

---

## Term structure of bank flows to emerging countries: what effects of short- vs. long-term regulatory arbitrage are?

---

Document de Travail  
Working Paper  
2018-23

Samira Hellou



UMR 7235

Economix - UMR7235  
Université Paris Nanterre  
Bâtiment G - Maurice Allais, 200, Avenue de la République  
92001 Nanterre cedex

Email : [secretariat@economix.fr](mailto:secretariat@economix.fr)



# Term structure of bank flows to emerging countries: what effects of short- vs. long-term regulatory arbitrage are?\*

Samira Hellout<sup>†</sup>  
EconomiX - Université Paris Nanterre.  
[hellou.samira@u-paris10.fr](mailto:hellou.samira@u-paris10.fr)

---

## **Abstract :**

Considering the literature of economic stability, the need to analyze short-term external bank flows is particularly obvious to prevent the contagion crisis. Moreover, the context of crisis has put prudential regulation at the center of the current debate in this literature. In this paper, we offer a new perspective on the role of regulation as a determinant of banking flows maturity, with a focus on the issue of short-term vs. long-term regulatory arbitrage. Indeed, regulatory arbitrage that favors short-term bank flows is a destabilizing factor of the financing of these countries as they have experienced major crises due to the external financing volatility. We adopt a macroeconomic approach to study the importance of bank regulation adjustments as a determinant of bank flows maturity from 12 developed countries to 37 emerging countries for the period 1990-2014. The results confirm the significant effect of risk-based regulation on the term structure of bank flows to emerging countries, especially to speculative countries.

*Keywords:* Regulatory arbitrage, Short-term bank flows, Emerging countries

---

## **Résumé :**

Considérant la littérature sur la stabilité économique, la nécessité d'analyser les flux bancaires externes à court terme est particulièrement évidente pour prévenir les crises de contagion. De plus, le contexte de la crise a placé la réglementation prudentielle au centre du débat actuel de cette littérature. Dans ce papier, on propose une nouvelle perspective du rôle de la réglementation bancaire, en tant que déterminant de la maturité des flux bancaires vers les pays émergents, en mettant l'accent sur la question de l'arbitrage réglementaire court terme vs. long terme. En effet, l'arbitrage réglementaire qui favorise les flux bancaires à court terme est un facteur déstabilisant du financement de ces pays étant donné qu'ils ont connu des crises majeures en raison de la volatilité du financement externe. Nous adoptons une approche macroéconomique pour étudier l'importance des ajustements de la réglementation bancaire en tant que déterminant de la maturité des flux bancaires en provenance de 12 pays développés vers 37 pays émergents pour la période 1990-2014. Les résultats confirment l'effet significatif de la réglementation basée sur le risque sur la structure par terme des flux bancaires vers les pays émergents, particulièrement, vers les pays en catégorie spéculative.

*Mots-clés :* Arbitrage réglementaire, Flux bancaires à court terme, Pays émergents.

*JEL classifications :* F32, F34, G28.

---

\* I would like to thank Zouhair Ait Benhamou, Elena Ivona Dumitrescu, the participants at the seminar: crisis and new financial regulation (EconomiX, March 31<sup>th</sup>, 2017) and the 19<sup>th</sup> INFER annual conference for useful comments and suggestions.

<sup>†</sup> Corresponding author. Tel : 33 (0)1 40 97 59 06, Fax : 33 (0) 1 40 97 41 98. EconomiX - Université Paris Nanterre, Bâtiment G, bureau 301. 200 avenue de la République, 92001 Nanterre cedex.

## 1. Introduction

Considering economic stability, the need to analyze short-term external bank flows is particularly obvious to prevent the contagion crisis. In 2007, the subprime crisis dragged developed countries into recession with a downturn of economic conjuncture and a credit crunch. In this context, it is well documented that globalized banks transmit shocks across borders. Cetorelli and Goldberg (2011) show that during the global financial crisis, liquidity shocks to banking systems in advanced countries caused a contraction in lending to emerging markets (Aiyar, 2011 and 2012). Hence, a lot of attention has been directed towards recent financial crises around the world and has revealed that short-term debt can play a prominent role as an indicator of financial vulnerability. Particularly for emerging countries, empirical studies have found that short-term flows increase financial fragility and increase the probability of financial crises.

Emerging economies are usually damaged by the consequences of their excessive short term external financing and sudden stops or reversal in period of crises in emerging markets (e.g., Argentina crisis of 1994, Mexican Tequila crisis of 1994, and Asian crisis 1997). They have featured troubled financial institutions and sudden reversals of short-term capital flows, which are at the heart of Chang and Velasco (2000) models. The capital account reversal in East Asia caused a collapse in asset prices and exchange rates. Foreign creditors called in loans and depositors withdrew funds from the banks, which magnified the illiquidity of the domestic financial system. So, understanding the determinants of short-term bank flows to emerging countries is a key concern because it may have important impacts and policy implications for these countries.

In this context, banking regulation can have an effect on the maturity of bank flows as the shorter maturity is cheaper in term of regulatory requirements and easier to roll off for bank. Indeed, under Basel I, regulatory arbitrage favored short-term bank flows to emerging countries. Before the 1997 crisis, 64% of bank loans to the five countries in crisis were short-term (Bisignano, 2003). Hence, with the implementation of Basel II and Basel III, changed regulatory arbitrage opportunities could modify the structure of bank flows to emerging countries. In this perspective, we are concerned with the potential impact of the new prudential rules on the term

structure of bank financing of emerging countries that have experienced major crises due to the volatile nature of external financing.

A first look at the data shows that there has been a steady increase of the share of short-term bank flows in total flows, what we call hereafter the term structure of bank flows. Therefore, we focus on the potential impact of the regulatory requirements on the international bank financing structure of emerging countries. Indeed, the regulatory arbitrage that promotes short-term claims is a very undermining factor of their funding. Then, based on the model of Buch and Lusinyan (2003) of international bank loans, we emphasize on the determinants of the short-term bank flows to emerging countries and focused on the importance of the adjustments in banking regulation. To extend Rodrik and Velasco (1999), Buch and Lusinyan (2003), Valev (2006 and 2007), we investigate the determinants of international debt maturity by adopting a macroeconomic approach based on the determinants of term structure of bank claims from banks located in developed countries to 37 emerging countries.

We offer a new perspective on the role of new regulation in the determinants of banking flows maturity with a regard to the question long- versus short-term regulatory arbitrage under Basel II (Basel III) and its effect to short-term bank flows to emerging countries. This paper extends the study of Buch and Lusinyan (2003) which tries to capture the effect of Basel 1 by integrating an OECD (Organisation for Economic Cooperation and Development) dummy. The purpose of our work is to make the link between the financing of these countries and financial embrittlement, specifically in terms of change in the structure of bank flows where banking regulations are involved.

To conduct the empirical model we use the BIS (Bank for international settlements) international banking statistics that allows studying lending according to the maturity of bank claims. We use cross border data of international banking claims provided by BIS and ratings of Standard & Poor's used in the evaluation of short and long term regulatory requirements.

The results of GMM in difference confirm the significant impact of regulatory requirements. In the first, we will integrate variables reflecting the criteria of regulation, OECD membership under Basel I and ratings under Basel II. Then, in order to evaluate the effect of short-term vs. long-term regulatory arbitrage, we integrate the differences between regulatory requirements in the short term and long term under the IRB approach. The results confirm the significant effect of capital requirements on the share of short-term lending to emerging countries. Finally, the comparison results of speculative grade countries vs. investment grade countries confirm that

speculative grade countries are influenced by the regulatory requirements, contrary to countries rated in investment grade category.

The remainder of the paper is organized as follows; the second section presents the determinants of short-term bank capital flows and stylized facts to explain the relationship between bank regulation evolution and short-term bank flows. Section 3 presents the literature review. Section 4 and 5 discuss the empirical model and results. Finally, the 6<sup>th</sup> section presents the main results and the conclusion.

## **2. Banking regulation and determinants of short-term bank flows to emerging countries**

Most of the literature on international bank flows is focalized in their volume in the context of pull and push factors which point to banking structure and financing as a significant determinant of investment dynamics in emerging countries; however it becomes a factor of fragility with short-term maturity by exposing countries to sharp reversal of flows. In spite of the consensus that short-term debt was a cause for 1997 crisis, the literature in the determinants of international short-term bank flows as theoretical and empirical remains very limited and does not address the effect of banking regulation arbitrage on these flows. It forms no clear consensus as to how banking regulation affects the bank flows structure of emerging countries.

This very limited literature in the determinants of international short-term bank flows requires consideration of the risk associated with foreign activities as liquidity and solvency risk captured through variables as interest rate, institutional development and GDP. Diamond and Rajan (2001) confirm that countries with poorly institutional development borrow in short term, so financial market development impacts maturity of debt, with increasing costs of short-term lending. Valev (2006 and 2007) confirms the role of the size of banks as well as the uncertainty as determinant of the maturity of loans. Buch and Lusinyan (2003) show that determinants of short-term bank lending do not differ, significantly, between developed and developing countries. Tasić and Valev (2008, 2010) found that financial sector development, as captured by the ratio of bank credit to gross domestic product (GDP), has a positive impact on bank loan maturity.

This literature initiated by Rodrick and Velasco (1999) paper emphasize that, generally, preference for short-term loans is justified by its cheaper cost, hence our interest in regulatory requirements that increase these costs. Indeed, even if short-term financing could be less costly in the contractual sense, it will stand a risk premium and it is cheaper in term of regulatory requirements. Furthermore, default on long-term debts generates higher costs and it has an externality on long-term lenders. In what follows, we present how the change of regulatory

restrictions and capital adequacy requirements for internationally active banks can affect the maturity of bank flows to emerging countries through the change in short-term and long-term regulatory arbitrage.

### *2.1. Banking regulation evolution and bank flows maturity to emerging countries*

Prudential regulation of 1988, as already mentioned, played a very important role in triggering financial crises in emerging countries encouraging short-term financing that causes a sudden outflow of capital in the event of market disruptions. In this context, one may wonder about the effects of Basel II prudential regulation or changes get by Basel III on the access of emerging countries to long-term funding.

#### *Basel I: A favorable financing but vulnerable*

We mention several shortcomings to the Basel I regulations framework: the weighting of credit commitments with the established 8% Cooke was insufficiently differentiated to take into account all the complexity of the credit risk. On the other hand, it was characterized by a simple categorization based on OECD membership. This gave a wide margin of arbitration; large banks took advantage of the loopholes created by this lack of regulatory coverage to favor short-term bank flows to non-OECD emerging countries (e.g. Mexico). Indeed, factors that explain short-term financing of emerging countries are mainly related to fixed weightings proposed by Basel I (Table 1).

These weights favor loans to the public sector for OECD countries with a rate of 0%, against loans to non-OECD countries are weighted at 100%. For the bank sector, loans to OECD emerging countries are weighted at 20%. For lending to non-OECD countries, the risk weight for loans to banks differentiates between short- and long-term lending with 20% for loans that have a maturity of less than 1 year, against 100% for long-term loans to these countries. This preferential treatment can be expected to raise the share of short-term lending to non-OECD countries, so we expect a negative link between OECD membership and the share of short-term loans. However, for the private sector, it does not offer preferential treatment for OECD or non-OECD countries.

As a result, given that the majority of emerging countries are non-OECD countries, they are penalized by prudential regulations of 1988 in the amount of loans and maturity (Table 2), which is a barrier to their access to stable international long-term financing.

**Table 1: The risk weights under Basel I**

Risk weights	Assets
0%	- Cash or claims collateralised by cash, guaranteed by or. - Claims on and guaranteed by the OECD central governments and central banks. All Claims on non-OECD central governments and central banks denominated and funded in local currency.
0, 10, 20 or 50%	- Claims on domestic public-sector entities, excluding central government, and loans guaranteed by such entities.
20%	- Claims (with a residual maturity of up to one year) on and guaranteed by banking institutions incorporated in countries outside the OECD. - Claims on and guaranteed by domestic non central governments and other public sector entities. - Claims on and guaranteed by OECD public sector entities, excluding central government.
50%	- Loans fully secured by mortgage on residential property that is or will be occupied by the borrower or that is rented
100%	- Claims on banking institutions incorporated outside the OECD with a residual maturity of over one year. - Claims on non OECD central governments other than those denominated in national currency - Claims on commercial companies owned by the public sector and all other claims.

Source: BIS, 1988

**Table 2: Comparison of short-term and long-term weights under Basel I**

Countries	Risk weights under Basel I					
	Public sector		Bank sector		Private sector	
	ST	LT	ST	LT	ST	LT
<b>OCDE</b>	0%	0%	20%	20%	100%	100%
<b>NON-OCDE</b>	100%	100%	<b>20%</b>	<b>100%</b>	100%	100%

Note: ST and LT refers respectively to Short and Long -Term

Source: author based on Table 1

*Basel II: An efficiency-stability dilemma*

The increased complexity of banking required a reform of Basel I agreements. According to the Basel Committee, Basel II is implemented to strengthen financial instability adapting capital requirements to the specificities and diversity of domestic banking systems and risk management approaches which give to banks more options for calculating their capital requirements (standard approach, IRB “Internal Ratings-Based” approach and advanced IRB approach).

