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## Determinants of loans and deposits strategies of foreign bank subsidiaries in emerging countries

**Dr. Mehdi Mili**

ISG Sousse | e-mail: [milimehdi@gmail.com](mailto:milimehdi@gmail.com)

**Prof. Jean-Michel Sahut**

Geneva School of Business Administration, University of Applied Sciences | e-mail: [jmsahut@gmail.com](mailto:jmsahut@gmail.com)

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### Abstract

This paper focuses on the transmission of bank liquidity shocks in Loan and deposit in emerging markets. First, we attempt to identify factors affecting the credit strategy of foreign banks in emerging countries. Second, we test whether depositors exert market discipline on foreign subsidiaries. By combining financial variables of subsidiaries and their parent banks and macroeconomic variables of host and home countries, we investigate the factors that may affect the behavior of depositors. Our empirical approach is based on a Partial Least Squares-Path model that allows us to identify the causal relationships between the various groups of variables. Our results show that foreign bank lending is determined by the specific financial variables of the parent bank and macroeconomic variables of the country of origin. This supports that the strategy's credit of foreign subsidiary is centrally managed at the parent bank and credit supply of subsidiaries depends primarily on the financial situation of its parent bank. Finally, we find evidence of market discipline exercised over foreign subsidiaries in emerging countries. We show that market discipline is strongly affected by the specific characteristics of the subsidiary.

**Keywords:** foreign banks, credit supply, market discipline, emerging countries



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# Determinants of loans and deposits strategies of foreign bank subsidiaries in emerging countries

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## I. Introduction

The world today is characterized by perfect capital mobility which has accelerated the transmission of shocks from developed to emerging countries. In the literature, it is argued that large banks have played an important role in the transmission of liquidity shocks through their subsidiaries established in foreign countries. Thus, some studies have concluded that the existence of subsidiaries of foreign banks in emerging countries favor the transmission of liquidity shocks to banks from developed countries to emerging countries. Haas and van Lelyveld (2010) show that the strength of the parent bank is an excellent guarantee that attracts credit applications and deposits. In addition, the subsidiary is not completely autonomous and is part of a group where the parent bank centrally manages the liquidity of its subsidiaries.

Foreign banks have significantly expanded their range of activities in emerging economies. Traditionally, they mainly offered financial services to international companies. However, since the 90s, they are increasingly attracted by the prospect of growing profits in local markets. Basically, foreign banks has no longer a passive response quite changing needs of existing customers, but a dynamic exploration of new markets in the host country. The distress of many emerging banking systems has caused the

phenomena of credit crunch, an extreme form of rationing behavior.

The 2007-2009 crisis experienced by large international banks brings up the problem of destabilizing role of parent banks in host countries which leads to the vulnerability of their banking systems countries. Pressures on liquidity and capital that international banks undergoing in the EU have affected national banking systems of Central and Eastern Europe. In particular, liquidity problems in the parent companies have the incentive to reduce the funding of their subsidiaries in CEE.

Data from the BIS bank lending by foreign banks show that local currency loans granted by any subsidiaries of foreign banks CEE declined from March 2008 to June 2008 in most emerging countries in Central and Eastern Europe. For Havrylchyk (2009), the decline of local debt was mainly due to the depreciation of the currency and cross-border debt is due to credit lines from their foreign subsidiaries decreased banks. There was instability and movement of bank capital and the role of developed countries of the European Community in funding foreign banks proved risky.

While the evolution of foreign bank participation in the development of investment opportunities and risks in emerging economies, increased competition in traditional markets has forced international banks to seek new areas of expansion. Improved measurement and risk management has facilitated the development of financial institutions in emerging countries. On the one hand, they have learned to quantify and manage the market risks and credit support standard models. On the other hand, the consolidation of macroeconomic policy frameworks and increased reliance on market forces probably standardized nature of risks in relation to the developed world.

The aim of our paper is to identify factors affecting the credit strategy of foreign banks in emerging countries. As has been suggested by several researchers that one possible way for the reversal in lending is the financing of foreign banks, we extend our analysis to more focusing on market discipline. In particular, we investigate whether the characteristics of subsidiary and parent bank can explain the behavior of deposits.

The problem of transmission of liquidity shocks has been widely discussed in the context of emerging countries. Major studies in this context show that the strategy of credit may be affected by specific characteristics of both subsidiaries and parent banks. But it was also proved that the macroeconomic conditions of the country and the mother country home may also affect the credit subsidiaries. Allen et al.(2012) show that foreign bank lending is determined by different factors in emerging markets and in developed countries. They show that parent bank fragility negatively affects lending by subsidiaries. Among the macroeconomic variables, economic growth and exchange rate matter only for developing countries. Furthermore, they also observe a significant impact of market structure on the lending growth in the developing countries.

But one limit their models is that macro variables of emerging country can be themselves affected by macroeconomic variables of developed country. Similarly, the home country macroeconomic variables can also affect specific characteristics of the parent bank which is located in a developed country. This presents a major problem of colinearity between the variables considered in the same model. In this study we remedy this limit by considering a type econometric approach PLS Path which will allow us to take account of interdependent

relationships between different groups of variables.

