The impact of regulatory requirements on the international banking flows to emerging countries: lessons for Covid 19 crisis.

Abstract:

The strengthening of regulatory requirements, along with evolution in banking regulations, can have a negative impact on the external bank financing of emerging countries heavily dependent on this type of financing. Indeed, several studies have aroused fears about the potential effects of significant regulatory adjustments on bank lending to emerging markets. This paper presents a trial to estimate the sensitivity of the banking flows to increased regulatory requirements in order to learn lessons for Covid 19 crisis. We adopt a macroeconomic approach based on the determinants of cross-border banking claims flows from banks located in 19 developed countries to 37 emerging countries. The results of the GMM estimation confirm the negative impact of regulatory requirements on the banking flows to emerging countries, the significant impact of business openness and the negative effect of bank financialization on banking flows to these countries. The results also show that countries rated as speculative grade are influenced by the regulatory requirements, unlike countries rated in investment grade category.

Keywords: banking flows, emerging countries, pull and push factors, regulatory requirements

1. Introduction

In the context of the global economy characterized by the financial globalization and according to economic theory, the great international mobility of capital flows favors the growth of emerging economies by extending the financial resources beyond national savings. Nevertheless, the procyclicality of these flows represents damaging effects through contagion causing by financial crises that have hit emerging countries in recent years as subprime crisis and Covid 19 shock.

Therefore, given the importance of capital flows in the financing of emerging countries and the increasing regulatory requirements, several studies have aroused fears about the potential effects of significant regulatory adjustments on international bank lending to emerging markets as well as the effectiveness of this regulatory strengthening. After the 2007 crisis, in a situation comparable to the current shock with the Covid 19 pandemic, these capital requirements led to a credit crunch in developed countries with risk overestimation and increased regulation of banking activities on the financial market. This can compromise the macroeconomic stability of these countries through the transmission or the amplification of this shock due to the sudden drying up of bank flows from these countries to emerging countries. In this context, it is well documented that liquidity shocks to banking systems in advanced countries caused a contraction in lending to emerging markets (Aiyar, 2011 and 2012; Cetorelli and Goldberg, 2011). This contraction in lending to emerging markets can be due to risk aversion after crisis as subprime crisis and Covid 19 (Nickol et Stoppok, 2020). However, IIF (*Institute of International Finance*) research notes (2013) confirm that flows declined slightly in 2012, despite a boost from lower risk aversion in 2012.

In this context, Bremus and Fratzscher (2015) show that changes in regulatory policy are important drivers of structural change in cross-border banking and hence of international banking sector integration after the 2007 crisis. So, the regulatory arbitrage opportunities can be the origin of the change in the structure of banking flows to emerging countries. This structure has been greatly influenced by evolutions in prudential regulation. Basel I was characterized by simple categorization based on OECD membership countries that gave a wide margin of arbitration. Banks could hold risky assets without regulatory coverage such as public sector of OECD emerging countries and low regulatory coverage to favor short-term bank flows to non-OECD emerging countries (for example Mexico). These arbitrages have fueled massive banking flows to emerging countries before the 1997 crisis (Bisignano, 2003).

Prudential regulatory reforms, proposed by Basel II, focused on improving risk management and market efficiency in terms of funding resources with risk-based regulation. However, after publishing the first proposal of Basel II in 1999, the Basel Committee received several concerns about its negative effects on lending to risky entities in lower rating category as Small and Medium Enterprises and emerging countries. The last financial shock has highlighted the weaknesses of this legislation. Therefore, the Basel Committee has proposed a new regulatory framework, Basel III, to strengthen the solvency and liquidity of banks in case of shocks (Basel Committee on Banking Supervision, 2010). Due to capital requirements even higher under Basel III, banking flows might know a tightening due to increased costs and limited risk-taking. The current shock of Covid 19 pandemic represents a biggest test of the effectiveness of this new regulation.

Consequently, as financing conditions become increasingly restricted with new regulatory reforms, these countries, in need of financing, offset the decline of banking flows in financial markets, which remain volatile and depend on market cycles. Indeed, the tightening of bank financing is part of the current debate around the change in the external financing structure of emerging countries, with the increase of financing in the bonds market to the detriment of bank financing. On the other hand, access to this type of financing requires a fairly developed market, which is not the case for all emerging countries. In this context, this paper attempts to provide some answers to the question of the new prudential regulations effects on the banking flows to emerging countries in order to learn lessons for the current Covid crisis. We use a macroeconomic approach in order to test the regulatory requirements as a determinant of banking flows to emerging countries under the push and pull factors.

In the best of our knowledge, no paper discusses this question in such way. Firstly, we integrate variables reflecting regulation criteria to consider the effect of the regulation through the effect of these criteria. Secondly, based to Weder and Wedow (2002) paper who attempted to evaluate *ex-ante* the impact of Basel II requirements over the period 1993-2001, we evaluate *ex-post* the capital requirements changes based to IRB approach (Internal Ratings Based) over the period 1990-2014. This method permits the association of risk with regulatory requirements. So, this allows for a detailed analysis of sensitivity to regulatory requirements based on the level of risk, contrary to Figuet *and al.* (2015) studies' which show the effect of different components of Basel III on the level of banking flows to emerging countries. But they separate the level of risk from regulatory requirements. To conduct our empirical assessment, we use cross border data of international banking claims from 19 developed countries to 37 emerging countries, provided by

the Bank for International Settlements, and ratings to estimate risk, provided by Standard & Poor's, used in the evaluation of regulatory requirements.

Comparing the results of the two estimates with GMM for both periods 1990-2006 and 2007-2014 confirms the significant effect of banking regulations on the banking flows to emerging markets through the significance weighting criteria, OECD membership for Basel I period and rating for the Basel II period[1]. The results confirm also the negative impact of regulatory requirements on the banking flows to emerging countries, the significant impact of business openness and the negative effect of bank financialization on banking flows to these countries. Moreover, the results show that countries rated in the speculative grade category are influenced by the regulatory requirements, contrary to countries rated in investment grade category.

The paper is structured as follows. Section 2 presents the structure of capital flows to emerging countries and their relation with banking regulation evolution. Section 3 presents the literature review that confirms theoretically the role of banking regulation as an important push or pull determinant of banking flows to emerging countries, without providing a unanimous empirical answer to the question. Sections 4 devise a new statistical methodology to test this hypothesis and section 5 analyzes results that confirm the effect of banking regulation. Section 6 summarizes and interprets the different results and discusses propositions to reduce regulatory arbitrage and these effects for emerging countries.

2. Banking flows to emerging countries and banking regulation. What link?

Despite the subprime crisis, the overall situation of emerging economies appears strengthened. Nevertheless, when taken separately, several countries are still dependent on capital flows and very vulnerable to the volatility of international liquidity. Indeed, these capital flows have been a source of several crises in global markets, such as: the Asian crisis in 1997 with the sharp reversal of these flows, the subprime crisis in 2008 when capital flows played an amplifier role through the transmission of shocks between markets or Covid 19. Thus, several studies have examined the movements of capital flows and they focus mostly on the determinants of these flows.

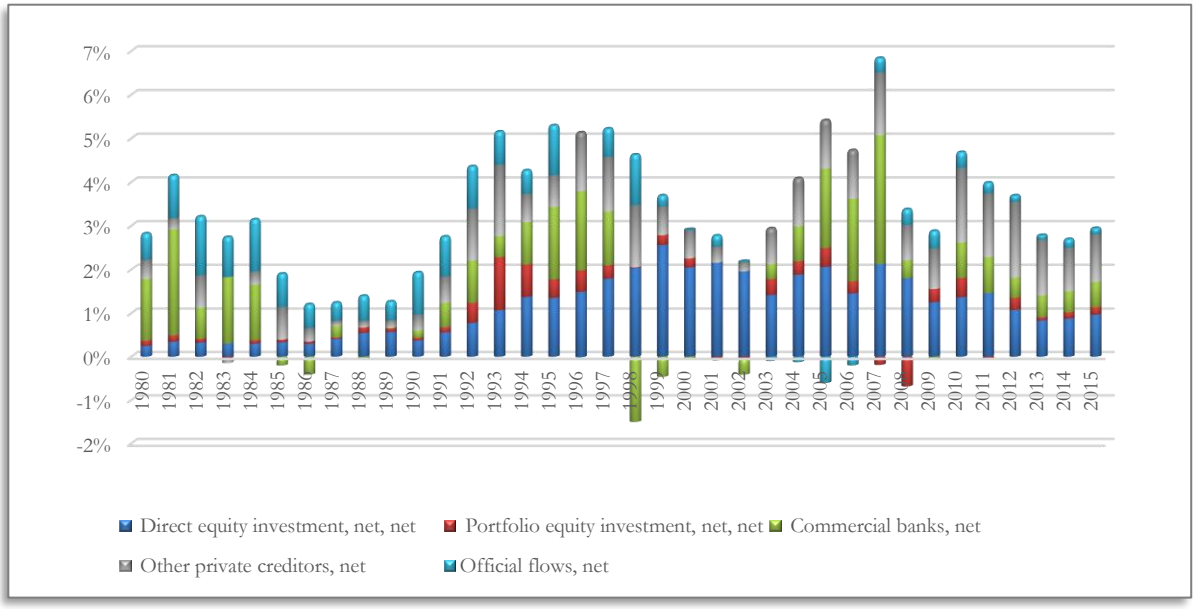
After the 2007 crisis, net capital flows fell by half. Figure 1 shows that this decline in flows after the crisis has affected mainly the portfolio equity investment and commercial banks flows. Therefore, some countries worry about the possible effects of these inflows, which still represent a significant source of funding for these economies, despite the high level of foreign exchange

[1]The choice of Basel I and Basel II corresponds to the period of the empirical study, namely from 1990 to 2014.

reserves.[2] Figure 1 also shows the importance and the volatility of banking flows within total flows. These flows originate mainly from developed countries (Figure 2), hence the interest for the issue of capital requirements and their effects on the volume of flows form developed countries that can affect the financing of growth in emerging countries. Especially with the recent Covid 19 pandemic, which has led to an unprecedented economic contraction and turbulences in financial markets, causing the largest ever outflow of portfolio capital from emerging market economies (EMEs). Indeed, the cross-border bank claims fell by $2.7 trillion in Q1.2020 and $1,2 trillion en Q2.2020 (BIS, 2021).

In fact, international bank flows, FDI and portfolio investment are the main sources of financing in emerging markets. The regulatory requirements are among the factors that affect the banking flows by influencing the bank's costs level. Effectively, at an international level, the prudential supervision of banks is based on the principle of maintaining reserve capital based on the risk faced. In addition, the external financing structure of emerging countries change with the increase of financing in the bonds market to the detriment of bank flows, as bank financing conditions become increasingly restricted.