**Table 3: Risk weights in the standard approach under Basel II**

	AAA à AA-		A+ à A-		BBB+ à BBB-		BB+ à BB-		B+ à B-		<B-		Unrated	
	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT
<b>Sovereign</b>	0%		20%		50%		100%		100%		150%		100%	
<b>Banks</b>	20%	20%	20%	50%	20%	50% à 100%	50%	100%	50%	100%	150%	150%	20%	50% à 100%
<b>Corporates</b>	20%		50%		100%		100%		150%		150%		100%	

Note: ST and LT refers respectively to Short- and Long -Term

Source: BIS, 2001

Table 3 shows that the standard approach of the new prudential regulation is characterized by the elimination of preferential treatment for the OECD membership. It gives more importance to the individual risk of borrowers, which allows emerging countries to improve their credit ratings to benefit from borrowing advantage that should support the development efforts and growth targets in these countries.

With this approach, in order to maintain liquidity in local inter-bank markets, the Basel Committee on Banking Supervision proposes a preferential treatment of short-term inter-bank exposures. This treatment will be available to both rated and unrated bank claims, but not to banks risk weighted at 150%. This option bases the risk weighting on the external credit assessment of the bank itself, as shown in the table below. Under this option, a preferential risk weight that is one category more favorable than the risk weight for banks may be applied to claims with an original maturity of three months or less (BIS, 2001).

Then, with the change in cost of capital requirements which affects the volume of bank flows (Hellou and Boutillier, 2017), new regulatory arbitrage can affect the maturity of bank flows; Figuet and Lahet (2007) confirm that Basel II favors short-term bank flows to emerging markets.

Therefore, the standard approach just shows that the new regulation favors interbank flows with a preferential treatment. In the same way, the IRB approach (most used by international banks) shows in table 4 that short-term claims are less costly in regulatory capital than long-term claims. Indeed, this is due to the risk level that is more important in the long term than in the short term.

However, the comparison of regulatory requirements for short and long-term loans under the IRB approach of Basel II in table 4 shows that the regulator considers the effects of short-term versus long-term arbitrage by decreasing the difference between short term and long term capital requirement for riskier categories. For the higher level risk category, the difference decreases when the level of risk increases. So, the regulator has taken measures to reduce short versus long-term regulatory arbitrage for riskier categories in order to penalize short-term bank loans to these categories.



**Table 4: Comparison of regulatory requirements for short versus long term loans with IRB approach (rating S&P)<sup>3</sup>**

RATING	S&P	PD_1Y	PD_5Y	k			K-diff
				100\$ for 1y	100\$*5 for 1y *5	500\$ for 5y	
AAA		0	0,35			38.0941	
AA+		0	0,17			27.602	
AA		0,02	0,38	.48954	2.4477	39.40145	36,95375
AA-		0,03	0,39	.67371	3.36855	39.81775	36,44920
A+		0,06	0,53	1.14323	5.71615	44.82145	39,10530
A		0,07	0,57	1.2815	6.4075	46.0218	39,61430
A-		0,08	0,69	1.41309	7.065451	49.16965	42,10420
BBB+		0,14	1,27	2.10053	10.50265	58.7691	48,26645
BBB		0,2	1,69	2.66894	13.3447	62.8649	49,52020
BBB-		0,32	3,51	3.58865	17.94325	73.28705	55,34380
BB+		0,43	4,56	4.26503	21.32515	77.994	56,66885
BB		0,68	7,66	5.4417	27.2085	90.67445	63,46595
BB-		1,13	10,33	6.86163	34.30815	99.65605	65,34790
B+		2,31	16,05	8.94284	44.7142	112.3991	67,68490
B		4,73	21,02	11.47776	57.3888	118.0195	60,63070
B-		7,92	26,93	14.15987	70.79935	120.2583	49,45895
CCC/C		26,87	46,75	20.84981	104.249	106.9668	2,71780

Source: author's calculation using default probability associate to S&P rating (Standard & Poor's). For MOODY'S and FITCH rating, see Appendix 9. Note: PD-1Y, PD\_5Y refers respectively to the default probabilities on one and five years associated with sovereign ratings of Standard & Poor's. K-diff: is the difference between long- term and short-term capital requirements (k) as a percentage of the amount due.

### *Basel III: What effect on the bank flows maturity of emerging countries?*

The first measure of the new agreement Basel III is improving the regulatory capital requirements in quantity and quality. The minimum requirements for common equity increased from 2% to 4.5% with the introduction of 2.5% of assets as capital conservation buffer, as well as the establishment of capital reserves contra-cyclic level to contain the excessive accumulation of leverage and the introduction of threshold leverage internationally. These significant costs could encourage banks to increase the credit rate and reduce allocation of loans, which can create a drag on economic activity and the level of investment for emerging countries (Figuet *and al.*, 2015). So, as Basel III adopts the same methods of evaluation and measure of regulatory requirements for credit risk with a higher level, it can further strengthen the effect of the regulatory requirements

<sup>3</sup> We compare capital requirements for a credit of 500\$ with a maturity of 5 years and for a credit of 100\$ with a maturity of 1 year, renewed for 5 years. For this, we assume that the risk level at one year does not change over the 5 years

on short-term loans. An effect that can disrupt highly dependent markets on bank flows as emerging markets.

On the other hand, the NSFR (Net Stable Funding Ratio) is a new prudential liquidity rule of Basel III that aims at limiting excess maturity transformation risk in the banking sector and promotes funding stability. But, considerable concerns have been raised against the NSFR that may be too restrictive and could lead to a shortage in long-term lending with real consequences for economic growth (Gobat *and al.*, 2014). For this purpose, concerns have been raised that the impact on developing and emerging countries could be more stringent, especially for countries that have less-developed markets and fewer nonbank financial intermediaries and would suffer more if banks cut back on long-term finance as a result of this new prudential regulation (World Bank, 2015).

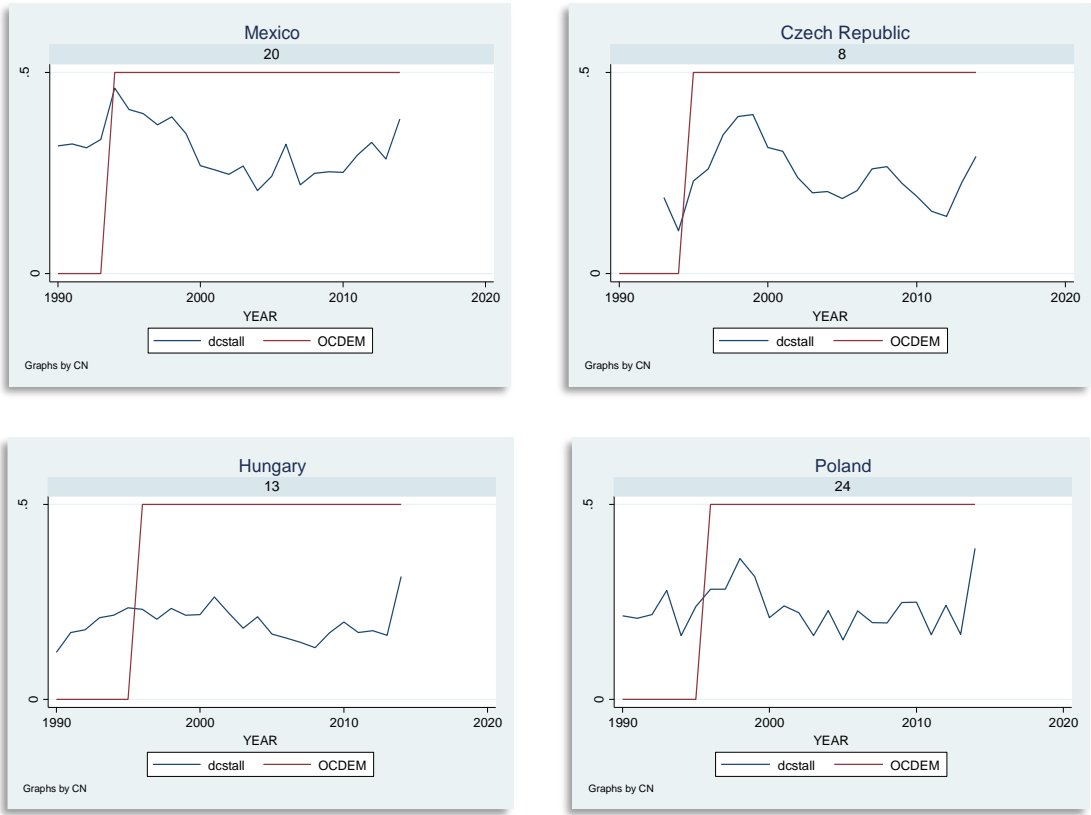
## *2.2. Stylized facts*

In the section below, we focused on stylized facts that define the main relevant aggregates of 37 emerging countries. Considering the importance and the volatility of banking flows and given that these flows originate mainly from developed countries, we considered the issue of the evolution of bank regulation in developed countries and its effects on the maturity of this flows.

Indeed, with a brief retrospective look, the evolution in figure 1 confirms that the share of short-term international claims in total international claims in emerging OECD countries falls after OECD membership for Mexico and Hungary. This is probably due to preferential treatment that favors short-term loans for emerging non-OECD countries. However, Poland has stagnated before an increase in short-term flows before the 1997 crisis. This increase also concerns Czech Republic; it can result from domestic policies, excess of international liquidity and euphoria in emerging countries with attractive interest rate compared with low interest rate in developed countries (Dadush *and al.*, 2000).

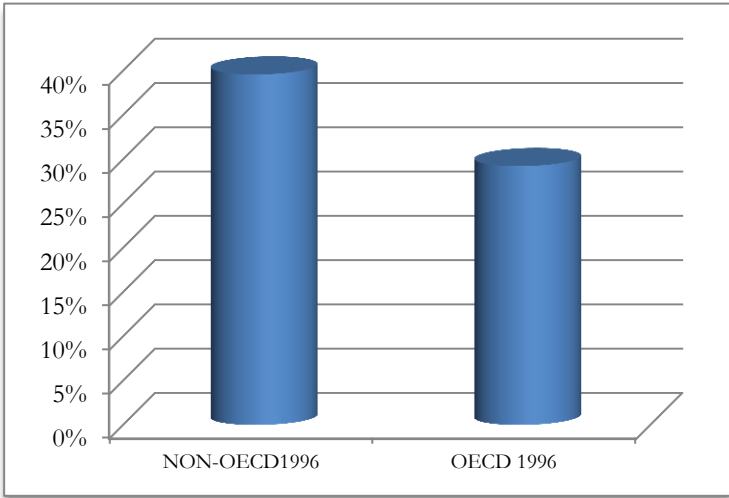
Nevertheless, Figure 2 shows that the average share of short-term flows in total flows to non-OECD countries is much larger than that of OECD emerging countries, which confirms the preferential treatment of Basel I accord expected to raise the share of short-term lending to non-OECD countries.

**Figure 1: Share of short-term international claims in total international claims to OECD emerging countries (OECD membership before 1997)**



Source: BIS, Consolidated statistics, 2015

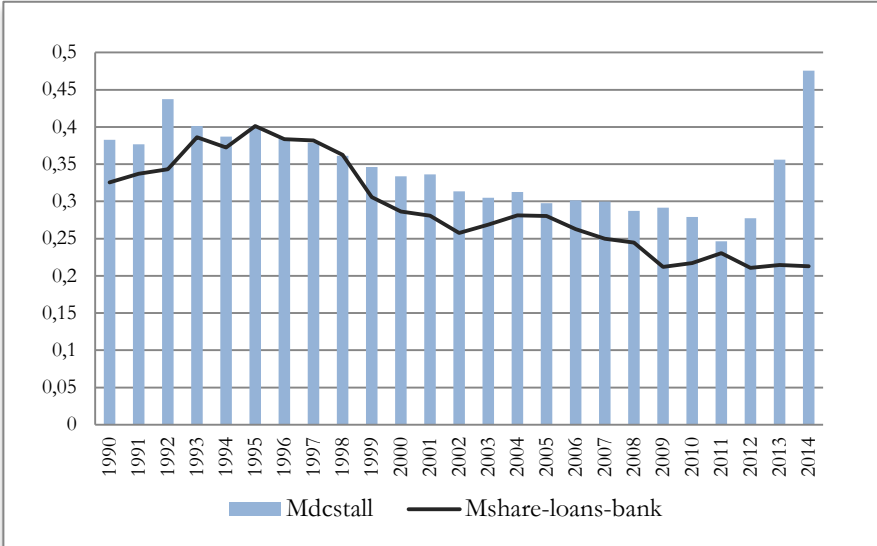
**Figure 2: Comparison of the average of share of short-term international claims in total international claims to OECD and non-OECD emerging countries**



Source: BIS, Consolidated statistics, 2015

The recent crisis period has led to a substantial decrease in bank cross-border flows to emerging countries. This decline in the level of bank flows in the crisis period is accompanied by a change of its structure with an increase of short-term bank flows as shown in Figure 3. Since the literature argued that short-term bank flows are explained by interbank flows (Buch and Lusinyan, 2003), we showed in figure 3, the evolution of the share of short-term international claims in total international claims from developed countries to emerging countries compared to the evolution of share of loans to banks. The figure shows that short-term bank flows cannot be explained by interbank flows after 2010 as this increase in short-term flows is not accompanied by an increase in interbank flows.