Chin (2000) and Esposito (2008) among other show that the PLS has the important advantage is that that it requires no assumption on multinormality of the data. However, this condition is rarely met in finance. It is this advantage that has led us to favor this approach in the context of our practical application.

The rest of the paper is organized as follow. Section 2 presents a literature review on the role of foreign affiliates in the transmission of liquidity socks in emerging countries. The third section describes our methodology and the database used in this study. The following section provides a synthesis of the results. Section 5 concludes.

## **II. Lending shock transmission to emerging countries by bank subsidiaries and market discipline**

### **a. Lending shock transmission by bank subsidiaries**

The last financial crisis and the need for sound banking systems have opened the opportunities to invest in financial institutions and to develop activities in emerging countries. Monetary authorities in these areas attempted to overcome this crisis by accelerating the liberalization of their financial sectors to facilitate the recapitalization of banks and the concentration of the banking sector.

The expansion of credit via foreign banks also poses problems of financial stability authorities of the host country. The invasion of the emerging country by foreign banks had direct effects on the transmission of credit shocks from developed countries to developing

countries. The activity of foreign banks is strongly focused on lending through local institutions affiliated. The ratio of local claims in local currency on the total foreign claims (international and local currency) held by foreign banks has significantly increased in all emerging regions. Bank subsidiaries may affect the economies of the emerging country in two ways. First, a crisis liability that often occurs as banking panic and is derived from the random nature of depositor's withdrawals. This is based on the polarization of depositors' expectations and surely marks the limits of the policy's deployment banking strictly individual. Second, a crisis of assets which is due to the irreversibility of the lending relationship: if a negative shock affects the profitability or chronic repayments for loans already made, then the bank is facing a liquidity risk, which itself may cause a race to liquidity.

Loans of subsidiaries contribute to the financing of the growing demand for domestic credit. Heavy dependence on external capital exposes the foreign subsidiaries to the risk of non-renewal of funding, even at the risk of sudden withdrawal of capital. The experienced liquidity crisis by the global banking system during the financial year 2008-2009 had particularly affected Muslim countries. Financing difficulties of parent bank and risk premiums rising have reduced funding for subsidiaries. In addition, the deterioration of the general economic situation led foreign banks to re-evaluate the risks in host markets and tougher lending conditions abroad.

Arvai et al. (2009) present different two contagious channels that can be carried through inter-bank linkages and relationships' parent / subsidiaries. The first channel, the problems of liquidity or solvency of a subsidiary may affect its parent, which feeds back on its other subsidiaries in other host countries through

the channel of the common creditor. The parent banks of subsidiaries operating in host countries are in spin affected. A variant of this channel implies also that subsidiary wants to reduce its exposure, for reasons of portfolio diversification. This translates withdrawals of deposits or the rising cost of financing the subsidiary, which can cause liquidity problems and affect, through the money market, other banks in the host country, as well as their parent and the markets in which they are active. The second channel, the problems of liquidity or solvency of the parent affect its subsidiaries, which is propagated by inter-bank linkages or through distrust in the banking system, the banks of the host country, and, in turn, impact their respective parent companies.

Shnabl (2011) suggests that the efficient market theory suggests that as long as investment opportunities are constant, shocks to financial institutions in one market should not affect lending in other markets. Then, if financing frictions prevent financial institutions from accessing alternative financing sources to cover shortfalls, then liquidity shocks in one market may affect lending in other markets. Cetorelli and Goldberg (2012) show that the critical description of the bank lending channel is that banks' experience of a funding shock. If they cannot substitute liabilities with other external funding sources, such as by issuing certificates of deposit or attracting money market funds, the shock is transmitted to the asset's side of their balance sheets. Martinez Peria et al. (2002) and Haas and van Lelyveld (2006, 2010) suggest that subsidiary banks do not change their lending strategies in times of local crisis.

Bernanke and Blinder (1988) and Bernanke and James (1991) tested the relationship between liquidity and changes in loans. They demonstrate that changes in the liquidity of real consequences on loan

strategies of banks. However, these studies have ignored a number of variables such as economy wide productivity shocks that affect both changes in supply and demand of loans at the same time. Louprias, Savignac and Sevestre (2003) and Gambacorta (2005) show that liquidity positions of banks affect how banks react to a monetary shock in several European countries.

Claessens et al., (2009) suggest that foreign subsidiaries may be a factor of a financial instability. In fact, the relaxation of restrictions on foreign bank's entry can bring risks. Particularly, by increasing competition and thereby lowering the profits of domestic banks, foreign entry may reduce charter values of domestic banks, making them more vulnerable. This may have a destabilizing effect on the financial system especially if the domestic prudential regulations and supervision are not sturdy.

From a public policy standpoint, Peek, J. and E. Rosengren (1997) indicate that credit flows by global banks will be influenced by both domestic and foreign conditions. Moreover, a bank's capitalization will not be a sufficient statistic for predicting its willingness to lend. Nonperforming loans, even those yet to be reflected in capital ratios or publicly disclosed, can alter the willingness of global banks to lend.