Figure 1: Evolution of net capital flows to emerging countries (as a percentage of GDP).[3]



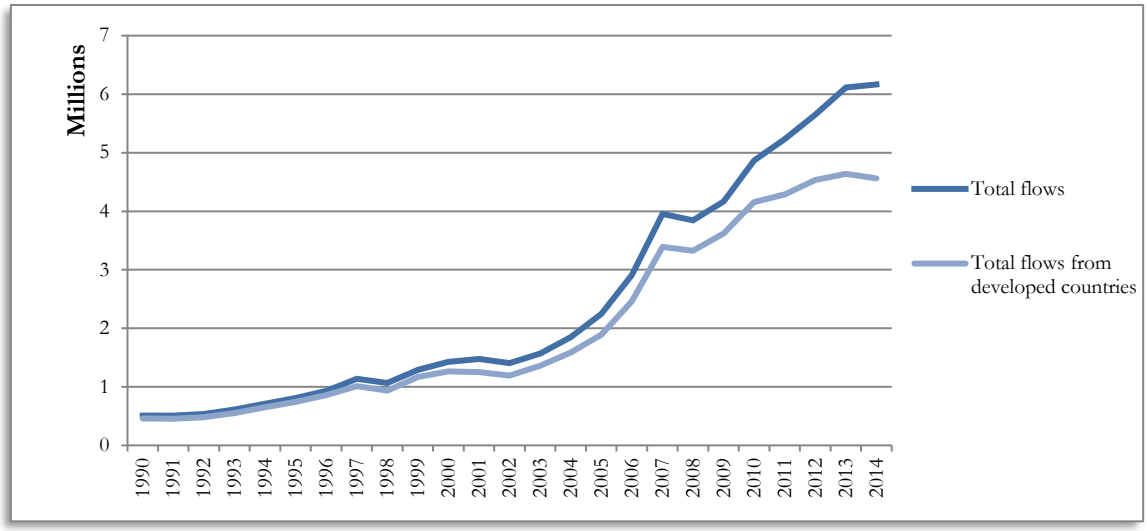
Source: Authors' calculation, Net capital flows, from IIF 2015 and GDP from IMF, 2016

[2] Bussière and al. (2015) confirm that countries with high reserves suffered less during the global financial crisis, particularly if they had less open capital accounts.

[3] The 30 emerging countries are as follows: Argentina, Brazil, Bulgaria, Chile, China, Colombia, Czech Republic, Ecuador, Egypt, Hungary, India, Indonesia, Korea, Lebanon, Malaysia, Mexico, Morocco, Nigeria, Peru, Philippines, Poland, Romania, Russia, Saudi Arabia, South Africa, Thailand, Turkey, Ukraine, United Arab Emirates and Venezuela.

Consequently, regulatory requirements may influence the behavior of banks that adjust their lending to the less expensive actors in terms of regulatory requirements. Basel I prompted the short-term financing to emerging countries. 60 percent of international bank loans were short term before the Asian crisis (Figuet and Lahet, 2007). This is primarily related to fixed weightings proposed by Basel I. These weights favor loans for OECD countries with a rate of 0 percent for public sector. Short-term bank loans to emerging countries are made in foreign currencies to avoid foreign exchange risk and are weighted at 20%. Against the long-term loans to non-OECD countries are weighted at 100%. As a result, emerging countries are penalized by prudential regulations of 1988 in the amount of loans and maturity, which is an obstacle to their access to international financing. Indeed, the old agreement seems questionable to perform its role of ensuring financial stability. These too simple principles seem unable to correctly measure the banking risks.

Figure 2: Banking flows to emerging countries: total banking flows and flows from developed countries



Source: Authors' calculations. BIS, *locational banking statistics*, 2015

Notes: Total flows refer to total flows to 37 emerging countries in the sample. Total flows from developed countries refer to total flows from 19 developed countries to 37 emerging countries in the sample (Appendix 2).

Therefore, the overhaul of prudential regulation focuses on more sophisticated methods of calculating risks. The Basel II agreement adopts a menu of options to differentiate more finely borrower's level of risk and capital requirements, to cover always a rate of 8 percent. However, some economists call into question the effectiveness of Basel II agreement because of its procyclical effect and too stringent regulatory requirements for risky entities. Indeed, the increased requirements for capital strengthening economic cycles may have a destabilizing macroeconomic impact if the decline of credit is not substitutable by other funding sources.

The new Basel agreement (Basel III) further strengthens the regulatory capital requirements in quantity and quality. The minimum requirements for common equity increased from 2 percent to 4.5 percent with the introduction of a conservation buffer of 2.5 percent of active funds, the establishment of countercyclical capital reserves of 2.5 percent - to contain the excessive accumulation of leverage- and the introduction of threshold leverage. This significant cost could push banks to increase the credit rate and reduce their loan allocation levels particularly in a context of crisis, which can create a drag on economic activity and the level of investment. An effect that highly disrupts dependent markets such, as banking flows to emerging markets especially those have not an alternative financing. Indeed, the current Covid 19 crisis is the best example of the damage that such a situation could cause.

3. Literature review

Our paper contributes to the growing literature related to capital flows. It consists in three main parts; the first one focuses on the general framework on the determinants of the banking flows to emerging countries. The second part discusses the role of banking regulation as pull or push factor of the banking flows. The third part deals with the effects of regulatory requirements on bank flows to emerging countries.

3.1. Determinants of banking flows to emerging countries

Emerging countries have experienced a great return of capital flows after 2003, a return explained by changes in economic fundamentals of these countries as well as the abundance of international liquidity. The level of favorable performance in emerging economies is one of the determinants of banking flows that are classified into two categories: Pull and Push determinants (Calvo *and al.*, 1993; Fernandez-Arias, 1996). The external factors (*push*) represent the disadvantage to investing in developed countries with low yields pushing liquidity to emerging countries. The internal factors (*pull*) are the favorable economic situation in emerging countries that attract liquidity to these markets. But the relationship between these factors and capital flows remain ambiguous because of the complex interaction between them. However, Koepke, R. (2019)[4] confirms that Pull factors matter most for banking flows.

[4] For more information, Koepke, R. (2019) reviews the recent empirical literature on the drivers of capital flows to emerging markets.

External or push factors are the unfavorable situation in countries originating of banking flows pushing these capitals to emerging countries. The origin of these flows is mainly developed countries that have excess liquidity, low yields and low interest rates. Several studies, as Calvo *and al.* (1993), Montiel and Reinhart (1999), Kim (2000), Ying and Kim (2001), Ferrucci *and al.* (2004), confirm the influence of these factors on the direction of financial flows. Research on push factors of bank flows focus on developed countries GDP as Jeanneau and Micu (2002) and S&P 500 as Broto *and al.* (2011). Other factors are recently discussed as push factor such as the cost of bank flows and contagion.

Pull factors are the internal factors that reflect the economic performance of a country, which makes it more attractive in terms of investment as the economic fundamentals, growth rate, interest rate and inflation. Several studies such as Fernandez-Aria (1996), Bohn and Tesar (1998) showed the importance of these factors as determinants of capital flows to developing countries. The stability of exchange rates, political stability and trade openness also are factors that may favor some countries in terms of attractiveness of flows. Few studies, on determinants of foreign bank lending, focused on risk aversion, interest rate and economic growth (Jeanneau and Micu, 2002). After the last crisis, several studies have highlighted the disruptive effects of fluctuations in capital flows by identifying the episodes of sudden stops and surges as; Ghosh *and al.* (2014); Forbes and Warnock, (2012); Reinhart and Reinhart, (2008). This literature confirms the effect of traditional determinants as growth and interest rate differentials between emerging and advanced economies and global risk appetite. Ahmed and Zlate (2014) confirm that there have been significant changes in the behavior of net inflows from the period before the recent global financial crisis to the post-crisis period, partly explained by capital controls introduced in recent years. Fratzscher (2012) finds that both pull and push factors have exerted a large effect on capital flows. However, these effects have been highly heterogeneous across countries, explained by differences in the quality of domestic institutions, country risk and the strength of domestic macroeconomic fundamentals. Therefore, several studies have been conducted within this context. Nevertheless, the literature, on the determinants of banking flows under the pull and push factors to emerging countries, remains limited and focus mainly on traditional variables as interest rate and economic growth (even after Covid 19 crisis).

Other studies, Jeanneau and Micu (2002), Heid *and al.* (2004); Forbes and Warnock (2012); Bruno and Shin (2015b), concentrate on risk aversion variable such as yield spread and VIX. They show the strong correlation between capital flows and the level of risk. Ghosh *and al.* (2011) discuss factors that determine banking flows from advanced economies to emerging markets in the

context of global factors push and pull. The results show that the impact varies considerably depending on the region. Brana and Lahet (2010) provides evidence that both push factors as carry trade strategies, global liquidity and contagion factors, seem to be major determinants of capital inflows into Asia. Avdjiev et al (2020), Bruno and Shin (2015a) and Rey (2013) show that banking sector capital flows are strictly associated with US monetary policy. Bremus and Fratzscher (2015) confirm the structural change in the behavior of cross-border banking since the global financial crisis, which they explained partly by bank regulation. This result is confirmed by Figuet *and al.* (2015) which underline the importance of bank regulation as a determinant of banking flows to emerging countries.

3.2. Banking regulation: push or pull factor?

Basel III is the result of improvements experienced by prudential regulation based on Basel II imperfections revealed by the subprime crisis. These reforms are supposed reduce the frequency or intensity of financial crises, covering both; micro-prudential measures that strengthen banks' resilience to shocks and macro-prudential measures to strengthen the banking system. These measures limit the procyclicality and risk interdependence between institutions. So, this bank regulation should have a positive impact on the stability of banking systems. However, the implementation of this new agreement gives rise to concerns about the effects on the costs of its application which can lead banks to reduce their credit offers by increasing capital cost. Therefore, it may cause a slowdown in economic activity and a reduction in the level of liquidity in the country, which adopts this regulation, and flows of this country to emerging countries. It is ' the financial flows channel ' through direct and indirect effects on banking flows (Ghosh *and al.*, 2011).

Banking regulation is an important factor in banking flows at national or international level through its influence on the banks behavior. Regulatory requirements are an additional cost and can influence the volume of loans and their costs. Capital level change effects can create shocks in the banking market; the regulator has taken into account this change through the gradual establishment by 2019 to allow time for banks to accumulate more capital with the retained earnings. Nevertheless, on the capital market this can cause a significant increase in capital costs: the IIF report (2012) estimates that financial markets would be less elastic with this new agreement. Therefore, the emerging economic equity markets may be affected through several channels, even excluding the application of Basel III by the emerging countries.

The first channel is the "trade flows channel" due to the economic activity decrease in developed countries. Indeed, the implementation of Basel III in developed countries affects the supply of credit and slowdown economic activity, imports and trade. A lack of available funding due to Basel III has raised fears that trade financing could become prohibitively expensive (Thieffry, 2011). This is the effect of Basel III on the developed countries to emerging countries transmitted through the foreign trade channel. The second is the financial channel (Ghosh *and al.*, 2011) which results of lower banking flows to emerging countries through increased capital costs and the decline in interest rate spreads. This channel is composed of two small channels; the first is the effect of the reduction in direct bank loans from developed countries to non-banking institutions in emerging countries. This has a direct effect on investment in these countries.

The second channel represents indirect effects on these markets through lower lending to banks in emerging countries. These effects can be enhanced by asymmetric information and problems of country risk assessment by the rating agencies. Moreover, the impact of the decrease in banking flows to emerging countries on the financing of these markets depends on the level of diversification of funding sources and access to capital markets. Small and medium enterprises can find themselves in trouble compared to large companies that can offset the lack of funding by access to financial markets that has evolved after the 1990s. In these countries, effects may be different from one country to another, depending on their level of independence on banking flows.

The importance of capital flows in the convergence of emerging countries incomes and the importance of financial channel in the transmission of shocks leads us to study the effects of this channel on the capital markets. In this context, the role of banking regulation remains ambiguous to classify it as pull or push factor. It influences the arbitration of international investors in two ways: it can push banking flows through the increase in capital costs, thus decreasing profitability flows to emerging countries, or attract these flows by improving the ratings of these countries.