**Figure 3: Share of short-term international claims and share of loans to banks to emerging countries\***



Source: BIS, Consolidated statistics, 2015, own calculation

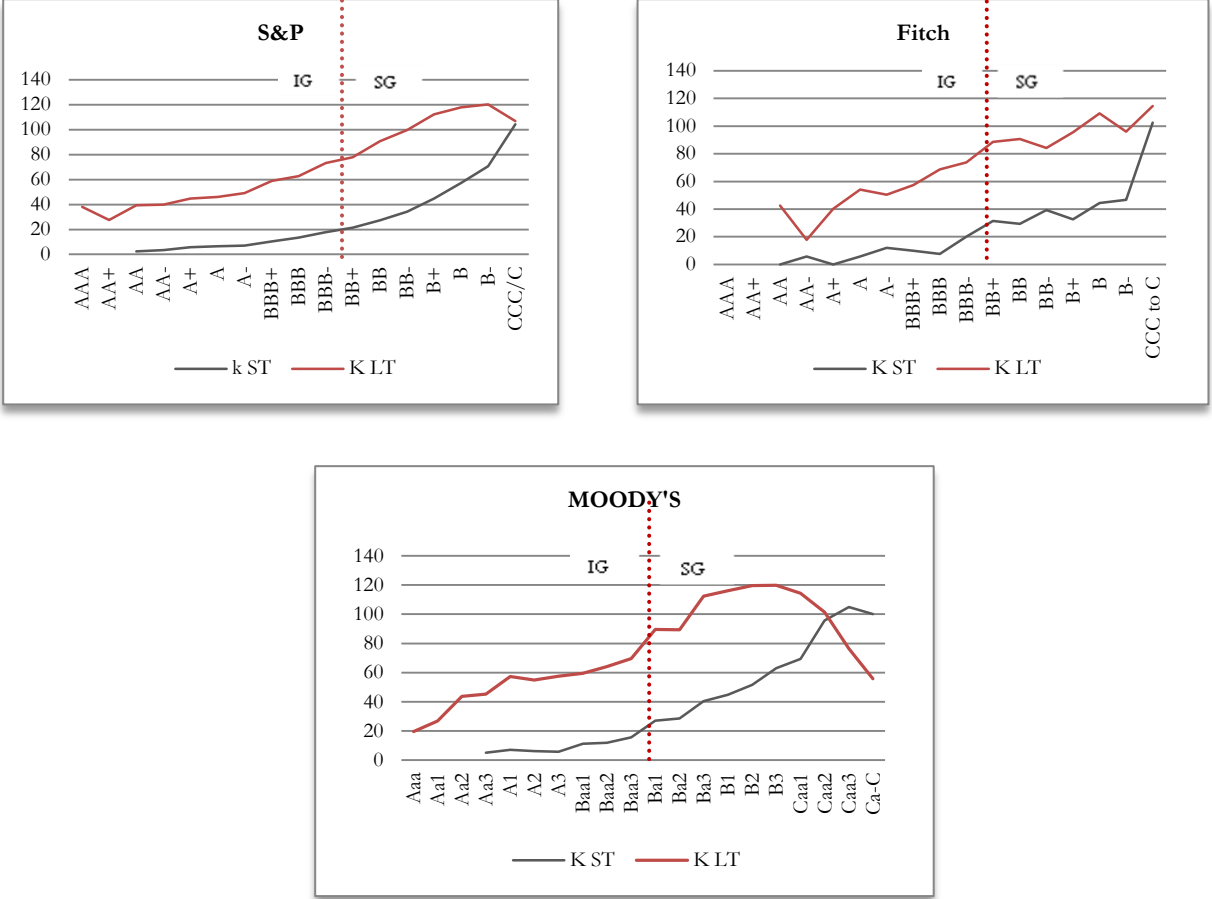
\* Notes: Mdcstall: mean of share of short-term international claims and share of loans to banks to emerging countries in our sample from developed countries. Mshare-loans-bank: mean of share of loans to banks in total claims

The literature has formed a consensus that short-term bank flows depend on flows between parent banks and their subsidiaries (Buch and Lusinyan, 2003; Valev, 2006 and 2007). However, graphs of appendix 2 show that in the recent period, these short-term flows to 37 emerging countries follow more the profitability on the financial markets than the interbank flows. This evolution can be explained by the evolution of the new banking industry strongly linked to the financial markets in the context of banking financialization and globalization.

Hence, some questions may be relevant: What can explain this increase of short-term bank flows to emerging countries? Can evolution of bank regulation explain this increase of short-term

international claims through the change of regulatory arbitrage opportunities? What about Basel III? To answer these questions we will try to emphasize the impact of evolution of bank regulation in the short-term loans to explain this increase of short-term international claims.

**Figure 4: Comparison of regulatory requirements: short- versus long-term loans under the IRB approach by agency ratings**



Source: author's calculation using default probability associate to S&P ratings Standard & Poor's, MOODY'S and FITCH rating (based to table 4 and appendix 9). KST and KLT refers respectively to Short- and Long-Term capital requirements

The comparison of short term and long term regulatory requirements under the IRB approach confirm that short-term claims are cheaper in term of capital requirement. However, the regulator restrains this difference for riskier categories. For the category with a higher risk level, the difference decreases when the level of risk increases.

We compare rating by three major rating agencies and their associate default probability (see appendix 11). For MOODY'S, from Caa2 rating, short-term loans are more penalized than long-term loans with a high level of capital requirements. So, the regulator has taken measures to

reduce short versus long-term regulatory arbitrage for riskier categories. However, this risk level that penalizes short-term maturity is superior to the risk level that separates speculative grade and investment grade countries (see Figure 4).

As countries rated as speculative grade are influenced by the regulatory requirements, unlike countries rated in investment grade category (Hellou and Boutillier, 2017), these countries are more likely to be affected by short- vs. long- term regulatory arbitrage. So, are these cost differences in terms of regulatory requirements subjected to regulatory arbitrage by international banks? In this context, we focus on the importance of the adjustments in banking regulation and the short- vs. long-term regulatory arbitrage and its potential effect on banking flows maturity to emerging countries, especially for speculative grade countries.

### **3. Literature Review**

The recent literature on the determinant of bank flows are oriented to the volume of cross-border flows to emerging countries under the pull and push approach as Forbes and Warnock (2012); Ghosh *and al.* (2011 and 2014); Bruno and Shin (2015) and Figuet *and al.* (2015). However, a limited literature focuses on determinants of short-term bank flows and their maturity. Sven and Buch (2010) and Taylor and Sarno (1997) explain that the rapid changes in flows are determined by rapid changes in some of the push and or some of the pull factors. Following this logic, they use cointegration to estimate the long-term convergence of short-term dynamics in the context of pull and push factors. Despite capital controls which alter the composition of capital flows reducing the share of short-term and portfolio flows (Montiel and Reinhart, 1999), Broner *and al.* (2004) argue that emerging economies borrow short term due to the high risk premium charged by international capital markets on long-term debt.

In another commitment, literature focuses on the effect of short-term capital flows on growth in emerging markets (Petroulas, 2007) and the effect of debt maturity in financial stability in these countries (Ekici and Nemlioğlu, 2017). Indeed, Stein (1965) emphasizes the speculative character of short-term flows. Petroulas (2007) takes a macro-oriented approach and shows that while large and volatile short-term debt has no effect on growth for developed countries, they are growth constraining for emerging countries. Park *and al.* (2015) find that domestic deposits and foreign liabilities are more important source of funding in emerging market and the most important drives of bank credit to companies at all maturities especially for the growth of long-term bank credit. Diamond and Rajan (2001) argue that the build-up of short-term debt in emerging markets

is the consequence of the illiquidity and poor quality of investments in countries lacking adequate regulation and institutions.

Nevertheless, a limited literature focuses on determinants of short-term bank flows. In the open economy model of Diamond and Dybvig (1983); Chang, and Velasco (2000), banks act as maturity transformers. They take liquid deposits and invest part of the proceeds in illiquid assets. In doing so, they pool risk and improve welfare, but also create the possibility of self-fulfilling bank runs. The model places international illiquidity at the heart of the problem of emerging countries vulnerability with banks in these countries that typically get sufficiently of international loan offers when things go well but none in period of crisis. Emerging countries with underdeveloped financial systems are particularly vulnerable in case of sudden stops that are reversals of capital flows (Forbes and Warnock, 2012).

Furthermore, despite the importance of the maturity of foreign bank debt in the financial instability of emerging countries, there is relatively a limited literature on the determinant of short-term bank debt to these countries. Rodrik and Velasco (1999) initiate this literature and provide a conceptual and empirical context to evaluate the impact of short-term capital flows in the international dimension. They also undertake an empirical analysis of the determinants of short-term debt maturity. The results confirm the role of the per capita income and the level of financial development as a determinant of short-term debt. Unlike the volume of international trade, which does not seem have a significant role. Jeanneau and Micu (2002) compare determinants of short and long-term loans. The results confirm that short-term lending is influenced by domestic return, exchange rate, risk level and credit worthiness. Otherwise, trade is not correlated with short-term loans but it influences long-term loans. Diamond and Rajan (2001) have investigated determinants of short-term flows in an international dimension by integrating monetary policy, exchange rate, level of development or risk and confirm that countries with poorly institutional development borrow in short term. Buch and Lusinyan (2003) complete this empirical model and integrate a dummy of OECD membership to identify the role of Basel 1.

Valev (2006 and 2007), by using International banks lending data for U.S, show that non-economic uncertainty in foreign countries leads to shorter maturity of international loans to emerging countries and important differences in behavior among banks of different sizes. Smaller banks lend more short-term compared to larger banks. Sven and Buch (2010) treat short and long-term determinants of the international banking portfolio and focus on macroeconomic conditions. By using BIS locational banking data, they show, principally, that adjustment speed depends on the degree of financial integration of the countries. In this context, Aiyar *and al.*

(2014) by examining cross-border bank loan supply from U K-resident banks, find that banks tend to favor their most important relationships. These banks tend to cut back cross-border credit to other banks (including foreign affiliates) more than to firms and households, consistent with shorter maturity, wholesale lending that is easier to roll off and may be associated with weaker borrowing relationships.

In spite of the consensus that bank regulation favored short-term debt before the 1997 crisis (Rodrick and Velasco, 1999; Diamond and Rajan, 2001), there are a few studies on the importance of bank regulation as a determinant of short-term bank debt. Briec and Mulder (2000) and Bisignano (2003) show that short-term financing to emerging countries are favored by Basel I. This funding remains important even after the implementation of Basel II for Figuet and Lahet, 2007. Buch and Lusinyan (2003) confirm that OECD membership have a negative impact on the share of short-term loans which reflecting the preferential treatment towards short-term lending in the risk weighting the Basle Accord implies for non-OECD members.

Recently, considerable concerns raises against the liquidity ratio of Basel III that could lead to a shortage in long-term lending with real consequences for economic growth, especially, for developing and emerging countries that have less-developed markets to offset long-term funding (Gobat *and al.*, 2014; World Bank. 2015).

To assess effect of regulatory requirements, to the best of our knowledge, no existing literature has been presented with regard to question long- versus short-term regulatory capital requirements and its effect to short-term bank flows to emerging countries. Hence, along with the literature that tried to explain the evolution of short term international banking flows, we include the regulatory arbitrage, for the first time, as an element that could explain the increase in short-term flows and influence the behavior of international banks. These banks are generally in developed countries, so, the evolution of regulation in these countries can affect banking flows maturity of bank flows from developed to emerging countries.

#### **4. Empirical approach**

Literature on the determinant of bank flows used on microeconomic or macroeconomic data assume that individual bank behavior can be approximated with aggregate data as Aiyar *and al.* (2014); De Nicoló (2015); Noss and Toffano (2014). Thus, in order to test our hypothesis, we adopted a macroeconomic approach using aggregate data of claims from international bank developed countries to emerging countries.



We proceed with the following steps: first, we try to estimate the effect of bank regulation criteria on term structure of bank flows to emerging countries as the difference between these two regulations lies in the weights which are primarily related to the OECD membership under Basel I and related to risks under Basel II. Thus, we try firstly to see the effects of these two criteria on the banking flows to emerging countries before and after the implementation of Basel II. Since according to the Basel Committee, the implementation of Basel II was scheduled for early 2007, we consider 2007 as the beginning of the Basel II implementation period. Furthermore, as the date of the application of Basel II coincides with the date of the crisis, there was a change on cross-border bank lending, partly related with bank regulation Bremus and Fratzscher (2015). Therefore, we retain two periods 1990-2006 and 2007-2014 reflecting the two Basel accord, for our estimates (table 5).

Second, to control for regulatory restrictions and capital adequacy requirements for internationally active banks, we compute the difference between short- and long-term regulatory requirements under the IRB approach of Basel II. We estimate the effect of the difference in short- and long-term regulatory requirements on term structure of bank flows to emerging countries (table 6). Finally, we attempt to estimate this effect for speculative grade countries vs. investment grade countries (table 7).

### *Data*

Data of international bank claims are from BIS (consolidated statistic). The use of the consolidated data is based on the availability of data on short-term bank flows (less than up 1 year) within the total banks flows. This data capture the consolidated positions of banks, including the positions of banks' foreign subsidiaries and branches but excluding inter-office activity. We use international claims, which include cross-border claims in any currency and exclude local claims of foreign affiliates in local currencies.

