighted sum of foreign currency liabilities, this regulatory change relaxed the restriction on foreign currency liabilities faced by banks, potentially increasing their demand for these liabilities.