3.3. Banking regulation and banking flows to emerging countries

Regarding the literature on regulatory requirements, there have been few papers on its effects on the stability of emerging funding. Van Hoose (2007) shows that it is generally accepted in the theoretical academic literature that the immediate effects of the capital requirements can reduce total loans and increase loan rates. It was not until the 2000s that the subject began to attract economist studies despite the important role played by Basel I in amplifying the 1997 crisis. Bisignano (2003) and Buch *and al.* (2003) show that Basel I favored the short-term financing to

emerging countries. Brana and Lahet (2009) show that the implementation of the 1988 Basel risk-based capital ratio had a significant impact on Japanese banking behavior and is one of the triggering factors of the 1997 Asian crisis. As for Basel II, few studies reported negative effects on banking flows to emerging countries such as Reisen (2001). He argued that borrowers speculative grade of most emerging and developing countries, would suffer a dramatic rise in debt costs and increased cyclicality of the global banking credit due to Basel II. Griffith-Jones and Spratt (2001) also confirm that Basel II will have a likely negative effect on developing countries. Griffith-Jones and Persaud (2008) explain that this is due to the fact that Basel II not explicitly takes account of clear international diversification benefits of lending to emerging and developing countries. Other economists confirm that Basel II will have a negligible effect on the financing of emerging countries. Weder and Wedow (2002) address this issue by calculating a measure of the economic capital variation and test its influence on the banking flows of BIS reporting banks.

Liebig *and al.* (2007), by adopting a micro perspective, calculate the level of bank regulatory capital and the unexpected loss using a value to risk model. This measurement is then tested in a dynamic panel model on the determinants of claims to emerging markets. The results show that there will be a negligible effect on lending by German banks to emerging markets. Liebig *and al.* (2007), Claessens *and al.* (2008), estimate that the Basel II effect on the financing of emerging countries is negligible. About the new Basel III, literature remains limited in some authors', which seems to confirm the negative impact of this agreement on the levels of bank lending in the world. Elliot (2009) shows that it is likely to be relatively small changes on the lending volumes of US banks due to higher capital requirements. As well Frenkel and Rudolph (2010) examine the macroeconomic and financial effects of the leverage ratio and prove that it will have a significant economic impact. This is likely to lead to a reduction of loans and thus a slowdown in economic activity. They also offer an extensive transition period to avoid these side effects. Others find different results that depend on the characteristics of each economy as Cosimano and Hakura (2011). They confirm that the increase in regulatory requirements under Basel III will push banks to increase their lending rates and reduce the level of credit supply. However, this varies considerably from an advanced economy to another according to equity and elasticity of demand for loans in relation to changes in loan rates.

Slovik (2012) shows that more stringent capital requirements on the basis of risk-weighted assets are intended to increase the capacity of the banking system to absorb losses, but also increase banks' incentives to circumvent regulations. On the other hand, Slovik and Cournède (2011)

estimate that the compliance with the Basel III rules on GDP growth of the order of -0.05 to -0.15 percentage points per year. Houston *and al.* (2012) confirm that differences in banking regulation may be important push or pull factors for cross-border bank claims. The introduction of a leverage ratio based on the unweighted total assets helps to harmonize the activities of banks with their main economic functions and to maximize capital - allocation- efficiency, even if the common argument against a strict leverage ratio is that it increases the cost of bank loans and hurts the economy. Figuet *and al.* (2015) show the significant effect of different components of Basel III on the level of banking flows to emerging countries. They use statistics of capital requirement of 500 international banks. This method separates the level of risk from regulatory requirements, which does not allow the detection categories of countries that will not be affected by the strengthening of regulatory requirements.

For recent studies on international regulatory spillover and regulatory effect on credit, we can cite Aiyar *and al.* (2014a, 2014b, 2014c), which show that changes in minimum capital requirements had large effects on the supply of credit by UK banks. They explain that, equity finance was sufficiently costly for banks that increase in capital requirements imposed important constraints on the supply of bank credit. Berrospide *and al.* (2017) show that domestic prudential regulation can have unintended effects across borders and may be less effective in an environment where banks operate globally. Using U.S. micro-banking data they show that some regulatory changes indeed spillover and propagates across borders through the global linkages of international financial institutions. So, changes in domestic prudential instruments might also spillover into foreign markets, because domestic banks affected by the policies adjust their operations globally.

Finally, regarding monetary policy, Aiyar *and al.* (2016), by using data on UK banks' minimum capital requirements to study the interaction of monetary policy and capital requirement regulation, they show that lending by large banks reacts substantially to capital requirement changes, but not to monetary policy changes. Lending by small banks reacts to both. However, theoretical models raise concerns about complex interactions between monetary policy and macro-prudential variation in capital requirements.

This literature review has been prepared in order to present reflection elements concerning the issue of banking flows vulnerability to emerging countries. A deductive reading literature about, on one side, the banking flows determinants to emerging countries, and on the other side, the banking regulation role in the supply of bank financing to these countries confirm ' theoretically ' the role of banking regulation as banking flows determinant to emerging countries without providing a unanimous empirical answer to the question. In this paper we intend to assess the

impact of regulatory requirements as push factors on cross-border banking claims to 37 emerging markets.

4. Measurements and estimation procedure

Our estimation of the prudential regulations impact on bank lending to emerging markets use modeling of banks' lending decisions through the push and pulls factors, which constitute the general framework of our empirical test. With this aim, we develop a model of international bank lending by using reduced-form models to assume that individual bank behavior can be approximated in aggregate as Aiyar *and al.* (2014); Noss and Toffano (2014) and Miles *and al.*(2013).

Therefore, we use data aggregated by creditor countries, which does not allow a detailed analysis of the behavior of individual banks. Thus, to test the sensitivity of banking flows to regulatory requirements, we are adopting a macroeconomic approach. On the basis of the push and pull models of banking flows, we are trying to integrate regulatory requirements as a determining factor of these flows. We try to assess these regulation requirements as a quantitative variable.

Regulatory requirements related to credit risk still represent 8 percent of the risk-weighted assets under Basel I and Basel II. 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 observe the effects of these two criteria on the banking flows to emerging countries before and after the implementation of Basel II. Subsequently, we try to estimate the sensitivity of these flows with regulatory requirements through the weights applied under Basel II. These weights represent risk-weighted assets as a percentage of outstanding capital and represents 12.5 of the level of minimum capital requirements.

Concerning the date of the Basel II implementation,[5] according to the Basel Committee, its implementation was scheduled for early January 2007. In our study, the year 2007 is considered as the beginning of the Basel II implementation period. We have known since that date that all developed countries have already begun at least the application of the standard method under Basel II, excepting USA, which began its implementation in 2009.[6] Moreover, the USA was already using another form of regulation as sophisticated and stringent than the Basel II

[5] Since the date of application of Basel II is not available for each developed country. The study of Hasan and al. (2015) dated the implementation of Basel 2 capital rules in each creditor country using even various Internet sources including national news reports and prudential regulatory authority and central bank websites.

[6] Report: European Parliament's Committee on Economic and Monetary Affairs. October 2011, available at: http://www.europarl.europa.eu/activities/committees/studies.do?language=EN

regulations. 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 for Bremus and Fratzscher (2015).

Regulatory requirements under Basel I are based on the only criterion of OECD membership. So, we included a dummy variable that takes the value 0 if the country is not OECD member and the value 1 otherwise (Appendix 3). The estimation is performed for Basel I implementation period (1990-2006) and Basel II implementation period (2007-2014) to test the effect of OECD membership on the banking flows before and after Basel II that corresponds to *pre-* and *post-crisis*. The Diff in Diff estimate confirms the structural change of bank flows between the two periods (Appendix 7), which confirmed by Bremus and Fratzscher (2015). In the same way, the fact that regulatory requirements under Basel II depend mainly on risk, we include a variable that reflects the risk -which takes a value between 1 and 26 from the AAA to SD rating (Appendix 6) - in the model to compare the risk effect on the credit flows before and after the implementation of Basel II.

In a last step, and to measure credit flows sensitivity to the regulatory requirements under Basel II, we include a variable that reflects the weights applied under Basel II. For the regulatory requirements calculation given that we don't have any information indicating the requirements level applied by each bank.[7] The calculation of these weights is based on the IRB method (Internal Ratings Based) that represents the method used by most large international banks to calculate capital requirements under Basel II (Basel Committee on Banking, Supervision, June 2006. p63) and Basel III (Basel Committee on Banking, Supervision, December 2010 revised June 2011. p39).

Calculation of interest variable: the risk weights with the IRB approach under Basel II

Under the IRB approach, four risk indicators are defined: 1. PD is the default probability: the risk weights are calculated[8] using the default probabilities associated with sovereign ratings of Standard & Poor's as a proxy to internal ratings (Ratings Standard & Poor's, 2014) (see Appendix 8). Since the study focuses on annual changes in international bank claims, we take the default

[7] We do not include the minimum requirements level of 8 percent since we do not have information on the level of regulatory requirements applied by banks. We thus integrate the weights applied that reflect the level of RWA as a percentage of the amount due.

[8] We assume that the default probability for all economic actors in an emerging country (public sector, private sector, banking sector) tend to the country's default probability because Basel II rules allows financial institutions to determine their own funds by weighing their assets at risk according to the sovereign rating (BIS, 2006). For this variable, we use the ratings provided by S&P rating agency (Ratings Standard & Poor's, 2014).

probabilities on one year out forecast in order to avoid the multicollinearity problem. 2. M is the credit maturity, which is fixed at 1 year for the same reasons. 3. EAD is the exposure to default, which represents the amount due. 4. LGD is the loss given default that fixed at 50 percent.

The risk weights (RWA / EAD) represent risk-weighted assets as a percentage of the amount due EAD which represent exposure at default as follow:

$$(1). \quad \frac{RWA}{EAD} = 12.5\,K \quad \text{Or} \quad K = 0.08\,\frac{RWA}{EAD}$$

Under this method, regulatory requirements *K* can take two following values that the counterparty may in default (equation 3) or not (equation 2):

$$(2). K = \left[LGD.N\left(\frac{N^{-1}(PD)+\sqrt{p(PD)}N^{-1}(0.999)}{\sqrt{1-p(PD)}}\right) - LGD.PD\right]\left(\frac{1+(\mathrm{M}-2.5)\times \mathrm{b(PD)}}{1-1.5\mathrm{b(PD)}}\right)$$

With:

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

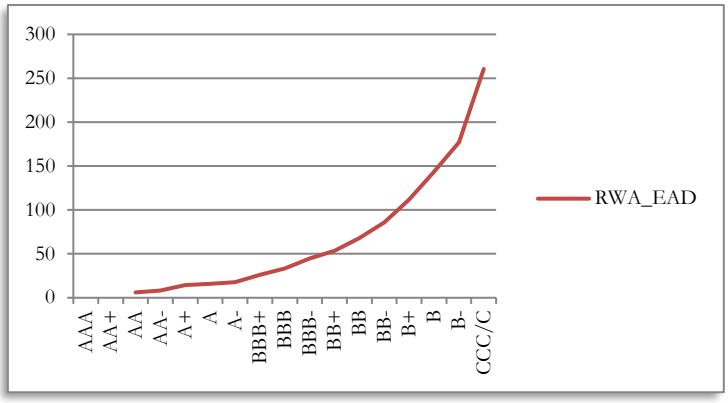
$$b(PD) = \left(0.11852 - 0.05478\,In(PD)\right)^2$$

$$(3). K = \max(0, LGD - EL)$$

N the standard normal distribution, $p(PD)$ indicates that correlation is a decreasing function of the default probability, *b* (*PD*) specifies that adjustment of maturity is a decreasing function of the default probability, EL (Expected Losses) = PD*LGD (Loss Given Default) with a confidence interval of 99.9%, p_{min}= 0.12 and p_{max} =0.24.