We use cross-border claims reported by internationally active banks located in 12 developed countries<sup>4</sup> towards 37 emerging countries. But, the geographical dimension of the consolidated data is not clear enough. So, we cannot use a gravity model to exploit this data. Therefore, we aggregate flows from developed countries. We have conducted the empirical study with annual data over 1990-2014 and we try to explain the change in short-term bank flows as a share of total bank flows through capital requirement and a number of control variables.

---

<sup>4</sup> Austria, Belgium, Canada, Finland, France, Italy, Japan, Spain, Sweden, Switzerland, United Kingdom, United states

### *Explanatory Variables*

By respecting the empirical literature, as explanatory variables (details given in appendix 1 with descriptive statistics in appendix 5), we include GDP per Capita as a proxy for the country economic development which reflects a positive outlook of profitability, M2 as a percentage of GDP to capture the financial sector development, trade openness as a percentage of GDP to explain trade related credit. As Buch and Lusinyan (2003) we include share of loans to banks to capture flows from parent's banks to their affiliates or subsidiaries which are generally short-term, then we could expect positive impacts. We integrate the financial markets, through SP500 since markets can favor a bank capital structure that is heavy on short-term leverage (Diamond and Rajan, 2009).

To capture the effect of bank regulation in banking flows maturity, we try first to estimate the effects of OECD membership under Basel I and rating (S&P rating) under Basel II. For OECD membership, we integrate a dummy that take a value of 1 if the country is an OECD membership and the value of 0 otherwise (Appendix 4). For rating, we integrate rating of Standards and Poor's that takes a value between 1 and 26 from the AAA to SD rating (Appendix 6). In the second step, we include a proxy reflecting the difference in short- and long-term regulatory requirements under Basel II on the banking flows to emerging countries.

### *Measuring the proxy of difference in short- and long-term regulatory requirements*

To estimate the difference in short- and long-term regulatory requirements we use the IRB approach<sup>5</sup> to estimate capital requirements as a percentage of bank claims for claims with one year maturity and capital requirements as a percentage of bank claims for claims with five years maturity. Therefore, we consider the difference between short- and long-term regulatory requirements under IRB approach of Basel II as a proxy of the difference in short- and long-term regulatory requirements.

Given that, we do not have any information indicating the requirements level applied by banks, we include a variable RWA (Risk Weighted Assets) that reflects the weights applied under Basel II. Then, we measure the risk weights (RWA/EAD) represent risk-weighted assets as a percentage of the amount due EAD which represent exposure at default:

$$\frac{RWA}{EAD} = 12.5 K$$

---

<sup>5</sup>The method used by most large international banks to calculate capital requirements under Basel II (Bank for International Settlements, June 2006. p63)

RWADIFF represent the difference in short- and long-term risk-weighted assets as a percentage of the amount due under the IRB approach with maturity of 1 year for short term and 5 year to approximate long term maturity. Four risk indicators are defined: 1. PD is the default probability: the risk weights are calculated using the default probabilities associated with sovereign ratings of Standard & Poor's as a proxy to internal ratings. We take the default probabilities on one year for short-term flows (up to one year) and the default probabilities on five years for long-term flows. 2. M is the credit maturity, which is fixed at 1 year for short-term and 5 years for long-term. 3. EAD is the exposure to default that represents the credit amount due. 4. LGD is the loss given default that fixed at 50%.

With this method, regulatory requirements  $K$  can take two following values that the counterparty may in default (equation (2)) or not (equation (1)):

$$1. \quad K = \left[ LGD \cdot N \left( \frac{N^{-1}(PD) + \sqrt{\rho(PD)} N^{-1}(0.999)}{\sqrt{1-\rho(PD)}} \right) - LGD \cdot PD \right] \left( \frac{1+(M-2.5) \times b(PD)}{1-1.5b(PD)} \right)$$

With

$$p(PD) = p_{min} \frac{1 - e^{-50PD}}{1 - e^{-50}} + p_{max} \left[ 1 - \frac{1 - e^{-50PD}}{1 - e^{-50}} \right]$$

$$b(PD) = (0.11852 - 0.05478 \ln(PD))^2$$

$$2. \quad K = \max(0, LGD - EL)$$

With  $N$ : the standard normal distribution.  $\rho(PD)$ : the correlation is a decreasing function of the default probability.  $b(PD)$ : stipulates that adjustment of maturity is a decreasing function of the default probability. EL (Expected Losses) = PD\*LGD with 99.9% confidence interval,  $p_{min} = 0.12$ ,  $p_{max} = 0.24$ .

*Sample*

To select the list of emerging countries, we focused on databases provided by the IFC (International Finance Corporation) in emerging markets and the list of countries available in the

database of the basic variables as consolidated cross-border international banking claims (BIS) and rating (S&P). Default probability is associated with the rating allows evaluation of changes and difference of short- and long-term in regulatory requirements for these countries. In total, a sample of 37 countries is built (Appendix 3) representing all geographic regions.

### *Model specification*

Generally, an endogeneity problem emerges when we study the bank capital flows regarding the continuity of the supply of funds by banks due to familiarity and relationships with borrowers. Moreover, we suspect a double causality term structure of bank capital flows and the level of risk measured by the rating since a low average debt maturity may further increase debt service costs is through an increased risk of default (Miller, 1997). On the other hand, inclusion of interbank lending in short-term flows poses problems of endogeneity. Therefore, we may construct efficient estimates with a dynamic panel data model in order to solve the problems of endogeneity. Thus, we consider a dynamic model as follows:

$$Y_{i,t} = \alpha Y_{i,t-1} + \beta X_{i,t} + \omega Z_t + \mu_i + \varepsilon_{i,t}$$

Where  $Y_{it}$  measure the share of short-term in total international bank claims from developed countries to emerging country  $i$  at time  $t$ .  $Y_{i,t-1}$  is the lagged dependent variable,  $X_{it}$  are control variables,  $Z_t$  are control variables that do not change at the country level,  $\mu_i$  the country specific effect and  $\varepsilon_{it}$  is the error term.

Considering a model containing a lagged dependent variable we use GMM difference as a solution to the problem of correlation between the lagged variable and the individual affect by taking first differences of the original model and the correlation between the lagged variable and the error term by using instrument of moments. Moreover, in the context of panel data, we usually deal with unobserved heterogeneity by applying the within transformation by taking first differences, which removes both the constant term and the individual effect. The sample dimension is compatible with GMM difference with small  $T$ , large  $N$  (Arellano and Bover, 1995; Blundell and Bond, 1998).

Despite using system GMM increased modestly efficiency, it is not appropriate to use system GMM for two reasons: first, because system GMM uses more instruments than the difference and we know that when the number of instruments is greater than the number of countries the Sargan test could be weak. Second, in our panel data with fixed effects, including the equation in

levels requires a new assumption that first-differenced instruments, used for the variables in levels should not be correlated with the unobserved country effects. Roodman (2009) discusses how this assumption depends on assumptions about the initial conditions (Mileva, 2007).

For the robustness test, we proceeded with the same approach as Rodrik and Velasco (1999); Buch and Lusinyan (2003) and Valev (2006). We use log Odds-ratio ( $\log(y/1-y)$ ) which allows transformation of the dependent variable, which represents a ratio that takes a value between 0 and 1. Thus, the log Odds ratio can take any values as  $y$  varies in the unit interval with a fractional dependent variable<sup>6</sup> (Papke and Wooldridge, 1996 and 2008).

## 5. Principal findings

### *First step: variables reflecting the regulation criteria*

In the first step (table 5), we adopt the baseline specification of Rodrik and Velasco (1999), Buch, and Lusinyan (2003), we performed empirical tests for two sub-periods and selected set of variables based on the literature, starting with the simplest subset for the first sub-period (column 1) and for the second sub-period (column 5). Therefore, for the first period (1990-2006), we include one by one variables representing criteria of bank regulation under Basel I (column 2) and Basel II (column 3). As a robustness test, we combine these two variables (column 4). Then, we follow the same steps for the second period (2007-2014) in column 5, 6, 7 and 8. All estimates in table 5 show that GDP per Capita of emerging countries (IGDP\_CEC) do not have a significant effect for the two periods on the maturity of bank flows. As Buch and Lusinyan (2003) and Rodrick and Velasco (199), we find no relationship between trade openness (TRADOPEN) and maturity of bank flows in spite of the assertion that it raises the share of short-term flows in the total flows. They argued that a higher degree of trade openness could promote long-term financing also. This may also explain the non-significance of GDP per Capita of emerging countries since a high level of development favors long-term flows. However, for developed countries 2007-2014 period, GDP per Capita (IGDP\_CDC) over seems have a negative and significant effect in bank capital flows maturity.

For the financial development captured with M2 as percentage of GDP (Financial Development), the relationship is not clear. For the first period, it is significant and negative effect. But, for the second period the effect is significant and positive. These results can be explained by the fact that

---

<sup>6</sup> With a fractional dependent variable, the adjusted values of a linear regression cannot be guaranteed to fall in the unit interval (Papke and Wooldridge, 1996 and 2008). For the dependant variable used in the paper, none of the fitted values was outside the unit interval.

before the 2007 crisis, countries with a high financial development benefitted from long-term bank flows thus reducing the share of short-term flows in total flows. On the other hand, the result obtained in the second period reflects banks difficulties of the developed countries due to the 2007 crisis. So, short-term flows increase with the level of financial development, probably because banks offer short-term loans for these countries. For countries with low financial development, the share of short-term bank flows is likely to fall because short-term loans are not renewed. Indeed, Aiyar *and al.* (2014) confirms that banks favor their most important relationships.

For share of loans to banks, in the first period, the effect of this variable is very significant and positive and it corroborates with Buch and Lusinyan (2003) and Valev (2006 and 2007) results. This result is likely to be due to the more short-term nature of transactions on the interbank market. On the other hand, for the second period it seems to have a significant and negative influence, reflecting the change of the behavior of parent banks with their subsidiaries after the 2007 crisis. In fact, these results corroborate with Kohn (2008) and Hoggarth *and al.* (2013) which explain that banks in response to an economic shock can use foreign affiliates as a source of liquidity. Aiyar *and al.* (2014) explains that banks tend to cut back cross-border credit to other banks including foreign affiliates and tend to favor their most important relationships.

Regarding variables that reflect criteria of banking regulation, for Basel I period, the effect of the OECD membership (OCDEDUM) is indeed positive and significant, which can explain the increase in short-term flows before the 1997 crisis. Since the estimate is in difference, it measures the temporal evolution rather than the comparison between groups. This increase confirm the observations in figure 1 and is due to several factors as domestic policies, excess of international liquidity and euphoria in emerging countries with attractive interest rate compared with low interest rate in developed countries (Dadush *and al.*, 2000). However, for the second period, The OECD membership has no longer any effect on the maturity of bank flows.

Therefore, in order to compare between OECD member and non-member OECD countries, we perform a cross-section fixed effect estimation (not reported) by using a cross-section of the 37 countries, including sample for 1996 and 2000. We obtain the same results as Buch and Lusinyan (2003); which confirms the negative and significant effect of the OECD membership. These results confirm observation in figure 2 and the effect of arbitrage related to less stringent regulatory requirements for short-term flows to non-OECD emerging countries.

On the other hand, results confirm the effect of Basel II through the risk level criterion embodied in the ratings (IRATING\_SP). It seems influence significantly maturity of capital flows to emerging countries only in the second period; which corresponds to the application period of Basle II. Finally, financial market with SP500 seems to have a significant and positive effect in the second period reflecting the bank financialization with new financial innovation in the banking sector activities.