Based on a sample of 45 banking groups, De Haas and van Lelyveld (2010) tried to explain the supply of credit by banking subsidiaries of the macroeconomic environment in the host country by country the financial characteristics of the subsidiary of its parent company and other subsidiaries. Their results support the existence of an internal capital market banking groups, in which the parent bank manages the supply of credit to their subsidiaries. They emphasize two effects: a substitution effect which arbitrates between the parent company and its

subsidiaries, changes in financial support depending on the state of the host country and the expected returns and the effects of support (means effect) by which parent bank support weaker subsidiaries (capital and liquidity). Thus, the subsidiaries would be protected against shocks from the host country and depends on the situation of the parent company and the country of origin.

## **b. Market discipline of foreign subsidiaries**

Market discipline can be described as a situation in which depositors penalize riskier banks by withdrawing deposits. Market discipline was stated by the Basel regulatory framework as one of the three pillars required for the stability of the international financial system. Market discipline is widely adopted by regulatory authorities to limit bank risk-shifting incentives that are exacerbated through a financial safety net. According to Berger (1991), market discipline in the banking sector is generally interpreted as a situation where the costs incurred by the partners of the bank on the risk of bank risk and react on the basis of these costs. Thus, the analysis of market discipline can be inclined through problems that may exist between agencies, mandating and agent. The applicant (which is the principal) wants to ensure that the bank (agent) protects its assets. Thus, applicants will respond to any increased risk of the bank through prices or quantities, demanding higher interest rates on their deposits or withdraw completely. This leads to penalize banks following an excessive risk-taking.

We address this issue by asking the question whether depositors require controlling risk-taking by foreign subsidiaries in emerging countries. The last global financial crisis has sparked a debate on incentives that may assist depositors to

discipline risk-taking by their banks. Klapper and Love (2002), Mitton (2002) note that market discipline which is an essential factor for banking stability is low in emerging countries and remains under the influence of banking regulations. Indeed, the regulatory and supervisory practices and institutional factors greatly influence and even alter the mechanisms of discipline.

Heavy dependence on external capital exposes subsidiaries in host countries to the risk of non-renewal of funding (funding risk), even at the risk of sudden withdrawal of capital. The liquidity crisis experienced by the global banking system in 2008-2009 has particularly affected Muslim countries. Financing difficulties of parent banks and rising risk premiums have reduced funding for subsidiaries. In addition, the deterioration of the general economic situation led foreign banks to re-evaluate the risks in emerging markets and tougher lending conditions abroad.

Depending on the funding strategy adopted, parents' banks can delegate more responsibility to their subsidiaries in terms of collecting deposits in host country. Consequently, parent banks isolate their foreign subsidiaries by reducing the available funding. In many countries, the reduction in funding foreign subsidiaries may have destabilized the entire system. According to Herring (2007), the risk is even more severe when the foreign subsidiaries with significant shares in host markets become systemically important, while at the same time, they are not so important for the parent bank because of their small size relative to multinational banking group.

Jacklin and Bhattacharya (1988) and Diamond and Dybvig (1983) support that failure to respond to liquidity problems can cause bank insolvency in the short term and induce contagion effects.

The risk undergoing by the banking system is that the failure of an insolvent bank can lead depositors of other banks to withdraw their deposits. Allen et al. (2010) show that liquidity needs determine the change in deposits in developing economies, especially during the recent crisis whereas market discipline is relatively more dominant in developed countries. De la Torre et al. (2003) evidence that bank fundamental indicators tend to be less important in explaining the evolution of deposits banks in emerging countries.

The conclusions of our paper are relevant to the academic literature on market discipline in at least two dimensions. First, we show that market discipline in developing countries depends on the risk directly taken by the depositor. This is will be shown by the fact that the evolution of deposits depends on fundamentals of the subsidiary and also on macro-economic characteristics of the host country. The specific variables of the mother and the macroeconomic variables bank do not affect the behavior of depositors in emerging countries. Second, market discipline is a fact that can characterized the banking sectors in emerging markets and regulatory authorities should establish prudential provisions necessary to strengthen discipline in their markets. This is especially necessary, when it is shown that this discipline depends on systemic risks that affect the fundamentals of banks.

### III. Methodology and data

In this study we investigate the transmission of liquidity crises from developed to developing countries through foreign subsidiaries. De Haas and van Leyveld (2010) show that loan growth of foreign subsidiaries is not only determined by their own characteristics but also by the characteristics of their parent bank and the variables of host countries. Following their

approach, we use the annual change of the logarithm of total loans of a subsidiary ( $\Delta Loans$ ) as the variable that describe the loans strategy of the subsidiaries.

In our work, we present a stylized model, which specifies the loan supply decision of bank subsidiaries in light of four blocks of exogenous latent variables; the two first groups are specific variables of subsidiaries and their parent banks. The third and the fourth groups are macroeconomic variables of origin and host country, respectively. Specific financial variables banks for subsidiaries and parent banks include, return on equity (*ROE*), equity to total assets (*equity*), assets liquid to total assets (*liquidity*) and we consider provisions for loan losses to net interest income (*Loan Loss Provisions*) as a proxy for credit risk following.

We expect that the capitalization of subsidiaries affect positively loan growth, since credit transactions are generally linked to effective and a real business which is based on risk sharing between the bank and its customers. However, non-performing loans' provision should have a negative sign, as banks reduce exposure in countries where they are experiencing problems. We include a variable size (*Size*), as a variable control, defined as the logarithm of total assets. Gambacorta (2005) shows that bank size is irrelevant; small banks are not more sensitive to monetary policy shocks than large banks.