Based on equation (1) and (2) (presented if Figure 4), we calculate a specific risk weighting (RWA / EAD) with each credit rating possible in order to measure the more relevant regulatory requirements rather than the linear measure of the rating to integrate in the estimate. Indeed, Figure 4 shows that the relationship between the rating and the RWA is not linear so that the RWA underestimates the effect of the risk for less risky borrowers and other by reinforcing the risk effect for the riskiest borrowers.

Figure 4: Ratings and Risk-weighted assets as a percentage of EAD [9]



Source; author's calculation

In summary, in the first step we try to show, empirically, that Basel I and Basel II affected banks' cross-border lending through their risk weighting rules. The dependent variable is the annual change in cross-border lending by developed countries to a panel of 37 emerging countries. So, the key independent variables are: a dummy for the OECD emerging country (because the OECD membership is associated with a low risk-weight under Basel I but not necessarily so under Basel II) and the emerging countries S&P rating (used in Basel II).

In the second step, we use ratings to determinate risk-weight cost to estimate the sensitivity of the banking flows to the changes of regulatory requirements. Finally, we use ratings-determined risk-weight cost comes primarily from less lending to countries with speculative grade ratings as opposed to variation among countries with investment grade ratings, which allows us to use the coefficient of estimation on risk-weights during the Basel II period to extrapolate an expected further decrease in lending from higher overall capital requirements under Basel III.

Model specification

We opt for push and pull factors models, which consider the key factors that determine the level and direction of banking flows. The choice of empirical modeling is conform to empirical studies on these factors. The model is represented as follows:

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

$Y_{i,t}$ the cross-border banking claims from 19 developed countries to the emerging country *i* in each period *t*, $Y_{i,t-1}$ the dependent lagged variable with α the corresponding coefficient, $X_{i,t}$

[9] Author's calculation based on equation (1) and (2), using default probability associate to S&P rating (Standard & Poor's) for 1 year as default probability in appendix 8.

represents all push variables with β the vector of corresponding coefficients, Z_t represents all pull variables with ω the vector of corresponding coefficients; μ_i the fixed effect and $\varepsilon_{i,t}$ the term error.

As part of the dynamic panel, the generalized method of moments (GMM) appears to be the most appropriate choice for three reasons, the explanatory variable endogeneity, the low temporal dimension in the model and the individual effects resulting from the heterogeneity in the emerging countries group. All tests with the GMM method are validated like so: the p-value of the Hansen test is above the 10 percent level (accepting the hypothesis of non-correlation instrumental variables with the error term) and the p-value of the test AR2 is above the 10 percent threshold (accepting the null hypothesis of no-autocorrelation of errors in order 2). For robustness tests (Appendix 9), we use Dynamic Feasible Generalized Least Squares model, which allows correcting autocorrelation of errors. Finally, we use Iterated Feasible Generalized Least Squares model (IFLGS) as Phillips (2010) finds that the IFLGS estimator compares favorably to the GMM estimators.[10]

Sample

We attempt to provide empirical evidence by focusing on a specific spatiotemporal field. It covers the period of the application of a uniform banking regulation recorded during the 1990 years. Thus, two major waves help defining the temporal scope of our study: Basel I in 1988 and Basel II in 2007. For the spatial field of the study is identified by defining a list of 37 emerging countries. To date, there is no universal definition for emerging markets. Therefore, the selection of emerging countries is not unanimous among the different academic or professional sources.

To select a list of emerging countries, we based our study 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, i.e. the default probability, which allows us to evaluate changes in regulatory requirements for these countries and cross-border international banking claims. The excluded countries are not retained for non-compliance in the period, or data unavailability. In total, a sample of 37 countries is retained (Appendix 2) representing all geographic regions of emerging countries over 1990-2014.

[10] Furthermore, the IFGLS estimator has negligible finite sample bias. However, GMM estimators can have substantial finite sample bias. So, the IFGLS estimator can, therefore, be more accurate in terms of root mean squared error even in situations where GMM estimators have smaller sampling variance (Phillips, 2010).

Variables

After selecting countries included in the study and the temporal dimension, we consider the problem of the variables selection, specifically the variables that influence banking flows to these countries.

We hold variables widely used in the literature on the subject. Data used in the model are defined in appendix 1.[11] The dependent variable is provided and aggregated for all cross-border international claims from BIS reporting banks[12] from developed countries to emerging country i by the end of year. Those are referred as a locational banking statistics and include international transactions between parent banks to their affiliates to capture financial claims of internationally active banks. This conforms to balance of payments and external debt methodology. They capture outstanding claims and liabilities of banks located in BIS reporting countries, including intragroup positions between offices of the same banking group. The explanatory variables are grouped into two categories according to the literature on the determinants of bank credit flows to emerging economies, pull factors and push factors.

Pull factors:

GDP is the first indicator of country development. We use GDP per capita, which measures the country development indicator, and the economic cycles (Ghosh *and al.*, 2011; Figuet *and al.*, 2015) as a higher level of economic development should attract more capital. The competitiveness in terms of profitability as measured by the differential in real interest rates between emerging countries and the United States (Jeanneau and Micu, 2002; Figuet *and al.*, 2015). The degree of trade openness measured as the sum of imports and exports of goods and services as a percentage of GDP and variables reflecting the weighting criteria in the regulations, OECD membership and rating. These criteria are indicators of the country solvability. OECD membership and good credit rating score are an attractive factor for capital flows.

Push factors:

GDP per capita in developed countries to indicate prosperity pushing these countries to offer more funds (Jeanneau and Micu, 2002; Ghosh *and al.*, 2011; Figuet *and al.*, 2015). We include the attractiveness of financial markets as a proxy of profitability in the financial markets through the

[11] See appendices 4, 5 and 5.1 for variables detailed information (descriptive statistics, correlation matrix and collinearity diagnostic).

[12] BIS reporting banks located in 19 developed countries : Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, Portugal, Spain, Sweden, Switzerland , United Kingdom, United States.

Standard & Poor's 500 index (Broto *and al.*, 2011; Figuet *and al.*, 2015) and VIX (Volatility Index) to measures market expectation of volatility, so it be used as a proxy for the converse effect of the international banks' leverage (Herrmann and Mihaljek, 2013; Bruno and Shin, 2015b). Then, we consider the weights related to bank claims that reflect the bank loans cost so that bank flows to riskier borrowers are more expensive with a higher probability of default. Finally, since the disruption in the financial and banking markets has a negative influence on bank flows, we integrate a dummy variable for crisis, which takes a value of 1 for 2008 and 2009 and 0 otherwise, to control the effect of subprime crisis.

5. Result analysis

We conduct the empirical test in five steps in two periods and by groups of variables. We begin with the baseline model with traditional push and pull variables (column 1) and then, one by one with variable representing criteria of bank regulation under Basel I (column 2) and Basel II (column 3). Then, we combine these two variables (column 4). Finally, as a robustness test we change variables control (column 5). All estimates show that the lagged variable is very significant with a positive coefficient sign (table 1). This strong significance reflects the continuity in the behavior of the credit supply, which can be explained by pattern and familiarity with borrower by internationals banks. This finding is consistent with Figuet *and al.* (2015). It reflects the crucial role of the relationship between borrowing countries and international banks in the provision of bank funds. Indeed, Aiyar *and al.* (2014c) confirm that banks tend to favor their most important relationships.

Concerning the two variables that reflect the weighting criteria in bank regulation, the estimate for the Basel I period (1990-2006) confirm the significant positive effect (at 5 percent) of the OECD membership on bank flows. For the same period, the risk level appears insignificant. This result highlights probably the effect of preferential treatment of regulatory requirements to the OECD member countries. We can think that, the OECD result for the Basel I period will be entirely based on the Eastern European countries entering the EU during this period and that the increase in lending to this group of countries could to be an idiosyncratic phenomenon linked to economic and institutional catching-up that is difficult to link only to Basel I. However, in one hand, economic catch-up is constantly proved and taken into account by GDP per capita. On the other hand, the OECD membership is not significant pull-factor for international banking flows in the post-crisis period despite the OECD membership of other European countries after 2006. This confirms that the significant effect is probably due to the regulatory arbitrage under Basel I.

The estimation for Basel II period (2007-2014) shows that ratings influence the banking flows, which can be explained by the weight given by regulations to risk so that a high level of risk influences negatively the volume of bank flows. These results on the effects of ratings before and after the implementation of Basel II corroborate with the results of Hasan *and al.* (2015), confirming the weight of ratings after the implementation of Basel II in the credits flows to emerging countries. For this period, the effect of the OECD membership does not play an important role. So, comparing the results of the two estimates for both periods confirms the significant effect of banking regulations on the banking flows to emerging markets through the significance weighting criteria for the corresponding periods of Basel I and Basel II.

Hence, these results in the first step, suggest that Basel standards distorted bank-lending decisions since, the OECD dummy is positive and significant only during Basel I (1990-2006) and the ratings variable is negative and significant only during Basel II (2007-2014). We use a control for GDP, interest rate differentials, and others traditional push and pull factors. The robustness checks with a couple other controls and different estimation techniques, confirm this results.

As control variables, the pull factors determine the banking flows to emerging countries with a highly significant GDP per capita (with a positive and significant coefficient, particularly in the first period which is significant at 1 percent for all estimates). So, as confirmed by the existent literature, a higher level of economic development attracts more capital that consistent with the most of existent literature. The differential in interest rate does not seem have a significant role, which consists with the literature reflecting the non-speculative nature of bank flows (Liebig *and al.*, 2007; Figuet *and al.*, 2015).

Regarding the role of trade openness as a determinant of banking flows, the effect is positive and significant for the first period. Nevertheless, for the second period the effect is negative and significant which probably reflects that countries with wide trade openness are more affected by the disruption due to the crisis.

As a push factor, the per capita GDP of developed countries does not seem to play a role in the behavior of international bank lending to emerging countries. The crisis dummy, seem to have a significant and negative effect on bank lending towards emerging countries. This result confirms the strong risk aversion during the crisis as well as the drying up of the liquidity of international banks that has generated a sharp cut of bank flows to emerging countries. Moreover, the

Financial Markets Index S&P500 and VIX (largely affected in the crisis period) can capture the impact of crisis.

Concerning the role of financial markets, it depends on the estimate period. International financial markets attractiveness, represented by the S&P500, does not seem influencing the behavior of the bank flows for the period 1990-2006. For the 2007-2014 period, the role of profitability in the financial markets appears significantly negative (1 percent) which, highlights the impact of the banks' financialization and the banking evolution with financial innovations related to credit. Indeed, this period is characterized by a strong disruption of the markets as well as the regulation of banking activities on the financial markets. This result confirms the important role of business climates on international banks lending to emerging countries. Recently, Nickol and Stoppok (2020) confirm that a high VIX has been accompanied by a collapse in capital flows following the current Covid 19 crisis.