**Table 5: Determinants of bank flows, term structure with GMM-difference**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	DCSTALL	DCSTALL	DCSTALL	DCSTALL	DCSTALL	DCSTALL	DCSTALL	DCSTALL
	<i>1990-2006</i>				<i>2007-2014</i>			
Lagged.DCSTALL	-0.179 (0.217)	0.0430 (0.243)	-0.0348 (0.0707)	-0.0283 (0.0677)	-0.153 (0.102)	-0.251** (0.0925)	-0.238** (0.0939)	-0.256*** (0.0882)
IGDP_CEC	0.0207 (0.0250)	0.0138 (0.0322)	-0.0127 (0.0310)	-0.0151 (0.0321)	-0.0567 (0.0486)	-0.0751 (0.0598)	-0.0558 (0.0548)	-0.0453 (0.0514)
IGDP_CDC	-0.0890* (0.0439)	-0.0787* (0.0437)	0.0148 (0.0473)	0.0188 (0.0587)	-0.356*** (0.121)	-0.257* (0.141)	-0.248* (0.137)	-0.381* (0.191)
lShare_Loans_Bank	0.0925*** (0.0232)	0.0790*** (0.0268)	0.0511* (0.0295)	0.0516* (0.0289)	-0.0490** (0.0186)	-0.0657*** (0.0238)	-0.0514** (0.0215)	-0.0501** (0.0221)
Financial Development	-0.165*** (0.0554)	-0.213*** (0.0649)	-0.592*** (0.159)	-0.572*** (0.169)	0.548** (0.241)	0.596* (0.331)	0.682** (0.325)	0.708** (0.339)
dIIRADOPEN	0.00986 (0.0418)	0.0108 (0.0489)	0.0399 (0.0406)		-0.0884 (0.0531)		-0.00747 (0.0421)	
ISP500	-0.0105 (0.0236)	-0.0246 (0.0229)	0.0162 (0.0241)	0.00840 (0.0237)	0.193*** (0.0392)	0.149*** (0.0435)	0.144*** (0.0467)	0.138*** (0.0433)
DIFF_IRA		0.0166 (0.0488)	0.0901* (0.0456)	0.0796* (0.0460)		-0.0428 (0.190)	-0.0901 (0.198)	-0.0972 (0.192)
<b>OCDEDUM</b>		<b>0.102*</b> (0.0559)		<b>0.0971*</b> (0.0535)		<b>0.0724</b> (0.139)		<b>0.120</b> (0.163)
<b>IRATING_SP</b>			<b>-0.0411</b> (0.0400)	<b>-0.0364</b> (0.0409)			<b>0.179**</b> (0.0803)	<b>0.174**</b> (0.0737)
Lvix				0.00217 (0.0262)				0.0250 (0.0275)
Observations	456	402	352	352	264	224	224	224
AR2	0.626	0.664	0.496	0.344	0.838	0.508	0.512	0.357
Hansen	0.363	0.223	0.299	0.439	0.356	0.387	0.370	0.384
Instr	20	22	34	36	28	29	30	32

Notes: the dependent variable for all estimations is the share of short-term international bank claims from developed countries to emerging countries. Standard errors in parenthesis: \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01. Given the strong correlation (see appendix 7) between ISP500 and IGDP\_CDC; IRATING\_SP and IGDP\_CEC, we perform a test with confirm absence of multicollinearity (see appendix 8).

Consequently, results confirm a change in the behavior of international banks probably linked to the effect of arbitrage related to regulatory requirements for short-term flows to emerging countries, the bank financialization with the significant effect of SP500 in the second period

unlike the first period and the interbank activities with a strong and positive link between the shares of interbank loans and short-term loans in total flows.

*Second step: the effect of short-term vs. long-term regulatory arbitrage*

In this step, we try to estimate the sensitivity of the maturity of bank flows to short- vs. long-term regulatory arbitrage under Basel II. We adopt the same specifications with the baseline model then we integrate short- and long-term regulatory requirements differential (RWADIFF) and the level of regulatory requirement as a percentage of the amount due (RWA\_EAD) <sup>7</sup>(table 6). The effect of the difference in short- and long-term regulatory requirements appears to have a negative effect on short-term loans, which is probably due to the structure of the variable. Indeed, the regulator has taken into account the arbitrage effects by reducing these discrepancies for the risky entities. Nevertheless, the level of short-term loans is higher for risky countries. The result of the latest estimate that incorporates the level of regulatory requirements confirms that the level of regulatory requirements has a positive and significant effect on short-term loans (table 6). For the remainder of variables, results of table 6 confirm results obtained for the second period of table 5.

Therefore, we can conclude that the measures taken by the regulator to reduce short-term regulatory arbitrages versus long-term are not efficient as the level of short-term bank flows to risky countries remains important. The results in table 7, which perform estimates for investment grade vs. speculative grade countries, are in line: these results confirm that risky countries (speculative grade) are affected by the risk level and capital requirement level.

*Third step: comparison of speculative grade countries vs. investment grade countries*

Results in table 7 show that, for countries rated in the speculative category, the regulatory requirements and the risk level seems to play an important and positive role in determining maturity of bank flows to these countries. This result corroborates with Diamond's (1991) model which assumes that less-rated borrowers can only issue short-term debt. The effect of the difference between short- and long-term regulatory requirements appears to have a negative effect on short-term loans, which is probably due to the structure of this variable. This reflects the importance of these capital requirements so high that country-specific variables do not have any effect. The strong significance of the lagged variable with a negative effect reflects a strong

---

<sup>7</sup> we do not integrate the variables: RATINGS\_SP, RWA and DIFFRWA in the same specification because of the strong correlation between these variables



feedback that can be explained by the demand which decreases to reduce illiquidity risk as results of high short-term default probability.

For investment grade countries, the difference and the level of regulatory requirements and risk level do not seem to play a significant role in the determination of banking flow maturity. This reflects the low level of risk and regulatory requirements for this category. For control variables, lagged variable and GDP for emerging countries do appear influence banking flows maturity to these countries.

As a final point, for both categories, financial markets, through SP500, seem to exert significantly and positively on short-term bank flows to emerging countries unlike trade openness and VIX which does not seem to have a significant effect.

For all robustness tests in appendix 10, we used GMM difference of log Odds-ratio of short-term international bank claims as percentage of total claims. These tests were similar and confirmed our results. Other estimates in effect fixed and GMM static (not reported) confirm the results previously obtained. Furthermore, the effect of the 2007 crisis has been tested (not reported) for all estimates and it is confirmed that it does not affect the maturity of bank flows to emerging countries. Others test (not reported) confirm our results even by removing the year 2008.

Finally, as credit risk assessment remains unchanged (BCBS, 2010) still calculated with IRB model, the adjustments required for credit risk, under Basel III, should not reduce the level of short-term bank flows to risky countries, which remain important. An effect strengthened by the integration of the liquidity ratio under Basel III. This ratio aims at limiting excess maturity transformation risk in the banking sector to promote funding stability. But, it could lead to a shortage in long-term lending (World Bank. 2015).

**Table 6: Determinants of term structure of bank flows: Short- vs. Long-term arbitrage with GMM-difference (2007-2014)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	DCSTALL	DCSTALL	DCSTALL	DCSTALL	DCSTALL	DCSTALL	DCSTALL	DCSTALL
	<i>Diff RWA</i>				<i>RWA</i>			
Lagged.DCSTALL	-0.153 (0.102)	-0.251** (0.0925)	-0.245** (0.0947)	-0.268*** (0.0881)	-0.153 (0.102)	-0.251** (0.0925)	-0.240** (0.0905)	-0.262*** (0.0847)
IGDP_CEC	-0.0567 (0.0486)	-0.0751 (0.0598)	-0.0464 (0.0535)	-0.0263 (0.0479)	-0.0567 (0.0486)	-0.0751 (0.0598)	-0.0373 (0.0549)	-0.0166 (0.0504)
IGDP_CDC	-0.356*** (0.121)	-0.257* (0.141)	-0.295* (0.166)	-0.483** (0.227)	-0.356*** (0.121)	-0.257* (0.141)	-0.306* (0.158)	-0.503** (0.229)
lShare_Loans_Bank	-0.0490** (0.0186)	-0.0657*** (0.0238)	-0.0677*** (0.0213)	-0.0682*** (0.0225)	-0.0490** (0.0186)	-0.0657*** (0.0238)	-0.0581*** (0.0190)	-0.0581*** (0.0202)
Financial Development	0.548** (0.241)	0.596* (0.331)	0.561* (0.304)	0.617* (0.346)	0.548** (0.241)	0.596* (0.331)	0.586* (0.305)	0.647* (0.342)
DITRADOPEN	-0.0884 (0.0531)		-0.0886 (0.0759)		-0.0884 (0.0531)		-0.0848 (0.0773)	
ISP500	0.193*** (0.0392)	0.149*** (0.0435)	0.163*** (0.0588)	0.149** (0.0546)	0.193*** (0.0392)	0.149*** (0.0435)	0.157** (0.0580)	0.143** (0.0541)
DIFF_IRA		-0.0428 (0.190)	-0.0709 (0.205)	-0.0641 (0.206)		-0.0428 (0.190)	-0.111 (0.203)	-0.109 (0.203)
OCDEDUM		0.0724 (0.139)		0.0970 (0.144)		0.0724 (0.139)		0.101 (0.152)
<b>RWADIFF</b>			<b>-0.0826***</b> (0.0152)	<b>-0.0842***</b> (0.0157)				
IVIX				0.0312 (0.0304)				0.0329 (0.0312)
<b>RWA_EAD</b>							<b>0.107***</b> (0.0179)	<b>0.110***</b> (0.0203)
Observations	264	224	208	208	264	224	208	208
AR2	0.838	0.508	0.224	0.172	0.838	0.508	0.555	0.420
Hansen	0.356	0.387	0.434	0.416	0.356	0.387	0.490	0.499
Instr	28	29	30	32	28	29	30	32

Notes: the dependent variable for all estimations is the share of short term international bank claims from developed countries to emerging countries. Standard errors in parenthesis: \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01. . Given the strong correlation (see appendix 7) between lSP500 and lGDP\_CDC; lRATING\_SP and lGDP\_CEC, we perform a test witch confirm absence of multicollinearity (see appendix 8).

**Table 7: Determinants of term structure of bank flows: Speculative Grade Vs Investment Grade countries, GMM-difference (2007-2014)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	DCSTALL	DCSTALL	DCSTALL	DCSTALL	DCSTALL	DCSTALL	DCSTALL	DCSTALL	DCSTALL	DCSTALL	DCSTALL	DCSTALL
	<i>Speculative Grade Countries</i>						<i>Investment Grade Countries</i>					
Lagged.DCSTALL	-0.493*** (0.0681)	-0.477*** (0.0968)	-0.485*** (0.0755)	-0.492*** (0.0643)	-0.476*** (0.0915)	-0.484*** (0.0715)	-0.00745 (0.139)	0.0224 (0.151)	0.0259 (0.155)	0.000707 (0.139)	0.0185 (0.150)	0.0219 (0.155)
IGDP_CEC	0.0538 (0.0843)	0.0288 (0.0893)	0.0407 (0.0859)	0.0550 (0.0840)	0.0311 (0.0897)	0.0424 (0.0855)	0.0447 (0.0463)	0.0618 (0.0502)	0.0633 (0.0506)	0.0414 (0.0463)	0.0626 (0.0497)	0.0643 (0.0501)
IGDP_CDC	-0.366 (0.263)	-0.336 (0.297)	-0.354 (0.289)	-0.369 (0.257)	-0.342 (0.289)	-0.358 (0.282)	-0.527** (0.195)	-0.605** (0.223)	-0.602** (0.220)	-0.519** (0.192)	-0.602** (0.221)	-0.599** (0.218)
Financial Development	0.268* (0.136)	0.178 (0.107)	0.216 (0.126)	0.261* (0.129)	0.165 (0.107)	0.206 (0.120)	0.153 (0.170)	0.188 (0.206)	0.190 (0.211)	0.194 (0.161)	0.202 (0.212)	0.204 (0.216)
DIFF_IRA	-0.0338 (0.104)	-0.0684 (0.102)	-0.0903 (0.0972)	-0.0157 (0.0897)	-0.0334 (0.0990)	-0.0649 (0.0890)	0.150 (0.172)	0.123 (0.172)	0.118 (0.177)	0.106 (0.151)	0.118 (0.175)	0.113 (0.179)
lShare_Loans_Bank	-0.0124 (0.0335)	-0.0224 (0.0342)	-0.0216 (0.0342)	-0.0137 (0.0347)	-0.0249 (0.0355)	-0.0237 (0.0353)	-0.0353 (0.0234)	-0.0451 (0.0266)	-0.0407 (0.0243)	-0.0368 (0.0235)	-0.0463 (0.0273)	-0.0418 (0.0248)
ISP500	0.155** (0.0592)	0.178** (0.0790)	0.165** (0.0759)	0.148** (0.0624)	0.167* (0.0819)	0.156* (0.0804)	0.130* (0.0672)	0.144* (0.0824)	0.143* (0.0826)	0.120* (0.0622)	0.134* (0.0732)	0.134* (0.0731)
DITRADOPEN	-0.0614 (0.125)	-0.109 (0.131)	-0.0842 (0.125)				-0.0313 (0.0297)	-0.0508 (0.0916)	-0.0512 (0.0921)			
<b>IRATING_SP</b>	<b>0.489***</b> (0.111)			<b>0.493***</b> (0.106)			<b>-0.0163</b> (0.0550)			<b>-0.00325</b> (0.0559)		
<b>RWADIFF</b>		<b>-0.113***</b> (0.0239)			<b>-0.113***</b> (0.0242)			<b>-0.0589</b> (0.165)			<b>-0.0601</b> (0.163)	
<b>RWA_EAD1</b>			<b>0.115***</b> (0.0143)			<b>0.117***</b> (0.0153)			<b>-0.0114</b> (0.195)			<b>-0.0113</b> (0.194)
Observations	83	82	82	83	82	82	141	126	126	141	126	126
AR2	0.965	0.204	0.396	0.934	0.206	0.412	0.158	0.212	0.205	0.217	0.243	0.236
Hansen	0.276	0.221	0.315	0.424	0.332	0.406	0.579	0.470	0.512	0.638	0.625	0.660
Instr	13	13	13	13	13	13	14	14	14	14	14	14

Notes: the dependent variable for all estimations is the share of short term international bank claims from developed countries to emerging countries. Standard errors in parenthesis: \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01. . Given the strong correlation (see appendix 7) between lSP500 and IGDP\_CDC; lRATING\_SP and lGDP\_CEC, we perform a test witch confirm absence of multicollinearity (see appendix 8).