The same specific variables are used to describe the financial situation of the parent bank and to construct the latent variable Parent fundamentals.

The third and the fourth group of variables consist of macro-economic variables of host country of the subsidiary and the origin country of parent bank. We include the growth rate of GDP (*GDP Growth*) and the real exchange rate of the U.S. dollar (*Real Exchange Rate*). We

expect that lending by foreign banks increase with the local GDP and appreciation of the local currency.

The study of the effect of GDP on the credit supply is carried by the assumption that better economic conditions increase the investor's optimism. A higher exchange rate results in higher imports prices and in turn, increases domestic prices. Accordingly, a higher exchange rate reduces exports' prices and thus leading to a higher demand for exports, Kia and Darrat (2007). As a result, the higher demand for resources creates a pressure on domestic prices and hence increases loans in Islamic banks.

In addition, to test whether the structure of the banking sector's liquidity affects the transmission of liquidity shocks we include the variable (*Concentration*). The concentration of the banking sector implies the importance of local banks in the host country. We estimate that more high concentration lower the role of foreign subsidiaries in the transmission of liquidity shocks.

In a following step, to test the existence of market discipline and to identify its mechanism, we use the change in bank deposits ( $\Delta Deposits$ ) as measure for market discipline. We assume that a double evaluation of risks by both the counter-party and the bank should help introduce a healthy discipline in the whole banking business and eliminate a range of undesirable lending practices.

The sample used in this study focuses on banks' subsidiaries existing in emerging countries and whose parent banks are located in developed countries. We collect data on 590 foreign subsidiaries operating in emerging countries and that are associated with 270 parent bank which operate in developed countries. This paper combines financial data of subsidiaries and

macroeconomic variables of both host and home countries to investigate determinants of loans shock transmission from developed to emerging countries. The financial information on subsidiaries was collected from Bank scope data base.

**Table 1. Summary statistics of all subsidiaries**

	Banks Subsidiaries		Parent banks	
	Mean	Std. dev	Mean	Std. dev
$\Delta$ Ioan	0.037	1.837	0.182	0.631
$\Delta$ Bank Deposits	0.169	1.521	0.071	2.998
Total Assets	3681	11.632	15972	23.061
Loan Loss	0.391	2.635	1.517	4.713
Equity	0.422	2.641	0.572	8.671
ROE	0.731	4.729	0.341	2.742
Liquidity	0.389	2.631	0.277	3.974
Interbank	5.363	0.644	2.731	6.370

To test the impact of each group of variables on both credit strategy of foreign subsidiaries and market discipline exerted by the depositors in emerging markets, we apply a consistent econometric approach PLS Path that allows us to estimate complex causal relationship between latent variables measured themselves by called manifest observed variables.

PLS is a structured equation modeling technique that can analyze structural equation models (SEMs) involving multiple-item constructs, with direct and indirect paths. This approach is a method of analysis to study the impact of a number of blocks of variables on the same individuals (Tenenhaus, 1998). The PLS method works by extracting successive linear combinations of the predictors and is effective in explaining both response and predictor variation. The PLS Path regression is a powerful approach for analyzing models because of the minimal demands on measurement scales, sample size, and residual distributions. The emphasis of PLS is on predicting the

Table1 provides descriptive statistics of our sample. The table shows that *total assets* of parent banks are on average much higher than those subsidiaries. However, liquidity and the ROE subsidiaries exceed those of parent banks.

responses as well as on understanding the underlying relationship between the variables.

Generally, groups of variable have some particular features such as high correlations. This leads to a problem of multicollinearity and makes it difficult predictive modeling using classical regression methods. Hence, the use of structural equation models of latent variable.

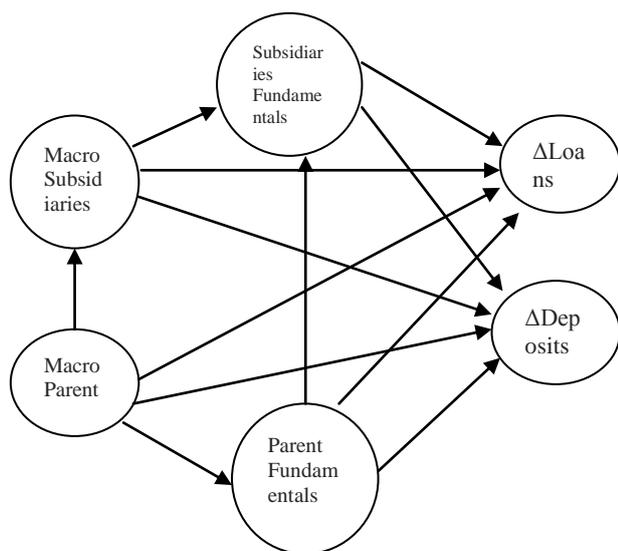
In our research we consider six groups of variables, each of which is determined by  $i$  manifest variables: *Let*  $X_{ij}$  be the vector of  $i$  manifest variables of the latent variable  $j$ . Each group variable is observable expression of a latent variable  $\zeta_j$  whose average is denoted  $m_j$ .