Table 1: Estimation results of regulation criteria with GMM system

	(1) DlIBCLAIMS	(2) DlIBCLAIMS	(3) DlIBCLAIMS	(4) DlIBCLAIMS	(5) DlIBCLAIMS	(6) DlIBCLAIMS	(7) DlIBCLAIMS	(8) DlIBCLAIMS	(9) DlIBCLAIMS	(10) DlIBCLAIMS
			1990-2006					***2007-2014***		
Lagged.DlIBCLAIMS	0.215***	0.215***	0.245***	0.246***	0.157**	0.406***	0.404***	0.401***	0.397***	0.344***
	(0.0561)	(0.0602)	(0.0647)	(0.0647)	(0.0762)	(0.0808)	(0.0814)	(0.0816)	(0.0821)	(0.0656)
DlGDP_CEC	0.652***	0.636***	0.598***	0.592***	0.710***	0.394**	0.384*	0.400**	0.388**	0.387**
	(0.117)	(0.113)	(0.124)	(0.119)	(0.104)	(0.192)	(0.190)	(0.191)	(0.189)	(0.179)
DlGDP_CDC	-0.117	-0.101	-0.0551	-0.0566	-0.166	-0.512	-0.503	-0.513*	-0.501	-0.111
	(0.163)	(0.117)	(0.0955)	(0.0973)	(0.137)	(0.303)	(0.300)	(0.300)	(0.297)	(0.286)
DIFF_IR	-0.0829	-0.0926	-0.140**	-0.134*		-0.113	-0.121	-0.115	-0.127	
	(0.103)	(0.0960)	(0.0685)	(0.0667)		(0.167)	(0.168)	(0.172)	(0.172)	
CRISIS						-0.207***	-0.209***	-0.203***	-0.205***	-0.0996*
						(0.0328)	(0.0326)	(0.0325)	(0.0325)	(0.0493)
lSP500	-0.0199	-0.0283	-0.0312	-0.0358		-0.325***	-0.325***	-0.323***	-0.323***	
	(0.0298)	(0.0294)	(0.0199)	(0.0212)		(0.0706)	(0.0706)	(0.0703)	(0.0702)	
OCDEDUM		**0.0704****		**0.0584****	**0.0531***		**-0.0189**		**-0.0280**	**-0.0127**
		(0.0336)		(0.0269)	(0.0304)		(0.0303)		(0.0311)	(0.0274)
lRATING_SP			**-0.0408**	**-0.0344**	**-0.0463**			**-0.0335****	**-0.0358****	**-0.0241***
			(0.0848)	(0.0711)	(0.0891)			(0.0150)	(0.0163)	(0.0131)
lVIX					-0.0118					-0.0961
					(0.0414)					(0.0643)
DlTRADOPEN					0.303*					-0.415**
					(0.155)					(0.163)
Constant	0.210	0.259	0.392	0.400	0.203	2.388***	2.393***	2.446***	2.458***	0.365*
	(0.208)	(0.202)	(0.285)	(0.262)	(0.241)	(0.511)	(0.510)	(0.512)	(0.510)	(0.185)
Observations	419	419	377	377	417	239	239	239	239	294
AR2	0.321	0.331	0.522	0.500	0.975	0.306	0.309	0.318	0.324	0.464
Hansen	0.444	0.459	0.497	0.512	0.438	0.386	0.535	0.387	0.508	0.201
Instr	32	33	33	34	34	35	36	36	37	37

Notes: Dependent variable, for all regressions, is cross-border banking claims. Standard errors in parenthesis: * p < 0.10, ** p < 0.05, *** p < 0.01. A robust covariance matrix is used to allow consideration for a heteroskedastic structure of the residuals and autocorrelation within panels. We limit the lag length (here to 1 period) to limit 'too many instruments' problem.

For the second step, we estimate the sensitivity of the banking flows to the changes of regulatory requirements; we integrate the weightings applied in banking regulation under Basel II (RWA). The results show a negative and significant effect at 1 and 5 percent in order of 0.045 to risk-weighted assets as a percentage of the amount due (claims annual variation) on the banking flows to emerging countries (column 2, table 2). The more significant effect of risk-weighted assets (table 2) compared to ratings (table 1) confirms the relevance of risk-weighted assets as a determinant of bank flows.

Table 2: Estimation results of risk weighted assets under Basel II

GMM system over 2007-2014

	(1) DlIBCLAIMS	(2) DlIBCLAIMS	(3) DlIBCLAIMS	(4) DlIBCLAIMS
Lagged.DlIBCLAIMS	0.385***	0.350***	0.338***	0.350***
	(0.0818)	(0.0826)	(0.0832)	(0.0770)
DlGDP_CEC	0.485**	0.509**	0.489**	0.387**
	(0.211)	(0.204)	(0.200)	(0.161)
DlGDP_CDC	-0.475	-0.478	-0.459	0.0387
	(0.333)	(0.318)	(0.311)	(0.324)
DIFF_IR	-0.125	-0.170	-0.200	-0.216
	(0.169)	(0.183)	(0.185)	(0.246)
CRISIS	-0.135***	-0.131***	-0.132***	-0.138*
	(0.0300)	(0.0296)	(0.0295)	(0.0784)
lSP500	-0.286***	-0.292***	-0.290***	
	(0.0727)	(0.0708)	(0.0704)	
lRWA_EAD		**-0.0450****	**-0.0541*****	**-0.0413****
		(0.0167)	(0.0170)	(0.0201)
OCDEDUM			-0.0478	-0.00963
			(0.0318)	(0.0353)
lVIX				-0.0768
				(0.0820)
DlTRADOPEN				-1.006**
				(0.454)
Constant	2.087***	2.085***	2.077***	0.226
	(0.525)	(0.511)	(0.508)	(0.243)
Observations	223	223	223	222
AR2	0.274	0.362	0.384	0.780
Hansen	0.589	0.507	0.541	0.603
instr	37	37	38	38

Notes: L.DlIBCLAIMS is the lagged dependent variable (cross-border banking claims).Standard errors in parenthesis: * p < 0.10, ** p < 0.05, *** p < 0.01.A robust covariance matrix is used to allow consideration for a heteroskedastic structure of the residuals and autocorrelation within panels. We limit the lag length (here to 1 period) to limit 'too many instruments' problem.

As credit risk assessment remains unchanged (BCBS, 2010) still calculated with IRB model and given the adjustments required for credit risk under Basel III,[13] the level of minimum regulatory requirements increase from 8 to 10.5 percent or even 13 percent if we consider the countercyclical buffer (Table 3). This corresponds to an increase of 2.5 to 5 percent of regulatory

[13] We adopt the implicit hypothesis that banks will not change their behavior with the introduction of Basel III.

requirements, inducing an increase of 31.25 to 62.5 percent of the weighted assets credit risk percentage. Considering the coefficient (-0.045) of the last estimate (Table 2), this increase induces a decrease of 1.40 to 2.81 percent of bank claims to emerging countries. Moreover, these countries will not be affected on the same level by this increase of regulatory requirements. A priori, countries with lower ratings will be more affected.

Table 3: Evolution of capital -Basel II to Basel III-

Components of equity	Basel II	Basel III
Total Tier 1	Tier 1: 2% RWA	Tier 1 Core: 4,5% RWA + Conservation Buffer: 2,5% RWA + Countercyclical buffer: 0 -2,5% RWA + Systemic risk
	Tier 1 complementary : 2% RWA	Tier 1 complementary : 1,5% RWA
Tier 2	Tier 2: 4% RWA	Tier 2: 4% RWA
Total funds	8% RWA	10,5% à 13% RWA

Table 4: Weights and regulatory requirements related to ratings of S&P under the IRB approach of Basel II

RATING	Code RATING	PD_1Y	p_PD	b_PD	M	MA	WCDR	LGD	k	RWA/EAD (%)	ΔRWA/EAD(%)
AAA	1	0	0,24		1			0,5			-
AA+	2	0	0,24		1			0,5			-
AA	3	0,02	0,238806	0,342333	1	1	0,009991	0,5	0,004895	6.11925	6.11925
AA-	4	0,03	0,238213	0,316834	1	1	0,013774	0,5	0,006737	8.421375	2.302125
A+	5	0,06	0,236454	0,27553	1	1	0,023465	0,5	0,011432	14.29037	5.868995
A	6	0,07	0,235873	0,266737	1	1	0,02633	0,5	0,012815	16.01875	1.72838
A-	7	0,08	0,235295	0,259234	1	1	0,029062	0,5	0,014131	17.66363	1.64488
BBB+	8	0,14	0,231887	0,228957	1	1	0,043411	0,5	0,021005	26.25662	8.59299
BBB	9	0,2	0,228581	0,210641	1	1	0,055379	0,5	0,026689	33.36175	7.10513
BBB-	10	0,32	0,222257	0,18767	1	1	0,074973	0,5	0,035887	44.85812	11.49637
BB+	11	0,43	0,216785	0,173909	1	1	0,089601	0,5	0,04265	53.31287	8.45475
BB	12	0,68	0,205412	0,1536	1	1	0,115634	0,5	0,054417	68.02125	14.70838
BB-	13	1,13	0,188203	0,132566	1	1	0,148533	0,5	0,068616	85.77038	17.74913
B+	14	2,31	0,157807	0,105577	1	1	0,201957	0,5	0,089428	111.7855	26.01512
B	**15**	**4,73**	**0,131274**	**0,081606**	**1**	**1**	**0,276855**	**0,5**	**0,114778**	**143.472**	31.6865
B-	**16**	**7,92**	**0,122288**	**0,06627**	**1**	**1**	**0,362397**	**0,5**	**0,141599**	**176.9984**	**33.5264**
CCC/C	17-25	26,87	0,12	0,036294	1	1	0,685696	0,5	0,208498	260.6226	83.6242

Source: author's calculation. Note: PD-1Y refers to the default probabilities on one year associated with sovereign ratings of Standard & Poor's as a proxy to internal ratings (Ratings Standard & Poor's, 2014)

Besides, regulatory requirements do not only dependent on the solvency ratio; rating has a negative or positive effect in determining the level of regulatory requirements. The deterioration or improvement, such as: the deterioration of the rating B to -B causes an increase of 33.5264 percent of risk weighted assets which, in our estimation, and considering the same level of regulatory requirements, can induce a fall in banking flows of 1.50 percent. Conversely, the improved rating, from -B to B, increases the banking flows by 1.50 percent.

Table 4 also shows that changes in risk-weighted assets are more important for the ratings that represent a high degree of risk. Therefore, we try, in table 5, to test the effect of regulatory requirements on bank flows to countries rated in speculative grade category compared to countries in investment grade category.[14] The results confirm that countries with lower ratings are influenced by regulatory requirements unlike the well-rated countries. As the increase of 2.5 to 5 percent regulatory requirements with Basel III, induce an increase of 31.25 to 62.5 percent of the risk-weighted assets in percentage of credit. Considering the coefficient (-0.194) of the last estimate (Table 5), this increase induces a decrease of 6.06 to 12.125 percent of bank claims to speculative grade emerging countries. However, this can have a positive effect by encouraging these countries to improve their ratings and develop alternative financing on capital markets to stabilize their external financing.

Results, in table 5, show that regulatory requirements do not seem to play a significant role in the determination of banking flows to investment grade countries. This reflects the low level of regulatory requirements for this category. For control variables, as pull variable; lagged variable and GDP for emerging countries seem to influence positively and significantly banking flows. For push variables, GDP per capita for developed countries, crisis, financial markets, through SP500 and VIX, seem to have a significant and negative effect on the volume of banking flows.

For countries rated in the speculative category, regulatory requirements are the only variable that seems to play a role in determining bank flows with the lagged variable and the crisis. This shows the importance of these requirements so high that the other control variables no longer have any effect. As a final point, for both categories, differential interest rate and trade openness do not affect banking flows to emerging market.

[14] The Diff in Diff estimate confirms the structural change of bank flows between the two categories ; Investment grade versus Speculative grade (Appendix 7)

In summary of this second step, it can be concluded that the significance of the RWA determined by the ratings mainly reflects the decline in lending to countries with speculative ratings as opposed to variations among countries with investment grade ratings. This result of the effect of risk-weights assets during the Basel II period for speculative grade countries allows us to extrapolate an expected further decrease in lending from higher overall capital requirements under Basel III.

As a robustness test for all estimations and with the same steps, we use dynamic and iterated feasible generalized least squares model (appendix 9). All tests confirm the significances and signs of each interest variables and period with the GMM model.