## 6. Conclusion

Considering the economic stability and the destabilizing effects of short-term bank flows, the need to analyse the term structure of external bank flows is particularly obvious to prevent the contagion crisis. Hence, given that the share of short-term debt has been attributed to lower costs of rolling over short-term debt and that regulatory restrictions impact on the costs of bank lending, we have settled in this paper a new perspective on regulatory restriction as a determinant of bank flows maturity to these countries.

The most striking result is that the empirical evidence presented in this paper shows the difference in the maturity behaviour in bank lending for both periods under Basel I and Basel II. Results confirm the effect of banking regulation criteria, by significant effect of the OECD membership for Basel I period and the risk aversion for Basel II period on the maturity of bank flows. The results also confirm the significant impact of bank financialization on banking flows to these countries.

Our results suggest that regulatory policies are not efficient in their tradeoff of short term credit flows to risky countries, which remain important. The level of short-term loans is higher for risky (speculative) countries; this is confirmed by positive and significant effect of regulatory requirements and rating on short-term loans. Therefore, we can conclude that arbitrage takes place at the risk level instead of the usual arbitrage, probably because short-term capital flows are not penalized sufficiently in regulatory requirements.

Consequently, as credit risk assessment remains unchanged under Basle III, still calculated with IRB model and does not change the opportunities for arbitrage for credit risk, it will be expected to have a positive effect on the proportion of short-term flows through the strengthening of regulatory requirements. Moreover, the integration of the liquidity ratio is likely to reduce loans maturity in order to comply with this new ratio regulation. However, these results are not a foregone conclusion because of modeling that decision-making process is a complex process. Furthermore, it would be interesting to see if the determinants of long-term capital flows are different from those in the short term. Nevertheless; the BIS data do not allow such comparison since only flows less than one year are reported.

Hence, improvements in macroeconomic stabilization policy and in institutions are required to lengthen international debt maturity and reduce the likelihood of international financial crises. For instance, the regulator could reduce elasticity regulatory requirements-maturity to penalize

short-term bank flows and promote long-term bank flows. Or else, the capping of the RWA could also reduce the sensitivity to risks and limit these effects on the bank flows maturity to risky countries.

On the other hand, emerging countries can improve their ratings to avoid the effects of regulatory requirements on the maturity of these banking flows since countries rated in investment grade are not affected by regulatory requirements and risk arbitrage. This in order to reduce the mismatch between maturities of investments that are mostly profitable in the long term and the maturity of short-term loans can be the origin of economic vulnerability.

## References

- Aiyar, S. (2011). *How did the crisis in international funding markets affect bank lending? Balance sheet evidence from the UK*. Bank of England working paper 424.
- Aiyar, S. (2012). From financial crisis to great recession: The role of globalized banks. *The American Economic Review*, 102(3), 225-230.
- Aiyar, S., Calomiris, C. W., Hooley, J., Korniyenko, Y., & Wieladek, T. (2014). The international transmission of bank capital requirements: Evidence from the UK. *Journal of Financial Economics*, 113(3), 368-382.
- Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of econometrics*, 68(1), 29-51.
- Basel Committee on Banking, Supervision. (2010). Basel III: A global regulatory framework for more resilient banks and banking systems, December.
- Basel Committee on Banking, Supervision. (2001). The Standardised Approach to Credit Risk. Consultative. Document. Supporting. Document to the New Basel Capital Accord Issued for comment, 31 May.
- Basle Committee on Banking Supervision. (1988). International convergence of capital measurement and capital standards. Basle Committee on Banking Supervision, July.
- Bremus, F., & Fratzscher, M. (2015). Drivers of structural change in cross-border banking since the global financial crisis. *Journal of International Money and Finance*, 52, 32-59.
- Bisignano, J. (2003). Qui ont été les privilégiés de Cooke? Perdants et gagnants de la réglementation des fonds propres. *Revue d'économie financière*, 77-96.
- Blank, S., & Buch, C. M. (2010). International Bank Portfolios: Short-and Long-Run Responses to Macroeconomic Conditions. *Review of International Economics*, 18(2), 289-306.
- Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics*, 87(1), 115-143.
- Broner, F. A., Lorenzoni, G., & Schmukler, S. (2004). Why do emerging markets borrow short term? *World Bank Policy Research Working Paper*, 3389.
- Bruno, V., & Shin, H. S. (2015). Cross-Border Banking and Global Liquidity. *The Review of Economic Studies*, 82(2), 535-564.
- Buch, C. M. (2003). What determines maturity? An analysis of German commercial banks' foreign assets. *Applied financial economics*, 13(5), 337-351.
- Buch, C. M., & Lusinyan, L. (2003). Determinants of short-term debt: a note. *Journal of International Financial Markets, Institutions and Money*, 13(2), 157-170.

- Cetorelli, N., & Goldberg, L. S. (2011). Global banks and international shock transmission: Evidence from the crisis. *IMF Economic Review*, 59(1), 41-76.
- Chang, R., & Velasco, A. (2000). Banks, debt maturity and financial crises. *Journal of International Economics*, 51(1), 169-194.
- Dadush, U., Dasgupta, D., & Ratha, D. (2000). The role of short-term debt in recent crises. *Finance and Development*, 37(4), 54.
- Diamond, D. W. (1991). Debt maturity structure and liquidity risk. *The Quarterly Journal of Economics*, 106(3), 709-737.
- Diamond, D. W. & Dybvig PH. (1983). Bank Runs, Deposit Insurance, and Liquidity. *Journal of Political Economy*; 91; 401-419.
- Diamond, D. W., & Rajan, R. G. (2001, June). Banks, short-term debt and financial crises: theory, policy implications and applications. In *Carnegie-Rochester Conference Series on Public Policy* (Vol. 54, No. 1, pp. 37-71). North-Holland.
- Diamond, D. W., & Rajan, R. G. (2009). The Credit Crisis: Conjectures about Causes and Remedies. *The American Economic Review*, 99(2), 606-610.
- Ekici, O., & Nemlioglu, K. (2017). Emerging economies' short-term private external debt as evidence of economic crisis. *Journal of Policy Modeling*, 39(2), 232-246.
- Figuet, J. M., & Lahet, D. (2007). Basel II and Its Implications for Foreign Banks Financing Emerging Countries. *Revue d'économie du développement*, 15(5), 47-67.
- Figuet, J. M., Humblot, T., & Lahet, D. (2015). Cross-border banking claims on emerging countries : The Basel III Banking Reforms in a push and pull framework. *Journal of International Financial Markets, Institutions and Money*, 34, 294-310.
- Forbes, K. J., & Warnock, F. E. (2012). Capital flow waves: Surges, stops, flight, and retrenchment. *Journal of International Economics*, 88(2), 235-251.
- Framework, A. N. C. A. (1999). New Capital Adequacy. Consultative paper issued by the Basel Committee on Banking Supervision. *Basel, June*.
- Ghosh, A. R., Qureshi, M. S., Kim, J. I., & Zalduendo, J. (2014). Surges. *Journal of International Economics*, 92(2), 266-285.
- Ghosh, S., Sugawara, N., & Zalduendo, J. (2011). Bank Flows and Basel III—Determinants and Regional Differences in Emerging Markets. *World Bank-Economic Premise*, (56), 1-6.
- Gobat, J., Yanase, M., & Maloney, J. F. (2014). The Net Stable Funding Ratio: Impact and Issues for Consideration.
- Hellou, S., & Boutillier, M. (2017). *The impact of regulatory requirements on the banking flows to emerging countries* (No. 2017-9). University of Paris West-Nanterre la Défense, EconomiX.

- Hamilton, D., T., & Cantor R., (2006). *Measuring Corporate Default Rates*. Moody's Special Comment. Moody's Investors Services: Global Credit Research, November.
- Hoggarth, G., Hooley, J., & Korniyenko, Y. (2013). Which way do foreign branches sway? Evidence from the recent UK domestic credit cycle.
- Jeanneau, S., & Micu, M. (2002). *Determinants of international bank lending to emerging market countries* (No. 112). Bank for International Settlements.
- Kohn, D. L. (2008). *Global economic integration and decoupling: a speech at the International Research Forum on Monetary Policy, Frankfurt, Germany, June 26, 2008* (No. 416).
- Miller, V. (1997). Political instability and debt maturity. *Economic Inquiry*, 35(1), 12.
- Mileva, E. (2007). Using Arellano-Bond dynamic panel GMM estimators in Stata. *Economics Department, Fordham University*, 1-10.
- Montiel, P., & Reinhart, C. M. (1999). Do capital controls and macroeconomic policies influence the volume and composition of capital flows? Evidence from the 1990s. *Journal of international money and finance*, 18(4), 619-635.
- Mulder, M. C. B., & Monfort, B. (2000). *Using Credit Ratings for Capital Requirements on Lending to Emerging Market Economies: Possible Impact of a New Basel Accord* (No. 0-69). International Monetary Fund.
- Noss, J., & Toffano, P. (2014). *Estimating the impact of changes in bank capital requirements during a credit boom* (No. 494). Bank of England Working Paper.
- Papke, L. E., & Wooldridge, J. M. (2008). Panel data methods for fractional response variables with an application to test pass rates. *Journal of Econometrics*, 145(1), 121-133.
- Papke, L. E., & Wooldridge, J. M. (1996). Econometric methods for fractional response variables with an application to 401 (k) plan participation rates. *Journal of Applied Econometrics*, 11(6), 619-632.
- Park, H., Ruiz, C., & Tressel, T. (2015). Determinants of Long-Term versus Short-Term Bank Credit in EU Countries. Policy Research Working Paper.7436.
- Petroulas, P. (2007). *Short-Term Capital Flows and Growth in Developed and Emerging Markets* (No. 60). Bank of Greece.
- Ratings, Fitch. (2014). *Fitch ratings global corporate finance 2013 transition and default study*. Credit Market Research—Fitch Ratings, March, 17.
- Ratings MOODY'S (2014). *Annual default study: Corporate default and recovery rates, 1920-2013*. Special Comment. New York: Moody's Investors Services, 1-62. February, 28.
- Ratings Services Standard & Poor's (2014). *2013 Annual Global Corporate Default Study And Rating Transitions*. Standard and Poor's, March, 19.
- Rodrik, D., & Velasco, A. (1999). Short-Term Capital Flows. *NBER Working Paper Series*, 7364.

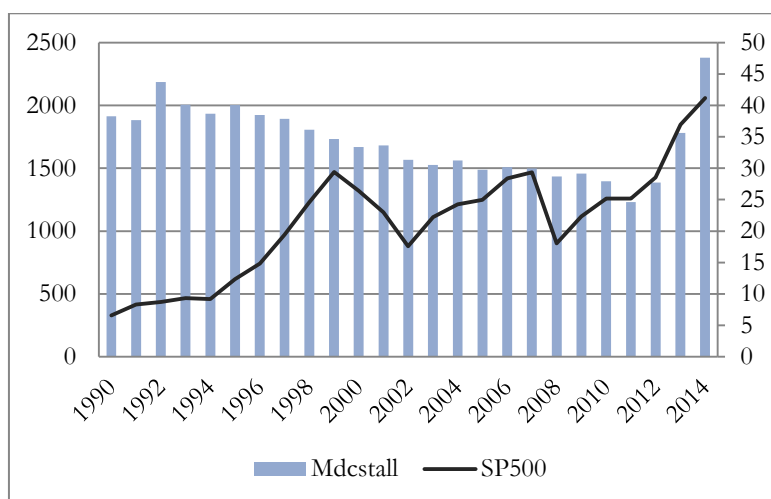


- Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *Stata Journal*, 9(1), 86-136.
- Stein, J. L. (1965). International short-term capital movements. *The American Economic Review*, 55(1/2), 40-66.
- Tasić, N., & Valev, N. (2010). The provision of long-term financing in the transition economies. *Journal of Comparative Economics*, 38(2), 160-172.
- Taylor, M. P., & Sarno, L. (1997). Capital flows to developing countries: long-and short-term determinants. *The World Bank Economic Review*, 11(3), 451-470.
- Valev, N. T. (2006). Institutional uncertainty and the maturity of international loans. *Journal of international money and finance*, 25(5), 780-794.
- Valev, N. T. (2007). Uncertainty and international debt maturity. *Journal of International Financial Markets, Institutions and Money*, 17(4), 372-386.
- Valev, N. T., & Tasić, N. (2008). The maturity structure of bank credit: Determinants and effects on economic growth.
- World Bank. (2015). Global Financial Development Report 2015/2016: Long-Term Finance. Washington, DC: World Bank. doi:10.1596/978-1-4648-0472-4. License: Creative Commons Attribution CC BY 3.0 IGO.