A hierarchical classification of manifest variables is first performed to obtain blocks of variables representing the latent variables in the model to estimate. The causal relationships between these blocks are made with partial correlations.

Then, the external model is specified with the reflective mode to the extent that manifest variables were chosen so that they reflect the dimension to which they refer.

We consider the following causal model:

**Figure 1. The PLS-PM model**



The estimation procedure consists of two types of estimates of latent variables and the estimation of structural equations.

**- The estimation of latent variables:**

Latent variables  $\xi_j$  are estimated in two ways: the  $y_j$  estimated from the manifest variables  $X_{ji}$  and internal estimate  $z_j$  derived from external estimates  $y_i$  of  $\xi_i$  related to  $\xi_j$ .

It is, therefore, an iterative algorithm, comprising the following steps: First, we estimate the latent variables based on the external model (each latent variable is estimated based on manifest variables of the block)

$$y_i = \sum w_{ih} x_{ih}$$

Where the coefficient  $w_{ih}$  represents the external weight.

Then, we estimate latent variables based on the internal model (each latent variable is estimated based on other latent variables that are related).

$$z_i = \sum e_{ii} y_i$$

Where  $e_{ii}$  is the internal weight which is defined by choosing a schematic structural calculation.

In a following step, we establish a relationship between the two types of

estimates for determining the external final weight:  $w_{ij} = cov(X_{ij}, z_j)$

We repeat these three steps until convergence in the estimates of the latent variable.

**- The estimation of structural equation**

Once scores (external final estimate) are obtained, we estimate the coefficient of internal model using multiple regression classics (MCO) or PLS. Indeed, the structural equations are estimated by replacing each latent variable by external estimate.

In this study, the relationship of the PLS algorithm is estimated using the PLS regression instead of OLS regression. Indeed, for two blocks of variables X and Y, the OLS regression explains the variable Y at the expense of variable X. It can produce aberrant signs and insignificant coefficients. Contrary, PLS regression explains both Y and X. It solves the problem of multicollinearity with the construction of major components.

**IV. Results and interpretation**

We perform PLS-PM analysis involving only reflective indicators for the inner estimation. Since each reflective block represents only one latent construct, it needs to be one-dimensional. This is why a preliminary exploratory analysis for verifying the composite reliability of blocks is required. Two different measures are available to test block one-dimensionality in PLS-PM framework: Dillon-Goldstein's rho and Cronbach's alpha. According to Chin (1998), Dillon-Goldstein's rho is considered a better indicator than Cronbach's alpha as it is based on the results from the model rather than on the correlations observed between the manifest variables in the dataset. Following Werts et al. (1974), a block is

considered homogeneous if this index is greater than 0.7 .

The results of composite reliability test are resumed in table 2. Since the Dillon-Goldstein Rho index is always greater than 0.7 we can deduce that all six blocks of manifest variables can be considered one dimensional.

Another method of assessing the *discriminant validity* is to compare the square root of average variance extracted (AVE) for each construct with the correlation between the construct and other constructs in the model. The measures are considered to have adequate discriminant validity if the square root of the AVE for each construct is larger than the correlation between the construct and any other construct in the model. As shown in Table 3, all constructs in the estimated model also fulfill this condition of discriminate validity.

**Table 3. Correlation among Construct Scores**

	Macro subsidiaries	Macro parent	Subsidiaries fundamentals	Parent fundamentals	Loan strategy	Market discipline
Macro subsidiaries	<b>0,251</b>					
Macro parent	0,119	<b>0,520</b>				
Subsidiaries dpecific	0,101	0,238	<b>0,210</b>			
Parent specific	0,172	0,157	0,171	<b>0,133</b>		
Loan strategy	0,156	0,026	0,192	0,089	<b>0,234</b>	
Market discipline	0,034	0,162	0,081	0,116	0,153	<b>0,490</b>

Notes: The bold diagonal figures are the square root of the average variance extracted; the off-diagonal figures are the correlations of the latent construct

Once the composite reliability is verified, we may look at the relationships between each manifest variable and its own latent

**Table 2. Composite Reability**

Latent Variables	Dimensions	Alpha de Cronbach	Rho de D.G. (ACP)	Critical Value	Eigenvalues
Macro subsidiaries	3		0,890	0,888	1,685 0,844 0,099
Macro parent	2	0,067	0,993	0,774	1,605 0,643
Subsidiaries fundamentals	5		0,917	0,829	1,811 0,714 0,403 0,227 0,054
Parent fundamentals	5	0,059	0,844	1,311	1,529 0,979 0,362 0,158 0,124
Loan strategy	1		0,730	0,749	1,319
Market discipline	1	0,106	0,857	1,135	1,477

variable. In table 4 we present the weights of the relationships between each manifest variable and its own latent variable, together with the standardized loadings. On the same table we report also average communality index that measure the ability of each latent variable to explain its own manifest variables. Since this index is always higher than 0.5, we can conclude that globally all the latent variables are powerful at explaining their own manifest variables. A low value in a loading factor suggests that the indicator has little relation to the associated construct. All indicators of a block of variables must reflect the same construct.