These results provide an overall estimate of the effects of regulatory requirements under Basel III on bank claims to emerging countries, but their analysis must be cautious because firstly, they do not take into account the impact of the liquidity and the leverage ratio. Secondly, they will depend on the level of regulatory requirements actually applied by the banks. However, other studies have dealt with the effect of these ratios that joins our results such as Houston *and al.* (2012). They confirm that the introduction of a leverage ratio based on the unweighted total assets harmonize the activities of banks with their main economic functions and to maximize capital -allocation- efficiency, but a strict leverage ratio increases the cost of bank loans and hurts the economy.

Otherwise, the paper does not take into account the dependence on the wholesale market to control the drying up of interbank dollar markets, which appear to have played an important role in the dynamics of international bank lending (McGuire and Peter, 2012 and McCauley *and al.*, 2015). Moreover, the paper doesn't consider the role of offshore centers and other tax havens. in fact, locational BIS statistics include many offshore financial centers, but the nature of the data does not allow to isolate bank flows to these centers.

Finally, for the exchange rate variable, the effect is tested but not reported; it is not significant for both periods. This result can be explained, on the one hand, by the fact that the first difference of cross-border bank claims is already adjusted for exchange rate fluctuations (Correa *and al.*, 2015) and on the other hand, bank loans may be more sensitive to exchange rate expectations than the real exchange rate.

Table 5: Estimation results of risk weighted assets under Basel II with system GMM over 2007-2014

Speculative grade versus Investment grade countries

	(1) DlIBCLAIMS	(2) DlIBCLAIMS	(3) DlIBCLAIMS	(4) DlIBCLAIMS	(5) DlIBCLAIMS	(6) DlIBCLAIMS	(7) DlIBCLAIMS	(8) DlIBCLAIMS	(9) DlIBCLAIMS	(10) DlIBCLAIMS
	Investment Grade countries					***Speculative Grade countries***				
Lagged.DlIBCLAIMS	0.143**	0.161**	0.185**	0.173**	0.166**	0.462***	0.386***	0.372**	0.479***	0.400**
	(0.0658)	(0.0715)	(0.0709)	(0.0754)	(0.0798)	(0.123)	(0.127)	(0.131)	(0.129)	(0.139)
DlGDP_CEC	0.798***	0.839***	0.874***	0.994***	0.820***	0.368	0.265	0.345	0.190	0.277
	(0.171)	(0.191)	(0.183)	(0.229)	(0.224)	(0.315)	(0.254)	(0.260)	(0.305)	(0.252)
DlGDP_CDC	-0.640**	-0.775**	-0.677**	-0.729*	-0.684*	-0.355	-0.388	-0.217	-0.962	-0.660
	(0.261)	(0.311)	(0.270)	(0.364)	(0.368)	(0.641)	(0.578)	(0.505)	(0.552)	(0.499)
DIFF_IR	-0.367	-0.350		-0.229	-0.346	0.00718	-0.294		-0.229	-0.480
	(0.272)	(0.295)		(0.256)	(0.316)	(0.305)	(0.371)		(0.371)	(0.388)
CRISIS	-0.109*	-0.126**	-0.130**	0.0181	-0.138*	-0.173***	-0.162***	-0.151**	-0.188*	-0.168**
	(0.0537)	(0.0596)	(0.0572)	(0.0815)	(0.0684)	(0.0518)	(0.0536)	(0.0541)	(0.103)	(0.0574)
lSP500	-0.252***	-0.266***	-0.273***			-0.325	-0.280	-0.304		
	(0.0605)	(0.0639)	(0.0667)			(0.212)	(0.224)	(0.182)		
lRWA_EAD		**-0.0296**	**-0.0476**	**-0.0221**	**-0.0175**		**-0.178****	**-0.152****	**-0.202****	**-0.194****
		(0.0341)	(0.0292)	(0.0375)	(0.0394)		(0.0731)	(0.0590)	(0.0826)	(0.0803)
lVIX				-0.175**					0.0490	
				(0.0807)					(0.124)	
DlTRADOPEN					-0.444					-0.357
					(0.284)					(0.221)
Constant	1.871***	1.922***	1.931***	0.496**	0.0277	2.347	2.007	2.178	-0.130	0.00676
	(0.441)	(0.459)	(0.481)	(0.223)	(0.0698)	(1.509)	(1.602)	(1.304)	(0.351)	(0.0344)
Observations	137	122	122	122	122	82	81	94	81	80
AR2	0.236	0.175	0.175	0.400	0.129	0.415	0.493	0.484	0.480	0.587
Hansen	0.252	0.276	0.296	0.156	0.180	0.569	0.720	0.347	0.742	0.778
Instr	16	17	17	17	17	16	17	16	17	17

Notes: Dependent variable, for all regressions, is cross-border banking claims. Standard errors in parenthesis: * p < 0.10, ** p < 0.05, *** p < 0.01. A robust covariance matrix is used to allow consideration for a heteroskedastic structure of the residuals and autocorrelation within panels. We use the lag length of 9 periods so, we 'collapse' the instrument to reduces the number of instruments by creating an instrument for each variable and lag,

6. Conclusion

The high-level growth in emerging countries promises of higher equity returns. Nevertheless, these expectations will not be fulfilled without the large capital flows from rich countries in capital to the developed economies. Nevertheless, the procyclicality of these flows represents damaging effects on their financial stability following the crises such as the subprime crisis and the current shock of the Covid 19 pandemic.

Consistent with the evidence in previous studies, first, we show that there have been significant changes in the behavior of bank capital flows to emerging countries from before the crisis to after, with starker changes for these flows. These changes do not appear to be due to an increase in the inherent instability of the flows, but due to changes in the sensitivity of the flows to risk aversion and regulation context, which has enhanced during the post-crisis period.

Second, we find that trade openness gains a more prominent role in the post-crisis period in contrast to the pre-crisis period. Indeed, instead of having a positive effect as the pre-crisis period, it affects negatively bank capital flows. This reflects that a country with wide trade openness is more affected by the disruption due to the crisis and its transmission through the commercial channel.

Regarding banking regulation criteria, results suggest that Basel standards affect international bank lending. Thus, strengthening regulatory requirements and changes in banking regulation affect the structure of external financing of emerging countries. The results confirm the negative and significant effect of the regulatory requirements weights on the banking flows towards emerging countries. As a result, adjustments to regulatory requirements under Basel III will lead to a reduction in bank flows to emerging countries. Particularly, when the implementation of Basel III coincides with the current context of the Covid 19 crisis characterized by an increase in the level of risk.

However, given that the banking flows to lower rated countries are more sensitive to this increase in regulatory requirements, emerging countries are encouraged to improve their ratings in order to offset or limit this effect. The results confirm also the significant and negative effect of bank financialization on banking flows to these countries in the post-crisis period.

Thus, we can conclude that this empirical result does show this reallocation, reflecting the regulatory arbitrage, could imply either that bank previously captured inadequately risk (due to overestimation of risk in times of crisis) or that imperfect risk weights under Basel II distort

banks' lending decisions and caused them to pursue regulatory arbitrage. Thus, Basel II likely over-penalized risky lending (such as to speculative grade countries) because the weighting did not take into account the portfolio diversification benefits of such lending. So, as Bremus and Fratzscher (2015) indicate, it will be important to implement regulatory rules in a transparent and harmonized in order to avoid distortionary lending behavior and reduced regulatory arbitrage by international bank activities.

As part of the reduction in regulatory arbitrage, Basel III presents a significant improvement by introducing a leverage ratio (independent of any weighting) while increasing the level of capital with internationally harmonized liquidity standards. However, it does not change the regulatory infrastructure based on risk weights, namely RWA calculations and the high sensitivity of regulatory requirements to risk. In order to limit this regulatory arbitrage and the effect of crises such as Covid 19 on international banking flows, the reframing of RWAs could constitute an interesting step forward through, on the one hand, the capping of RWAs and, on the other hand, determining a "floor" level for complex internal models.

Otherwise, emerging countries could offset the decline in banking flows by financing on the financial markets, which remain highly volatile. Nevertheless, for less developed countries that do not have access to financial markets, decline in banking flows will have an impact on the financing of investment and growth. This decline in bank flows gives these countries the opportunity to become aware of the need to develop their banking system and increase their savings capacity in order to limit their dependence on external financing.

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Appendix 1: Variables and sources presentations

Variables		Name	Source	Construction	Expected signe
Dependent variable		DlIBCLAIMS : Cross-border banking claims from 19 developed countries to emerging countries	Bank for international settlements (*locational banking statistics*)	Log-difference of Cross-border banking claims of the reporting banks by the BIS developed countries to emerging countries i at end of period	
Explanatory variables	Pull factors	DlGDP_CEC : Emerging countries GDP per capita	World Bank, World development indicators	Log-difference of emerging countries GDP per capita, current price	+
		DIFF_IR: The differential of real interest rates between emerging countries and the United States.	World Bank, World development indicators	The difference between the real interest rate of an emerging country i and the real interest rate of United States of closure (as a percentage)	+/-
		lRATING_SP : Ratings of emerging countries by Standard and Poor's	Standard and Poor's	Log S & P rating of emerging i associated with a numerical code from AAA = 1 'to' SD = 26 ', end of period	+/-
		DlTRADOPEN: the degree of trade openness measured as the 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.	Sum of imports and exports of goods and services as a percentage of GDP	+
	Push factors	DlGDP_CDC : Development countries GDP per capita	World Bank, World development indicators	Log-difference of the average GDP per capita in developed countries, current prices	-
		lSP500: Standard and Poor's 500	Standard and Poor's	Log S & P 500 closing price in Dollars	-
		lRWA_EAD : The risk weights assets used as a proxy of regulatory requirements (as a percentage of EAD)	Author's calculation	Log risk weights assets calculated by author	+/-
		VIX (Volatility Index): measures market expectation of short term volatility conveyed by stock index option prices.	Chicago Board Options Exchange	Natural Log of VIX Index, end of Period	-

Appendix 2: List of countries

Emerging countries (37)				Developed countries (19)	
Latin America	Europe	Africa	Asia		
Argentina	Bulgaria	Egypt	China	Australia	Italy
Brazil	Croatia	Morocco	Hong Kong	Austria	Japan
Chile	Czech republic	South Africa	India	Belgium	Netherlands
Colombia	Estonia	Tunisia	Indonesia	Canada	Portugal
Costa Rica	Hungary		Kazakhstan	Denmark	Spain
Mexico	Latvia		Malaysia	Finland	Sweden
Peru	Lithuania		Philippines	France	Switzerland
Uruguay	Poland		Russia	Germany	United Kingdom
Venezuela	Romania		Singapore	Greece	United States
	Slovakia		Thailand	Ireland	
	Slovenia		Turkey		
	Ukraine		Vietnam		

Appendix 3: List of emerging countries by OECD 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 4: Summary of descriptive statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
DlIBCLAIMS	848	0.1318106	0.3089537	-0.8419514	3.165039
DlGDP_CEC	852	0.0663377	0.1344944	-0.9793067	0.4044666
DlGDP_CDC	888	0.0316925	0.0683007	-0.0979309	0.1769991
DIFF_IR	732	0.02951117	0.1354502	-0.9526106	0.9082268
DlTRADOPEN	859	.0165008	.1125636	-.5678611	1.437791
lVIX	925	2.942686	.3285297	2.44755	3.68888
lSP500	925	6.80176	0.5020968	5.799759	7.522054
lRATING_SP	752	2.172214	0.5453672	0	3.258096
lRWA_EAD	715	-0.8699638	0.7491007	-2.793727	0.9579032
OCDEDUM	925	0.1448649	0.3521549	0	1

Appendix 5: Pearson correlation matrix

1990-2006

	DlIBCLAIMS	L.DlIBCLAIMS	DlGDP_CEC	DlGDP_CDC	DIFF_IR	DlTRADOPEN	lVIX	lSP500	lRATING_SP	OCDEDUM	lRWA_EAD
DlIBCLAIMS	1.0000										
L.DlIBCLAIMS	0.4167*	1.0000									
DlGDP_CEC	0.2738*	0.0831	1.0000								
DlGDP_CDC	0.1120*	0.0469	0.2644*	1.0000							
DIFF_IR	-0.1612*	-0.0594	-0.0937	0.0352	1.0000						
DlTRADOPEN	-0.0977	0.0516	-0.3687*	0.1338*	-0.0650	1.0000					
lVIX	-0.1302*	-0.0555	-0.3329*	-0.3298*	0.0874	-0.0482	1.0000				
lSP500	-0.0546	-0.0502	-0.0021	-0.0135	0.0383	0.0271	0.2513*	1.0000			
lRATING_SP	-0.0740	-0.0990	-0.0835	-0.0133	0.1364*	0.0288	0.1144	0.0757	1.0000		
OCDEDUM	0.0242	0.0346	0.0311	0.0242	-0.0585	0.0723	0.0464	0.1645*	0.0033	1.0000	
lRWA_EAD	-0.2620	-0.3007*	-0.1452*	-0.0432	0.1767*	-0.0168	0.1666*	0.0555	0.9815*	-0.0998	1.0000

Note: * significant at p < 0.01.