### Appendix 1: Data definition and sources

Variable	Definition	Construction	Source
Dependent variable	Short-term claims (maturity Up to and including 1 year) as a share of total claims.	Share of short-term claims of total claims hold by reporting banks on all sectors of emerging country (i) at time (t) in the end of period.	Bank for international settlements, consolidate statistics.
IGDP_CDC	Average of developed countries GDP per capita	Log of average of developed countries GDP per capita, current price	International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates.
IGDP_CEC	GDP per capita for emerging countries	Log of emerging countries GDP per capita, current price	International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates.
Financial Development	Money and quasi money (M2) as % of GDP	Money and quasi money (M2) as a percentage of GDP	International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates.
Share of Loans to Banks	Share of loans to banks of total claims hold by reporting banks on all sectors of emerging country	Share of loans to banks of total claims hold by reporting banks on all sectors of emerging country (i) at time (t) in the end of period.	Bank for international settlements, consolidate statistics.
DIFF_IR	The differential of real interest rates between emerging countries and the United States. It reflects the competitiveness in terms of profitability	The difference between the real interest rate of an emerging country i and the real rate of interest of the United States of closure	World Bank, World development indicators
DITRADOPEN	Degree of trade openness measured as the sum of imports and exports of goods and services as a percentage of GDP	Log-difference of sum of imports and exports of goods and services as a percentage of GDP	World Bank national accounts data, and OECD National Accounts data files.
IRATING_SP	Ratings of emerging countries by Standard and Poor's	Log S&P rating of emerging i associated with a numerical code from AAA = 1 'to' SD = 26 '	Standard and poor's
ISP500	Standard and poor's 500	Log S&P500 closing price in Dollars	Standard and poor's
RWADIFF	Difference of risk weights assets for short term and long term	Difference of risk weights assets for short term (1year) and long term (5 years)	Author's calculation

## Appendix 2: Share of short-term international claims and SP500 index\*



Source: BIS, Consolidated statistics, 2015, own calculation

\* Notes: Mdcstall: mean of share of short-term international claims and share of loans to banks to emerging countries in our sample from developed countries. SP500 represent Standard and Poor's index

## Appendix 3: List of country sample

Developed countries (12)		Emerging countries (37)			
		Latin America	Europe	Africa	Asia
Austria	Japan	Argentina	Bulgaria	Egypt	China
Belgium	Spain	Brazil	Croatia	Morocco	Hong Kong
Canada	Sweden	Chile	Czech republic	South Africa	Kazakhstan
Finland	Switzerland	Colombia	Estonia	Tunisia	Thailand
France	United Kingdom	Costa Rica	Hungary		India
Italy	United states	Mexico	Latvia		Malaysia
		Peru	Lithuania		Russia
		Uruguay	Poland		Singapore
		Venezuela	Romania		Philippines
			Slovakia		Indonesia
			Slovenia		Turkey
			Ukraine		Vietnam

## Appendix 4: List of emerging countries OECD by membership date

Country	OECD membership date
Chile	2010
Czech republic	1995
Estonia	2010
Hungary	1996
Mexico	1994
Poland	1996
Slovak Republic	2000
Slovenia	2010
Turkey	1961

### Appendix 5: Summary descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
DCSTALL	883	.3406366	.1957064	.0010612	.9539385
IGDP_CDC	925	10.36452	.3001874	9.966727	10.79252
IGDP_CEC	889	8.318351	1.063156	4.585293	10.93822
Financial Development	837	.616471	.459137	.0857049	3.62041
IShare_Loans-Bank	892	-1.413961	.6456644	-4.424522	-.0441498
DITRADOPEN	856	.0140772	.1005345	-.7942595	.8432035
IRATING_SP	752	2.172214	.5453672	0	3.258096
DIFF_IRA	732	.0295112	.1354502	-.9526106	.9082268
ISP500	925	6.80176	.5020967	5.799759	7.522054
OCDEDUM	925	.1448649	.3521549	0	1
RWADIFF	715	1.311049	.2695137	.0679431	1.692123
RWA	715	.5503855	.4435771	.0611927	2.606226

### Appendix 6: Codes associated with S&P ratings

Category	Rating S&P (long-term )	code associated
Investment Grade	AAA	1
	AA+	2
	AA	3
	AA-	4
	A+	5
	A	6
	A-	7
	BBB+	8
	BBB	9
	BBB-	10
Speculative Grade	BB+	11
	BB	12
	BB-	13
	B+	14
	B	15
	B-	16
	CCC+	17
	CCC	18
	CCC-	19
	CC+	20
	CC	21
	CC-	22
	C+	23
	C	24
	C-	25
	D	26
SD	26	

## Appendix 7: Pearson correlation matrix

### 1990-2006

	DCSTALL	IGDP_CEC	IGDP_CDC	Financial Development	lShare_loan~k	DITRADOPEN	DIFF_IRA	ISP500	IRATING_SP	OCDEDUM	RWADIFF	RWA_EAD1
DCSTALL	1.0000											
IGDP_CEC	-0.0451	1,0000										
IGDP_CDC	-0.1593*	0.2880*	1,0000									
Financial Development	0.4242*	0,2722*	0,1225*	1,0000								
lShare_loan~k	0,2599*	0,1121*	-0,1251*	0,2049*	1,0000							
DITRADOPEN	0.0424	0,0905	0,1372*	0,2066*	0,0466	1,0000						
DIFF_IRA	0.0216	0,0444	-0,0203	-0,0639	-0,0614	-0,0797	1,0000					
ISP500	-0,1692*	0,2326*	0,6270*	0,1076*	-0,1596*	0,0582	0,0383	1,0000				
IRATING_SP	-0.3154*	-0,5836*	-0,0516	-0,4980*	-0,4715*	-0,1624*	0,1364*	0,0757	1,0000			
OCDEDUM	-0.0807	0,2560*	0,1244*	-0,1212*	-0,0356	0,0700	-0,0585	0,1645*	-0,0033	1,0000		
RWADIFF	0.0020	-0,2998*	-0,0331	-0,4062*	-0,1761*	-0,1312*	0,2090*	-0,0251	0,6033*	-0,0711	1,0000	
RWA_EAD1	0.0906	-0,3537*	-0.0888	-0,3818*	-0,3905*	-0,0948	0,1141	0,0859	0,8285*	-0,0749	0,1881*	1,0000

Note: significant at \* p < 0.01

### 2007-2014

	DCSTALL	IGDP_CEC	IGDP_CDC	Financial Development	lShare_loan~k	DITRADOPEN	DIFF_IRA	ISP500	IRATING_SP	OCDEDUM	RWADIFF	RWA_EAD1
DCSTALL	1.0000											
IGDP_CEC	-0.1446	1,0000										
IGDP_CDC	0.0500	0.0886	1,0000									
Financial Development	0.3933*	0,1928*	0,0067	1,0000								
lShare_loan~k	0,3808*	-0,1797*	0,0052	0,3929*	1,0000							
DITRADOPEN	-0.1447	0,0340	0,3143*	0,0348	-0,0921	1,0000						
DIFF_IRA	0.0136	0,0284	-0,0344	-0,0360	-0,0800	-0,0233	1,0000					
ISP500	0,2383*	0,0746	0.4185*	0,0179	0,0248	0,2539*	0,1772*	1,0000				
IRATING_SP	-0.2289*	-0,6025*	-0,0180	-0,6876*	-0,2071*	-0,0005	0,0111	-0,0121	1,0000			
OCDEDUM	-0.1717*	0,3511*	0,0318	-0,1646*	-0,2151*	0,1394	-0,0475	0,0233	-0,1489	1,0000		
RWADIFF	-0.0055	-0,3962*	0,0044	-0,2751*	0,0287	-0,0290	0,0887	-0,0940	0,6090*	-0,2726*	1,0000	
RWA_EAD1	0.0974	-0,2945*	0.0074	-0,2923*	-0,0011	-0,0560	-0,1821*	0,0090	0,7625*	-0,2732*	0,1415	1,0000

Note: significant at \* p < 0.01

## Appendix 8: Collinearity diagnostics 1990-2014

	1990-2006				2007-2014			
	VIF	SQRT VIF	Tolerance	R-Squared	VIF	SQRT VIF	Tolerance	R-Squared
DCSTALL	1.75	1.32	0.5699	0.4301	1.77	1.33	0.5636	0.4364
IGDP_CDC	1.36	1.17	0.7330	0.2670	1.34	1.16	0.7439	0.2561
IGDP_CEC	1.68	1.30	0.5958	0.4042	1.94	1.39	0.5152	0.4848
Financial Development	2.89	1.70	0.3455	0.6545	2.15	1.47	0.4655	0.5345
IShare_Loans_Bank	1.34	1.16	0.7451	0.2549	1.53	1.24	0.6556	0.3444
DI'TRADOPEN	1.14	1.07	0.8765	0.1235	1.27	1.13	0.7867	0.2133
DIFF_IRA	1.15	1.07	0.8724	0.1276	1.08	1.04	0.9284	0.0716
ISP500	1.42	1.19	0.7019	0.2981	1.48	1.22	0.6774	0.3226
IRATING_SP	3.41	1.85	0.2933	0.7067	2.98	1.73	0.3354	0.6646
OCDEDUM	1.39	1.18	0.7205	0.2795	1.57	1.25	0.6363	0.3637
RWADIFF	1.51	1.23	0.6643	0.3357	1.59	1.26	0.6304	0.3696
Mean VIF	1.73				1.70			

## Appendix 9: Comparison of short and long-term regulatory requirements under the IRB approach Rating.

### Appendix 9.1: Rating Fitch

RATING	PD_1Y	PD_5Y	100\$ for 1y	100\$*5 for 1y *5	500\$ for 5y	Diff-K
AAA	0	0				
AA+	0	0				
AA	0	0,46			42.4946	42,4946
AA-	0,06	0,07	1.14323	5.71615	17.80365	12,0875
A+	0	0,4			40.22495	40,22495
A	0,06	0,94	1.14323	5.71615	54.1608	48,44465
A-	0,17	0,74	2.39644	11.9822	50.31445	38,33225
BBB+	0,13	1,16	1.9958	9.979	57.4134	47,4344
BBB	0,09	2,58	1.53889	7.69445	68.68155	60,9871
BBB-	0,39	3,6	4.03357	20.16785	73.70275	53,5349
BB+	0,92	7,13	6.27791	31.38955	88.65405	57,2645
BB	0,79	7,69	5.85221	29.26105	90.7866	61,52555
BB-	1,59	6,01	7.84376	39.2188	84.16309	44,94429
B+	1,01	9,04	6.54187	32.70935	95.57405	62,8647
B	2,28	14,24	8.90336	44.5168	109.2178	64,701
B-	2,63	9,19	9.34182	46.7091	96.0737	49,3646
CCC to C	23,51	39,58	20.48521	102.4261	114.5431	12,117

Source: author's calculation using default probability associate to Fitch rating (Fitch).  
Notes: PD-1Y, PD\_5Y refers respectively to the default probabilities on one and five year associated with sovereign ratings of Fitch

## Appendix 9.2: Rating MOODY'S

RATING	PD_1Y	PD_5Y	100\$ for 1y	100\$*5 for 1y *5	500\$ for 5y	Diff-K
Aaa	0	0,085			19.64635	
Aa1	0	0,161			26.89855	
Aa2	0	0,496			43.73	
Aa3	0,051	0,545	1.01211	5.06055	45.2817	-40,22115
A1	0,081	1,16	1.42592	7.1296	57.4134	50,2838
A2	0,068	0,991	1.25442	6.2721	54.991	48,7189
A3	0,06	1,174	1.14323	5.71615	57.59455	51,8784
Baa1	0,156	1,332	2.26155	11.30775	59.4709	48,16315
Baa2	0,169	1,843	2.38698	11.9349	64.06295	52,12805
Baa3	0,257	2,762	3.13517	15.67585	69.64715	53,9713
Ba1	0,674	7,352	5.41776	27.0888	89.50915	62,42035
Ba2	0,754	7,287	5.7235	28.6175	89.26005	60,64255
Ba3	1,733	16,037	8.093579	40.4679	112.3787	71,9108
B1	2,321	18,984	8.95722	44.7861	116.2066	71,4205
B2	3,544	23,663	10.33735	51.68675	119.5234	67,83665
B3	5,979	30,954	12.58792	62.9396	119.7449	56,8053
Caa1	7,531	39,856	13.86038	69.3019	114.3001	44,9982
Caa2	17,495	50,954	19.12987	95.64935	101.4428	5,79345
Caa3	29,109	66,052	20.96673	104.8336	76.4869	-28,3467
Ca-C	42,703	76,339	20.03282	100.1641	55.86955	-44,29455

Source: author's calculation using default probability associate to MOODY'S rating (MOODY'S).  
Notes: PD-1Y, PD\_5Y refers respectively to the default probabilities on one and five year associated with sovereign ratings of MOODY'S.