The normalized weight measure the impact of the corresponding manifest variable in computing the latent variable

score as an index and the standardized loadings. The results show that the manifest variable GDP Growth is the most important driver in computing the latent variable *Macro variables of host countries*. The same occurs for manifest variable *Total Asset* with respect to the latent variable *Specific Subsidiaries*, and for latent variable *Parent specific* with the two

**Table 4.** Normalized outer weights and average communalities

Variable latent	Manifest Variables	Loadings	Normalized outer Weights	Average Communalities
Macro subsidiaries	SGDPgrowth	1,042**	0,905	
	SExchange	-1,377	0,026	
	Sconcentration	-0,010*	0,055	0,541
Macro parent	PGDPgrowth	4,427**	0,833	
	Crisis	0,077*	0,166	0,628
Subsidiaries Specific	StotalAssets	4,981**	0,715	
	Sequity	2,354*	0,103	
	SloanLoss	-1,785**	0,037	
	SROE	2,982*	0,103	
	Sliquidity	1,254	0,040	0,587
Parent specific	PtotalAssets	3,258**	0,477	
	Pequity	1,249*	0,051	
	PloanLoss	-0,955**	0,097	0,721
	PROE	4,111**	0,131	
	Pliquidity	-1,281*	0,041	
Loan strategy	Sloan	1,767**	1,000	0,591
Market discipline	SbankDeposits	-0,184**	0,136	0,570

Table 5. shows that the goodness of fit index<sup>1</sup> for both the structural and

<sup>1</sup>A global criterion of goodness-of-fit (GoF) can be given (Espisit., 2008) by the geometric mean of the average communality and

manifest variables total asset and ROE. Among fundamental variables of the subsidiary, only the variable exchange rate does not significantly affect the latent variable Specific subsidiary. The variable *loan loss provision* has a significantly negative effect on the latent variables of the subsidiary.

measurement models are satisfactory with an absolute GoF value of 0.523 and an equal contribution of measurement model in constructing it. The relative GoF is very high. So are inner and outer models GoF.

**Table 5.** Goodness of fit index for the hole model

	GoF	GoF (Bootstrap)	Borne inférieure (95%)	Borne supérieure (95%)
Absolu	0,523	0,526	0,515	0,584
Relatif	0,842	0,844	0,811	0,876
Modèle externe	0,869	0,869	0,848	0,882
Modèle interne	0,978	0,9769	0,948	0,985

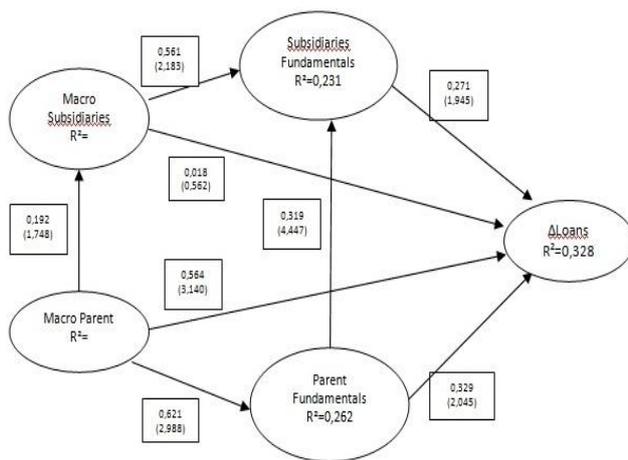
the average  $R^2$ :  

$$GoF = \sqrt{(average\ communality) \times (average\ R^2)}$$

After checking the reliability and validity of the relationship between manifest and latent variables, we present in the following the results of the structural model and the relationships between latent variables. Since the PLS approach is distribution free, the nonparametric bootstrap procedure is used to estimate the t-statistics and the significance levels for the structural path coefficients (Chin, 1998).

Let's first study factors affecting loans strategy of subsidiaries in emerging market. The results of structural model with *Δloans* as the dependent variable are summarized in figure 2<sup>2</sup>.

**Figure 2. Results of PLS Estimation for the Theoretical Model (a)**



The regression coefficients and associated *T-Values* are shown on the links (arrows) between exogenous and endogenous latent variables. The constructs in the model have both small and large effects on *loans growth*. The results show that the proposed model for loan growth has a R-square of 0.328.

<sup>2</sup> To simplify the figure we do not present the regression results of exogenous latent variables on the variable *Δdeposit*.

Additionally, the R-squares for the outcome constructs of parent and subsidiaries fundamentals variables are 0.262 and 0.231 respectively.

A positive effect was found for the built variables Parent and Subsidiaries fundamentals on loans growth with coefficients of 0.329 and 0.271 respectively. This imply that the strategy of loans supply of subsidiaries in emerging countries depends more heavily on fundamentals of the parent bank rather than on specific variables of subsidiaries. We deduce that the liquidity of the subsidiaries is centrally managed at the parent bank and credit supply of subsidiaries depends primary on the financial situation of its parent bank.

Other relationships, that justifies our use of PLS Path approach, can be highlighted and falling multicollinearity problems between variables. In particular, the specific variables of the subsidiary appear strongly affected by macro-economic characteristics of the home country. Parent bank appears also strongly influenced by macro-economic variables of the Let's study the results of the structural model estimates. Table 6 shows the correlation and regression Path coefficients linking each exogenous latent variable to the endogenous *Loan strategy*. The interpretation of this table should be done in conjunction with Table 3 which presents the loading factors. We can conclude that all path coefficient estimates of the structural model are significant.