2007-2014

	DlIBCLAIMS	L.DlIBCLAIMS	DlGDP_CEC	DlGDP_CDC	DIFF_IR	DlTRADOPEN	lVIX	lSP500	lRATING_SP	OCDEDUM	lRWA_EAD	CRISIS
DlIBCLAIMS	1.0000											
L.DlIBCLAIMS	0.3107*	1.0000										
DlGDP_CEC	0.3884*	0.4898*	1.0000									
DlGDP_CDC	0.2552*	0.4627*	0.6812*	1.0000								
DIFF_IR	-0.1288	-0.1837	-0.3412	-0.2861*	1.0000							
DlTRADOPEN	-0.0421	0.0681	0.1871*	0.5069*	-0.0977	1.0000						
lVIX	0.0617	0.3799*	0.2778*	0.3826*	-0.1398	0.0565	1.0000					
lSP500	-0.1347	0.1106	0.2389*	0.3333*	-0.1772	0.3376*	0.0660	1.0000				
lRATING_SP	-0.0898	-0.0572	0.0199	-0.0119	0.0111	-0.0322	0.0085	-0.0121	1.0000			
OCDEDUM	-0.0661	-0.0690	-0.1354	-0.0156	-0.0475	0.1612*	-0.0631	0.0233	-0.1489	1.0000		
lRWA_EAD	-0.0891	-0.0671	0.0126	-0.0394	-0.0557	-0.0705	-0.0029	-0.0394	0.9768*	-0.3891*	1.0000	
CRISIS	-0.0639	0.1517*	-0.1798*	-0.2356*	0.0700	-0.4301*	0.6685*	-0.3840*	0.0230	-0.0715	0.0377	1.0000

Note: * significant at p < 0.01.

Appendix 5.1. Collinearity diagnostics 1990-2014

	1990-2006				2007-2014			
Variable	VIF	SQRT VIF	Tolerance	R-Squared	VIF	SQRT VIF	Tolerance	R-Squared
DlIBCLAIMS	1.25	1.12	0.8030	0.1970	1.37	1.17	0.7291	0.2709
DlGDP_CEC	2.41	1.55	0.4158	0.5842	2.34	1.53	0.4274	0.5726
DlGDP_CDC	1.33	1.15	0.7506	0.2494	2.99	1.73	0.3341	0.6659
DIFF_IR	1.11	1.06	0.8978	0.1022	1.15	1.07	0.8685	0.1315
DlTRADOPEN	1.70	1.30	0.5893	0.4107	1.56	1.25	0.6426	0.3574
lVIX	1.64	1.28	0.6080	0.3920	1.23	1.11	0.8124	0.1876
lSP500	1.14	1.07	0.8799	0.1201	1.26	1.12	0.7906	0.2094
lRATING_SP	1.04	1.02	0.9637	0.0363	1.05	1.02	0.9543	0.0457
OCDEDUM	1.05	1.03	0.9489	0.0511	1.07	1.03	0.9382	0.0618
Mean VIF	1.41				1.56			

Appendix 6: Codes associated with S&P ratings

Category	Rating S&P (L-T)	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: Difference in difference estimation results

VARIABLES	(1) DlIBCLAIMS
BASELDUM	-0.176***
	(0.0293)
SGDUM	-0.0909***
	(0.0260)
_diff	0.0780*
	(0.0451)
Constant	0.229***
	(0.0198)
Observations	848
R-squared	0.053

Notes: BASELDUM is a dummy variable that takes the values of 0 for the Basel I period (1990-2006) and the value of 1 for the Basel II period (2007-2014). SGDUM is a dummy variable that takes the values of 1 if country is rated speculative grade and 0 if country is rated investment grade. _diff is the interaction between BASELDUM and SGDUM.

Appendix 8: Default Probability associated with S&P ratings

Rating	1 Year
AAA	0.00
AA+	0.00
AA	0.02
AA-	0.03
A+	0.06
A	0.07
A-	0.08
BBB+	0.14
BBB	0.20
BBB-	0.32
BB+	0.43
BB	0.68
BB-	1.13
B+	2.31
B	4.73
B-	7.92
CCC/C	26.87

Source: Ratings S&P, March 19, 2014

Notes: From S&P Global corporate average cumulative default rates: 1981-2013

Appendix 9: Robustness tests

9.1. Robustness tests of the first estimation with Dynamic Feasible Generalized Least Squares model

	(1) DlIBCLAIMS	(2) DlIBCLAIMS	(3) DlIBCLAIMS	(4) DlIBCLAIMS	(5) DlIBCLAIMS	(6) DlIBCLAIMS	(7) DlIBCLAIMS	(8) DlIBCLAIMS	(9) DlIBCLAIMS	(10) DlIBCLAIMS
				1990-2006					***2007-2014***	
L.DlIBCLAIMS	0.416***	0.394***	0.441***	0.424***	0.429***	0.171***	0.170***	0.158***	0.159***	0.140***
	(0.0321)	(0.0337)	(0.0363)	(0.0377)	(0.0341)	(0.0483)	(0.0484)	(0.0492)	(0.0495)	(0.0475)
DlGDP_CEC	0.555***	0.553***	0.502***	0.502***	0.778***	0.637***	0.637***	0.665***	0.659***	0.655***
	(0.0535)	(0.0531)	(0.0519)	(0.0516)	(0.0602)	(0.0841)	(0.0851)	(0.0887)	(0.0896)	(0.0857)
DlGDP_CDC	-0.0491	-0.0551	-0.00176	-0.00104	-0.142	-0.366**	-0.366**	-0.349**	-0.348**	0.0311
	(0.0983)	(0.0977)	(0.103)	(0.102)	(0.101)	(0.146)	(0.147)	(0.147)	(0.149)	(0.182)
DIFF_IR	-0.0686*	-0.0497	-0.0731	-0.0582		-0.0768	-0.0775	-0.0463	-0.0487	
	(0.0405)	(0.0408)	(0.0457)	(0.0458)		(0.103)	(0.104)	(0.104)	(0.106)	
lSP500	0.00764	-0.000592	-0.0223	-0.0296*		-0.198***	-0.198***	-0.210***	-0.210***	
	(0.0157)	(0.0157)	(0.0176)	(0.0175)		(0.0400)	(0.0399)	(0.0408)	(0.0410)	
OCDEDUM		**0.0397****		**0.0389****	**0.0116**		**-0.000438**		**-0.00883**	**0.00154**
		(0.0181)		(0.0189)	(0.0161)		(0.0170)		(0.0178)	(0.0155)
lRATING_SP			**-0.00784**	**-0.00233**	**-0.0205**			**-0.0255****	**-0.0263****	**-0.0187*****
			(0.0163)	(0.0157)	(0.0145)			(0.0103)	(0.0109)	(0.00586)
lVIX					0.0306					-0.102**
					(0.0221)					(0.0511)
DlTRADOPEN					0.434***					-0.234**
					(0.0757)					(0.105)
CRISIS						-0.0498***	-0.0498***	-0.0450***	-0.0463***	0.0459
						(0.0165)	(0.0166)	(0.0173)	(0.0174)	(0.0340)
Constant	-0.00775	0.0415	0.217*	0.249**	-0.0240	1.442***	1.445***	1.576***	1.581***	0.334**
	(0.108)	(0.108)	(0.126)	(0.124)	(0.0705)	(0.288)	(0.288)	(0.296)	(0.298)	(0.147)
Observations	442	442	388	388	430	239	239	239	239	294
chisquared	366.7	373.1	337.0	344.9	803.6	174.9	175.8	168.0	167.3	161.8

Notes: Dependent variable, for all regressions, is cross-border banking claims. Standard errors in parenthesis: * p < 0.10, ** p < 0.05, *** p < 0.01.
Autocorrelation (AR1) and heteroscedasticity have been corrected

9.2. Robustness tests of the first estimation with Iterated Feasible Generalized Least Squares model

	(1) DlIBCLAIMS	(2) DlIBCLAIMS	(3) DlIBCLAIMS	(4) DlIBCLAIMS	(5) DlIBCLAIMS	(6) DlIBCLAIMS	(7) DlIBCLAIMS	(8) DlIBCLAIMS	(9) DlIBCLAIMS	(10) DlIBCLAIMS
			1990-2006					***2007-2014***		
L.DlIBCLAIMS	0.416***	0.390***	0.436***	0.410***	0.408***	0.154***	0.163***	0.138***	0.141***	0.114**
	(0.0321)	(0.0332)	(0.0356)	(0.0368)	(0.0354)	(0.0475)	(0.0474)	(0.0463)	(0.0470)	(0.0461)
DlGDP_CEC	0.525***	0.522***	0.491***	0.490***	0.727***	0.620***	0.621***	0.693***	0.681***	0.687***
	(0.0505)	(0.0499)	(0.0496)	(0.0492)	(0.0668)	(0.0763)	(0.0800)	(0.0814)	(0.0827)	(0.0786)
DlGDP_CDC	-0.0172	-0.0251	0.0133	0.00744	-0.130	-0.350***	-0.410***	-0.407***	-0.406***	-0.00835
	(0.0958)	(0.0945)	(0.0994)	(0.0977)	(0.104)	(0.134)	(0.136)	(0.137)	(0.137)	(0.165)
DIFF_IR	-0.0897**	-0.0707*	-0.0800*	-0.0617	-0.0331	-0.0404	-0.0925	-0.0483	-0.0539	
	(0.0415)	(0.0416)	(0.0458)	(0.0458)	(0.0430)	(0.0884)	(0.0999)	(0.0977)	(0.0991)	
lSP500	0.000653	-0.00761	-0.0252	-0.0336**		-0.146***	-0.184***	-0.195***	-0.197***	
	(0.0154)	(0.0153)	(0.0170)	(0.0168)		(0.0346)	(0.0376)	(0.0378)	(0.0380)	
OCDEDUM		**0.0439****		**0.0441****	**0.0222**		**-0.00604**		**-0.00885**	**-0.000947**
		(0.0176)		(0.0180)	(0.0174)		(0.0165)		(0.0172)	(0.0150)
lRATING_SP			**-0.00681**	**-0.00136**	**-0.00659**			**-0.0237****	**-0.0239****	**-0.0161*****
			(0.0155)	(0.0148)	(0.0142)			(0.00945)	(0.00990)	(0.00543)
lVIX					0.0262					-0.0922*
					(0.0228)					(0.0473)
DlTRADOPEN					0.412***					-0.234**
					(0.0862)					(0.0956)
CRISIS							-0.0446***	-0.0402**	-0.0421***	0.0448
							(0.0154)	(0.0158)	(0.0160)	(0.0314)
Constant	0.0387	0.0882	0.233*	0.271**	-0.0422	1.060***	1.346***	1.465***	1.482***	0.307**
	(0.105)	(0.105)	(0.121)	(0.119)	(0.0746)	(0.249)	(0.271)	(0.274)	(0.276)	(0.135)
Observations	442	442	388	388	388	239	239	239	239	294
chisquared	366.8	387.0	346.4	363.1	421.2	175.5	185.7	193.0	187.7	173.9

Notes: Dependent variable, for all regressions, is cross-border banking claims. Standard errors in parenthesis: * p < 0.10, ** p < 0.05, *** p < 0.01.
Autocorrelation (AR1) and heteroscedasticity have been corrected.