## Appendix 10: Robustness tests

### Appendix 10.1: Robustness tests of the first estimation with Log Odds-ratio (GMM difference)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ORdcstall	ORdcstall	ORdcstall	ORdcstall	ORdcstall	ORdcstall	ORdcstall	ORdcstall
	<i>1990-2006</i>				<i>2007-2014</i>			
Lagged.ORdcstall	0.00311 (0.0538)	0.00106 (0.0670)	-0.0492 (0.0556)	-0.0187 (0.0561)	-0.326* (0.173)	-0.354** (0.112)	-0.254 (0.185)	-0.301** (0.121)
IGDP_CEC	-0.0319 (0.162)	-0.150 (0.172)	0.407 (0.357)	0.190 (0.279)	0.469 (0.381)	0.253 (0.359)	0.502 (0.354)	0.163 (0.351)
IGDP_CDC	-0.528 (0.394)	-0.682* (0.380)	-1.819 (1.195)	-1.734 (1.209)	-2.921*** (0.974)	-2.191** (0.983)	-2.144** (1.037)	-1.290 (1.473)
IShare_Loans_Bank	0.157 (0.153)	0.185 (0.134)	-0.00403 (0.143)	-0.000339 (0.141)	-0.347* (0.177)	-0.318** (0.146)	-0.334 (0.200)	-0.228 (0.154)
Financial Development	-1.620*** (0.532)	-1.671*** (0.437)	-2.476 (1.478)	-2.037 (1.577)	2.832 (3.360)	-0.492 (1.974)	1.835 (2.755)	0.822 (2.299)
DITRADOPEN	0.0502 (0.304)	0.105 (0.355)	0.477 (0.301)		-0.0580 (0.497)		0.401 (0.592)	
ISP500	0.360** (0.168)	0.154 (0.109)	-0.0953 (0.220)	-0.0489 (0.183)	1.178*** (0.242)	0.978*** (0.282)	0.884*** (0.283)	0.959*** (0.279)
DIFF_IRA		0.223 (0.284)	0.413 (0.305)	0.281 (0.328)		1.572 (1.120)	0.626 (1.116)	1.061 (1.217)
<b>OCDEDUM</b>		<b>1.210*</b> (0.606)		<b>1.152**</b> (0.474)		<b>4.917</b> (3.484)		<b>4.777</b> (3.516)
<b>IRATING_SP</b>			<b>0.200</b> (0.259)	<b>0.160</b> (0.252)			<b>1.216***</b> (0.440)	<b>1.057**</b> (0.456)
IVIX				-0.167 (0.179)				-0.119 (0.175)
Observations	456	402	352	352	264	224	224	224
AR2	0.239	0.120	0.782	0.225	0.130	0.171	0.303	0.484
Hansen	0.396	0.771	0.600	0.361	0.213	0.633	0.371	0.644
Instr	34	36	34	36	28	29	30	32

Notes: the dependent variable for all estimations is log Odds ratio of the share of short term international bank claims from developed countries to emerging countries. Standard errors in parenthesis: \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01



## Appendix 10.2: Robustness tests of the second estimation with Log Odds-ratio (GMM-difference)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ORdcstall	ORdcstall	ORdcstall	ORdcstall	ORdcstall	ORdcstall	ORdcstall	ORdcstall
	<i>Diff RWA</i>				<i>RWA</i>			
Lagged.ORdcstall	-0.326*	-0.354***	-0.284	-0.331**	-0.326*	-0.354***	-0.262	-0.314**
	(0.173)	(0.112)	(0.192)	(0.147)	(0.173)	(0.112)	(0.192)	(0.148)
IGDP_CEC	0.469	0.253	0.321	0.0887	0.469	0.253	0.355	0.129
	(0.381)	(0.359)	(0.527)	(0.474)	(0.381)	(0.359)	(0.536)	(0.493)
IDGP_CDC	-2.921***	-2.191**	-2.012	-2.060	-2.921***	-2.191**	-1.999	-2.224
	(0.974)	(0.983)	(1.563)	(1.738)	(0.974)	(0.983)	(1.549)	(1.774)
IShare_Loans_Bank	-0.347*	-0.318**	-0.515*	-0.356*	-0.347*	-0.318**	-0.460*	-0.306
	(0.177)	(0.146)	(0.252)	(0.181)	(0.177)	(0.146)	(0.260)	(0.182)
Financial Development	2.832	-0.492	5.463	4.692	2.832	-0.492	6.001	5.305
	(3.360)	(1.974)	(3.574)	(3.296)	(3.360)	(1.974)	(3.591)	(3.268)
DITRADOPEN	-0.0580		0.868		-0.0580		0.898	
	(0.497)		(1.335)		(0.497)		(1.339)	
ISP500	1.178***	0.978***	0.724**	0.812***	1.178***	0.978***	0.643*	0.740**
	(0.242)	(0.282)	(0.353)	(0.288)	(0.242)	(0.282)	(0.348)	(0.280)
DIFF_IRA		1.572	-0.580	-0.443		1.572	-1.021	-0.888
		(1.120)	(1.392)	(1.449)		(1.120)	(1.296)	(1.382)
OCDEDUM		4.917		4.627		4.917		4.603
		(3.484)		(3.327)		(3.484)		(3.344)
<b>RWADIFF</b>			<b>-0.456***</b>	<b>-0.426***</b>				
			(0.156)	(0.134)				
IVIX				0.0494				0.0801
				(0.193)				(0.205)
<b>RWA_EAD1</b>						<b>0.725***</b>	<b>0.660***</b>	
						(0.139)	(0.123)	
Observations	264	224	208	208	264	224	208	208
AR2	0.130	0.171	0.344	0.425	0.130	0.171	0.604	0.657
Hansen	0.213	0.633	0.407	0.554	0.213	0.633	0.430	0.518
Instr	28	29	30	32	28	29	30	32

Notes: the dependent variable for all estimations is the log Odds-ratio of share of short term international bank claims from developed countries to emerging countries. Standard errors in parenthesis: \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01

### Appendix 10.3: Robustness tests of the third estimation with Log Odds-ratio (GMM difference)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	ORdcstall	ORdcstall	ORdcstall	ORdcstall	ORdcstall	ORdcstall	ORdcstall	ORdcstall	ORdcstall	ORdcstall	ORdcstall	ORdcstall
	<i>Speculative Grade Countries</i>						<i>Investment Grade Countries</i>					
Lagged.ORdcstall	-0.597*** (0.104)	-0.617*** (0.123)	-0.612*** (0.113)	-0.598*** (0.101)	-0.619*** (0.120)	-0.614*** (0.110)	0.508 (0.467)	0.403 (0.351)	0.447 (0.377)	0.497 (0.470)	0.485 (0.471)	0.529 (0.497)
IGDP_CEC	0.117 (0.466)	0.137 (0.484)	0.172 (0.464)	0.140 (0.464)	0.164 (0.482)	0.196 (0.463)	-0.707 (1.528)	0.0406 (0.808)	0.0577 (0.853)	-0.401 (0.909)	-0.00904 (0.818)	0.00939 (0.863)
IGDP_CDC	-1.948 (1.608)	-1.955 (1.809)	-2.052 (1.756)	-1.997 (1.574)	-2.017 (1.766)	-2.106 (1.714)	-1.598 (3.225)	-3.407* (1.917)	-3.278 (2.006)	-2.333 (1.927)	-3.493* (1.858)	-3.370* (1.949)
Financial Development	1.551** (0.683)	1.087 (0.636)	1.249* (0.628)	1.512** (0.696)	1.031 (0.665)	1.201* (0.638)	11.84 (15.66)	5.572 (9.408)	6.404 (10.28)	6.845 (7.666)	5.290 (9.197)	6.163 (10.11)
DIFF_IRA	-0.879 (0.968)	-0.713 (1.086)	-1.072 (0.937)	-0.764 (0.857)	-0.553 (0.997)	-0.939 (0.851)	-4.347 (8.665)	-0.276 (4.522)	-0.789 (4.967)	-1.175 (3.704)	-0.162 (4.429)	-0.697 (4.888)
IShare_Loans_Bank	-0.128 (0.206)	-0.231 (0.180)	-0.211 (0.188)	-0.132 (0.215)	-0.237 (0.189)	-0.216 (0.197)	-0.867 (0.577)	-0.885** (0.407)	-0.795* (0.408)	-0.833* (0.469)	-0.888* (0.431)	-0.799* (0.423)
ISP500	0.693* (0.327)	0.909** (0.421)	0.811* (0.403)	0.648* (0.353)	0.854* (0.455)	0.762 (0.440)	0.651* (0.373)	0.744* (0.410)	0.725* (0.417)	0.920** (0.378)	0.949** (0.382)	0.928** (0.383)
DITRADOPE	-0.415 (0.688)	-0.549 (0.756)	-0.475 (0.691)				0.986 (1.360)	1.108 (1.343)	1.088 (1.329)			
<b>IRATING_SP</b>	<b>2.530***</b> (0.750)			<b>2.563***</b> (0.717)			<b>0.976</b> (1.816)			<b>0.258</b> (0.796)		
<b>RWADIFF</b>		<b>-0.606***</b> (0.119)			<b>-0.611***</b> (0.122)			<b>-0.497</b> (1.972)			<b>-0.445</b> (1.925)	
<b>RWA_EAD1</b>			<b>0.676***</b> (0.0976)			<b>0.682***</b> (0.0999)			<b>0.916</b> (2.663)			<b>0.985</b> (2.635)
Observations	83	82	82	83	82	82	141	126	126	141	126	126
AR2	0.329	0.101	0.175	0.335	0.0937	0.167	0.391	0.198	0.261	0.200	0.150	0.164
Hansen	0.353	0.202	0.318	0.436	0.248	0.235	0.808	0.400	0.502	0.558	0.403	0.502
Instr	17	17	17	17	17	17	14	14	14	14	14	14

Notes: the dependent variable for all estimations is log Odds-ratio of share of short term international bank claims from developed countries to emerging countries. Standard errors in parenthesis: \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01

## Appendix 11: Average cumulative default rates by rating

### Appendix 11. 1. S&P Global corporate average cumulative default rates: 1981-2013

Rating \ T-Year	1	2	3	4	5	10
AAA	0.00	0.03	0.13	0.24	0.35	0.74
AA+	0.00	0.06	0.06	0.11	0.17	0.50
AA	0.02	0.03	0.09	0.23	0.38	0.99
AA-	0.03	0.10	0.20	0.29	0.39	0.79
A+	0.06	0.11	0.24	0.40	0.53	1.29
A	0.07	0.17	0.27	0.42	0.57	1.69
A-	0.08	0.20	0.34	0.48	0.69	1.74
BBB+	0.14	0.38	0.66	0.95	1.27	2.73
BBB	0.20	0.51	0.80	1.24	1.69	3.91
BBB-	0.32	0.97	1.73	2.63	3.51	6.84
BB+	0.43	1.25	2.35	3.47	4.56	9.05
BB	0.68	2.08	4.07	5.92	7.66	13.39
BB-	1.13	3.47	5.91	8.26	10.33	18.33
B+	2.31	6.26	10.15	13.52	16.05	24.25
B	4.73	10.55	15.19	18.51	21.02	27.67
B-	7.92	15.37	20.55	24.12	26.93	32.94
CCC/C	26.87	36.05	41.23	44.27	46.75	51.35

Source: Ratings S&P, March 19, 2014

### Appendix 11. 2. Fitch global corporate finance average cumulative default rates: 1990-2013

Rating \ T-Year	1	2	3	4	5	10
AAA	0.00	0.00	0.00	0.00	0.00	0.00
AA+	0.00	0.00	0.00	0.00	0.00	0.00
AA	0.00	0.00	0.11	0.28	0.46	0.36
AA-	0.06	0.06	0.06	0.07	0.07	0.21
A+	0.00	0.10	0.20	0.27	0.40	0.89
A	0.06	0.25	0.45	0.69	0.94	2.05
A-	0.17	0.31	0.46	0.57	0.74	2.53
BBB+	0.13	0.28	0.51	0.82	1.16	2.39
BBB	0.09	0.64	1.29	1.97	2.58	4.79
BBB-	0.39	1.14	1.89	2.66	3.60	7.54
BB+	0.92	2.62	4.17	5.71	7.13	10.15
BB	0.79	2.84	4.55	6.36	7.69	13.78
BB-	1.59	2.60	4.08	5.08	6.01	9.19
B+	1.01	3.65	6.08	7.83	9.04	10.12
B	2.28	5.11	8.20	11.52	14.24	13.97
B-	2.63	4.92	6.16	7.42	9.19	10.19
CCC to C	23.51	31.48	34.96	37.01	39.58	39.54

Source: Rating Fitch, march 17, 2014

### Appendix 11. 3. Moody's average cumulative issuer-weighted global default rates: 1983-2013

Rating \ T- Year	1	2	3	4	5	10
Aaa	0.000	0.016	0.016	0.048	0.085	0.183
Aa1	0.000	0.000	0.000	0.087	0.161	0.249
Aa2	0.000	0.017	0.152	0.329	0.496	1.298
Aa3	0.051	0.148	0.222	0.353	0.545	1.075
A1	0.081	0.252	0.548	0.851	1.160	2.330
A2	0.068	0.212	0.433	0.691	0.991	3.421
A3	0.060	0.219	0.533	0.819	1.174	3.272
Baa1	0.156	0.426	0.704	0.995	1.332	2.661
Baa2	0.169	0.488	0.860	1.382	1.843	4.501
Baa3	0.257	0.764	1.374	1.985	2.762	6.871
Ba1	0.674	2.012	3.704	5.575	7.352	13.873
Ba2	0.754	2.113	3.796	5.634	7.287	14.010
Ba3	1.733	4.967	8.819	12.835	16.037	29.486
B1	2.321	6.467	10.929	14.911	18.984	36.847
B2	3.544	8.926	14.356	19.354	23.663	39.957
B3	5.979	12.993	19.981	25.820	30.954	46.837
Caa1	7.531	17.062	25.665	33.032	39.856	59.525
Caa2	17.495	29.376	38.591	45.673	50.954	70.274
Caa3	29.109	44.784	53.546	59.992	66.052	82.616
Ca-C	42.703	54.997	64.204	70.828	76.339	85.163

Source: Ratings Moody's, February 28, 2014

Notes: The  $T$ -horizon *cumulative default rate* is defined as the probability of default from the time of cohort formation up to and including time horizon  $T$ . (Hamilton and Cantor , 2006, p5)