Looking at the path coefficients, we note that credit growth of the subsidiary mainly depend on macroeconomic conditions of the country of origin. (Path coefficient = 0.564 and contribution to R² higher than 55%). This mean that changes in aggregate claims on home countries explain a significant share of the variance in the dependent variable country of origin.

**Table 6. Impact and contribution of exogenous latent variables on the Table endogenous  $\Delta$ Loans**

	Macro parent	Parent specific	Macro subsidiaries	Subsidiaries specific
Corrélation	0,161	0,001	0,005	0,043
Path coefficient	0,564	0,262	0,129	0,231
t-statistic	3,140	0,245	0,562	0,645
Contribution au R <sup>2</sup> (%)	55,529	6,81	9,309	28,352

The variable GDP is the most important variable among the macroeconomic variables of the country of origin which is the most relevant group affecting credit growth of subsidiaries. This confirms that the transmission of liquidity shocks' across countries is intensified by the foreign subsidiaries in emerging countries. This result contradicts those of Classens and Horen (2009), who document that the income level of the home country does not significantly affect the supply of loans of conventional subsidiaries banks.

From table 3 and 6, the manifest variable *exchange rate* also matters for the construct *subsidiaries fundamentals* but at lower degrees. This corroborates the results of Cook and Devereux (2011) who argue that the exchange rate exacerbates the impact of shocks in a liquidity trap for conventional banks that are increasingly affected by a systemic risk with the opening of capital markets. Parent banks' fundamental seems to be crucial in establishing the potency of the bank lending channel since Loan growth is significantly related to specific variables of parent bank. Especially bank capitalization of the parent bank positively affects credit growth of the subsidiary while loan loss

**Table 7. Goodness of fit index for the structural model**

R <sup>2</sup>	R <sup>2</sup> (Bootstrap)	Ecart-type	Borne inférieure (95%)	Borne supérieure (95%)
0,524	0,527	0,034	0,518	0,557

provision has a negative effect on the latent construct *Parent Fundamentals*, which allows us to deduce that the financial situation of parent bank reduces loans of subsidiary in the emerging countries.

The combination of the two results that credit growth of subsidiaries depends on the overall strategy of the parent bank and the fact that it also depends on the macroeconomic conditions of the country allow us to deduce that credit supply in emerging markets may contract due to economic downturn in developed countries. Accordingly, the foreign subsidiaries will result in a destabilizing role in the emerging country.

These findings evidence the theoretical mechanisms of the relationship between foreign banks and economic stability of the host country who argue that subsidiaries of foreign banks depend heavily on the decision of their parent banks with a globally diversified portfolio of assets. Indeed, in line with the results of Stein (1997), parent banks can play the role of lender of last resort in times of crisis. It can also manage an internal capital market operations and centralized allocate capital and liquidity of its subsidiaries. This helps to stabilize the supply of credit by foreign banks in the host country when foreign branches are facing financial shocks. Subsidiaries of foreign banks may be able to recover

relatively quickly, compared to domestic banks.

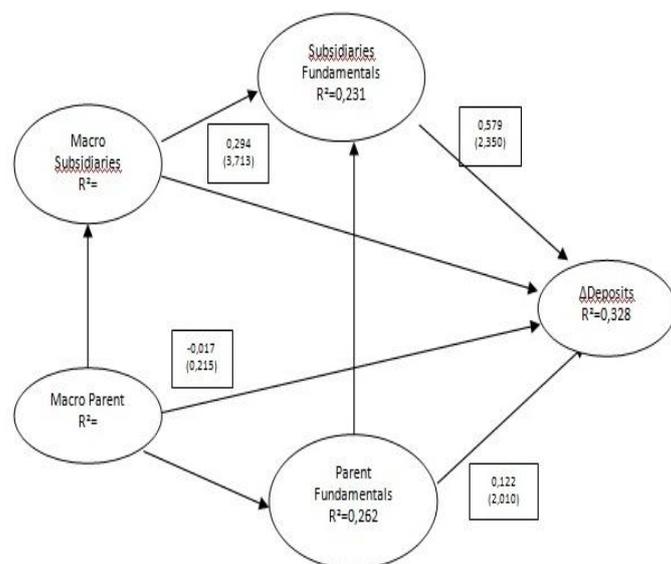
The fact that macro-economic conditions of the host country doesn't affect significantly credit supply of subsidiaries shows that in period of crisis in home country, parent bank can supports its subsidiary by providing necessary liquidity. In this case the subsidiary may play the role of stabilizer in the host country.

Figure 3<sup>3</sup> shows general results of structural model with  $\Delta deposit$  as endogenous variable. It's shown that market discipline is strongly affected by the specific characteristics of the subsidiary (Path coef = 0.579). The fundamental variables of the parent bank also significantly affect market discipline but at lower degrees. Macroeconomic variables of the host emerging country have an impact on market discipline as opposed to macro variables of the country of origin which appear globally uninformative about the mechanism through which depositors exert market discipline on foreign subsidiaries in emerging countries.