9.3. Robustness tests of the second estimation with Dynamic Feasible Generalized Least Squares model

	(1) DlIBCLAIMS	(2) DlIBCLAIMS	(3) DlIBCLAIMS	(4) DlIBCLAIMS
L.DlIBCLAIMS	0.171***	0.162***	0.165***	0.133**
	(0.0483)	(0.0524)	(0.0537)	(0.0574)
DlGDP_CEC	0.637***	0.693***	0.676***	0.745***
	(0.0841)	(0.101)	(0.103)	(0.106)
DlGDP_CDC	-0.366**	-0.396**	-0.382**	-0.383
	(0.146)	(0.180)	(0.181)	(0.256)
CRISIS	-0.0498***	-0.0437**	-0.0458**	0.000890
	(0.0165)	(0.0200)	(0.0202)	(0.0466)
DIFF_IR	-0.0768	-0.00190	-0.0127	0.0216
	(0.103)	(0.108)	(0.112)	(0.117)
lSP500	-0.198***	-0.221***	-0.220***	
	(0.0400)	(0.0479)	(0.0479)	
lRWA_EAD		**-0.0302*** **	**-0.0345*** **	**-0.0221***
		(0.0103)	(0.0117)	(0.0130)
OCDEDUM			-0.0254	-0.0133
			(0.0223)	(0.0235)
lVIX				-0.0495
				(0.0697)
DlTRADOPEN				-0.181
				(0.144)
Constant	1.442***	1.560***	1.557***	0.127
	(0.288)	(0.344)	(0.344)	(0.199)
Observations	239	222	222	221
chisquared	174.9	139.6	136.9	121.4

Notes: Dependent variable, for all regressions, is cross-border banking claims. Standard errors in parenthesis: * p < 0.10, ** p < 0.05, *** p < 0.01. Autocorrelation (AR1) and heteroscedasticity have been corrected

9.4. Robustness tests of the second estimation with Iterated Feasible Generalized Least Squares model

	(1) DlIBCLAIMS	(2) DlIBCLAIMS	(3) DlIBCLAIMS	(4) DlIBCLAIMS
L.DlIBCLAIMS	0.163***	0.151***	0.160***	0.133**
	(0.0468)	(0.0497)	(0.0513)	(0.0546)
DlGDP_CEC	0.633***	0.731***	0.703***	0.794***
	(0.0784)	(0.0950)	(0.0975)	(0.0925)
DlGDP_CDC	-0.418***	-0.526***	-0.518***	-0.646***
	(0.136)	(0.168)	(0.169)	(0.224)
CRISIS	-0.0440***	-0.0371**	-0.0400**	-0.00215
	(0.0153)	(0.0184)	(0.0187)	(0.0417)
DIFF_IR	-0.0847	-0.00539	-0.0173	-0.0100
	(0.0984)	(0.0981)	(0.103)	(0.109)
lSP500	-0.183***	-0.208***	-0.211***	
	(0.0375)	(0.0446)	(0.0449)	
lRWA_EAD		**-0.0272*** **	**-0.0304*** **	**-0.0126**
		(0.00984)	(0.0112)	(0.0122)
OCDEDUM			-0.0207	-0.0108
			(0.0216)	(0.0229)
lVIX				-0.0271
				(0.0625)
DlTRADOPEN				-0.0916
				(0.129)
Constant	1.339***	1.469***	1.495***	0.0766
	(0.271)	(0.320)	(0.322)	(0.178)
Observations	239	222	222	221
chisquared	188.2	152.1	143.9	142.0

Notes: Dependent variable, for all regressions, is cross-border banking claims. Standard errors in parenthesis: * p < 0.10, ** p < 0.05, *** p < 0.01. Autocorrelation (AR1) and heteroscedasticity have been corrected.

9.5. Robustness tests of the third estimation with Dynamic Feasible Generalized Least Squares model

	(1) DlIBCLAIMS	(2) DlIBCLAIMS	(3) DlIBCLAIMS	(4) DlIBCLAIMS	(5) DlIBCLAIMS	(6) DlIBCLAIMS	(7) DlIBCLAIMS	(8) DlIBCLAIMS	(9) DlIBCLAIMS	(10) DlIBCLAIMS
	Investment Grade					***Speculative Grade***				
Lagged.DlIBCLAIMS	0.0961*	0.110*	0.119**	0.120**	0.0882	0.508***	0.388***	0.380***	0.420***	0.307***
	(0.0570)	(0.0586)	(0.0565)	(0.0593)	(0.0581)	(0.0905)	(0.0740)	(0.0623)	(0.0783)	(0.0752)
DlGDP_CEC	0.792***	0.846***	0.758***	0.921***	0.825***	0.284*	0.320**	0.402***	0.241*	0.534***
	(0.118)	(0.120)	(0.124)	(0.120)	(0.124)	(0.156)	(0.128)	(0.114)	(0.140)	(0.134)
DlGDP_CDC	-0.408**	-0.522**	-0.340*	-0.195	-0.273	-0.295	-0.398	-0.131	-0.623**	-0.988***
	(0.178)	(0.211)	(0.200)	(0.232)	(0.271)	(0.285)	(0.300)	(0.278)	(0.254)	(0.271)
DIFF_IR	-0.195	-0.105		-0.0851	-0.0902	-0.309	-0.694**		-0.793**	-1.020***
	(0.121)	(0.125)		(0.129)	(0.123)	(0.279)	(0.300)		(0.314)	(0.331)
CRISIS	-0.0325	-0.0276	-0.0333	0.0866**	-0.0243	-0.0571	-0.0615*	-0.0578*	-0.0226	-0.0402
	(0.0269)	(0.0322)	(0.0285)	(0.0417)	(0.0301)	(0.0384)	(0.0339)	(0.0317)	(0.0353)	(0.0359)
lSP500	-0.150***	-0.120**	-0.175***			-0.311***	-0.204**	-0.268***		
	(0.0489)	(0.0558)	(0.0546)			(0.0804)	(0.0951)	(0.0861)		
lRWA_EAD		**-0.0109**	**-0.00332**	**-0.00711**	**0.000280**		**-0.175*** **	**-0.124*** **	**-0.211*** **	**-0.175*** **
		(0.0187)	(0.0187)	(0.0185)	(0.0192)		(0.0382)	(0.0335)	(0.0380)	(0.0428)
lVIX				-0.151***					-0.0657**	
				(0.0558)					(0.0320)	
DlTRADOPEN					-0.451**					0.0548
					(0.176)					(0.173)
Constant	1.112***	0.855**	1.261***	0.420***	0.00773	2.217***	1.439**	1.896***	0.155	-0.0205
	(0.355)	(0.404)	(0.393)	(0.160)	(0.0326)	(0.581)	(0.683)	(0.619)	(0.0946)	(0.0174)
Observations	136	120	160	120	120	80	79	90	79	78
chisquared	84.49	76.89	63.09	85.23	85.62	72.82	171.2	883.0	166.0	212.7

Notes: Dependent variable, for all regressions, is cross-border banking claims. Standard errors in parenthesis: * p < 0.10, ** p < 0.05, *** p < 0.01.
Autocorrelation and heteroscedasticity have been corrected.

9.6. Robustness tests of the third estimation with Iterated Feasible Generalized Least Squares model

	(1) DlIBCLAIMS	(2) DlIBCLAIMS	(3) DlIBCLAIMS	(4) DlIBCLAIMS	(5) DlIBCLAIMS	(1) DlIBCLAIMS	(2) DlIBCLAIMS	(3) DlIBCLAIMS	(4) DlIBCLAIMS	(5) DlIBCLAIMS
	Investment Grade					***Speculative Grade***				
Lagged.DlIBCLAIMS	0.0789	0.100*	0.135***	0.116*	0.0849	0.485***	0.421***	0.354***	0.402***	0.252***
	(0.0559)	(0.0562)	(0.0502)	(0.0622)	(0.0546)	(0.0760)	(0.0838)	(0.0521)	(0.0887)	(0.0584)
DlGDP_CEC	0.723***	0.775***	0.763***	0.995***	0.794***	0.431***	0.198	0.573***	0.113	0.609***
	(0.115)	(0.118)	(0.108)	(0.133)	(0.119)	(0.139)	(0.139)	(0.0942)	(0.139)	(0.0869)
DlGDP_CDC	-0.354**	-0.504**	-0.398**	-0.369	-0.252	-0.727***	-0.475	-0.524**	-0.783***	-1.399***
	(0.163)	(0.201)	(0.161)	(0.266)	(0.261)	(0.238)	(0.293)	(0.240)	(0.290)	(0.166)
DIFF_IR	-0.147	-0.0976		-0.106	-0.0925	-0.377	-0.792**		-0.806***	-1.333***
	(0.119)	(0.120)		(0.144)	(0.118)	(0.275)	(0.311)		(0.299)	(0.283)
CRISIS	-0.0268	-0.0165	-0.0223	0.105**	-0.0251	-0.0477	-0.0569*	-0.0419*	-0.0696	-0.00592
	(0.0245)	(0.0299)	(0.0224)	(0.0466)	(0.0284)	(0.0308)	(0.0320)	(0.0254)	(0.0424)	(0.0203)
lSP500	-0.175***	-0.137***	-0.154***			-0.257***	-0.218**	-0.219***		
	(0.0443)	(0.0525)	(0.0439)			(0.0730)	(0.0935)	(0.0740)		
lRWA_EAD		**-0.00283**	**0.00878**	**-0.0215**	**0.00835**		**-0.167*** **	**-0.0950*** **	**-0.218*** **	**-0.155*** **
		(0.0185)	(0.0176)	(0.0260)	(0.0189)		(0.0394)	(0.0294)	(0.0428)	(0.0356)
lVIX				-0.177***					0.0290	
				(0.0662)					(0.0631)	
DlTRADOPEN					-0.556***					0.194*
					(0.160)					(0.109)
Constant	1.295***	0.998***	1.128***	0.484**	0.0200	1.842***	1.547**	1.558***	-0.0998	-0.00819
	(0.322)	(0.381)	(0.316)	(0.191)	(0.0324)	(0.526)	(0.672)	(0.530)	(0.182)	(0.0152)
Observations	136	120	160	120	120	80	79	90	79	78
chisquared	85.44	73.20	82.12	72.38	97.37	89.38	107.9	33818.6	89.82	321.2

Notes: Dependent variable, for all regressions, is cross-border banking claims. Standard errors in parenthesis: * p < 0.10, ** p < 0.05, *** p < 0.01.
Autocorrelation and heteroscedasticity have been corrected.