### Foreign subsidiaries and market's discipline

To examine the existence of market discipline on subsidiaries in emerging markets, we use the same set of variables employed in the previous section. We measure market discipline by the manifest variable;  $\Delta Deposits$ . The market must have the power to restore stability to the banking system through the behavior of depositors against the risk that outstanding. The reaction of depositors results in an effect on deposits of subsidiaries.

**Figure 3. Results of PLS Estimation for the Theoretical Model (b)**



<sup>3</sup> In a concern of simplicity, only the regression results of exogenous latent variables on the variable deposit are shown in this figure.

The results of PLS path regression of the structural model with market discipline as dependent variable are resumed in table 8. The results confirm the existence of market discipline exerted by emerging countries. It's shown that the specific variables of the

**Table 8. Impact and contribution of exogenous latent variables on the endogenous  $\Delta$ Deposits**

	Subsidiaries specific	Macro subsidiaries	Parent specific	Macro parent
Corrélation	0,070	0,020	0,026	-0,045
Path coefficient	0,579	0,294	0,121	-0,017
t-statistic	2,350	3,713	2,297	0,215
Contribution au R <sup>2</sup> (%)	65,019	21,748	8,721	4,512

The construct specific variable of subsidiary appears the group that most affects the market discipline exerted on foreign subsidiaries. This means that depositors are more concerned with the risk taken by the subsidiaries in host country than risk taken by their parent banks. Macroeconomic variables of parent bank, globally, have insignificant effect on market discipline of their subsidiaries.

As the *total equity* positively affects the latent variable Specific subsidiaries, then we can deduce that the capitalization of the subsidiary bank is a determining factor of *deposit growth*. This may be explained by the fact that strengthening the capital of the bank is likely to restore confidence of depositors and to insure convergence of interests with depositors. By the same, *loan loss provision* negatively affects specific variables of the subsidiaries (see table 3).

subsidiary depositors on their foreign subsidiaries in affect more significantly market discipline than the specific variables of the parent bank and contributes to 65% of the R-Squared of the model.

**Table 9. Goodness of fit index for the structural model**

R <sup>2</sup>	R <sup>2</sup> (Bootstrap)	Ecart-type	Borne inférieure (95%)	Borne supérieure (95%)
0,007	0,019	0,010	0,006	0,046

So, high level of *loan loss provision* reduces deposits of subsidiaries. This may be due to the fact that problems encountered by the parent bank on its loan portfolio leads it to reduce its funding to its subsidiaries. Thus, if the parent bank seeks to preserve its liquidity crisis in the country of origin, their subsidiaries generally experience a reduction in their deposits. On further analysis, an increase in loan loss provisions should be associated with a higher expected write-off and therefore should indicate a riskier institution. So, higher level of loan loss provisions is not viewed as a better protection.

Parent bank significantly affects deposit growth. This result challenges the limited role of the parent bank to support their subsidiaries in times of crisis in the receiving country. This finding is in line to that of Allen et al. (2010) who show that in times of crisis, parent banks support their

subsidiaries in host countries which reassure depositors. Parent banks facing difficult financial situations can engage their subsidiaries in gathering deposits more aggressively especially in times of crisis.

Similarly, we can infer that liquidity of parent banks it significantly increases the deposits in foreign subsidiaries in the period of crisis. This is may be explained by the fact that depositors can expect that the parent bank supports their subsidiaries by providing them with a sufficient liquidity in order to fulfill their obligations at maturity. Being persuaded to withdraw their funds without incurring losses, the depositors increase their deposits in subsidiaries.

From this synthesis we argue that financial sectors in emerging countries are relatively small compared to those of developed countries, if the subsidiary has a substantial market share in the host country, it will be more inclined to bailout to limit systemic consequences. This fact creates the permissive to increased risk-taking by the subsidiary conditions. This situation is particularly damaging as the supervisor of the developed country is discharged of its responsibilities on the host country of the subsidiary and has little incentive to control the transfer of risk from the parent bank to its subsidiary.

## **I. Conclusion**

The presence of foreign banks in emerging countries can be a source of destabilization in emerging countries and may constitute a channel for the transmission of liquidity shocks. In this study our aim was to investigate factors

affecting the credit strategy of foreign banks in emerging countries. We apply a PLS-Path model that allows us to identify the causal relationships between the various groups of variables. An interesting result derived from our study that foreign bank lending is determined by the specific financial variables of the parent bank and macroeconomic variables of the country of origin. The internal capital market group can carry instability when the parent reallocates liquidity. This leads us to conclude that the expansion of credit via foreign banks can poses problems of financial stability authorities of the host country.

Our purpose was also to test whether depositors exert market discipline on foreign subsidiaries. We tried to identify factors that may explain the behavior of depositors. We show that specific variable of subsidiary is the group that most affects the market discipline exerted on foreign subsidiaries. This implies that the behavior of depositors is more affected by the risks taken by the subsidiaries in the receiving country. Despite the fact that the parent bank affects the strategies of their subsidiaries in developing countries, it does not affect the behavior of depositors.

One way to address weaknesses of banking sector in emerging countries is to submit banks to market discipline. This can be by promoting other financial intermediaries that will compete with banks or by developing efficient capital markets so that depositors receive information and their responses will be reflected on the share price of the bank on the market.

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