

Corporate Debt Expansion in Emerging Countries after 2008: Profile, Determinants and Policy Implications

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This study aims to explore corporate debt expansion in emerging countries after 2008 crisis, presenting its profile, main determinants and economic policy implications. First, it is presented the features of emerging market corporate debt after 2008, with the growth of leverage, net foreign exchange exposure, and deterioration in firms' debt repayment capacity. Next, a panel regression identifies the main changes in the determinants of emerging market corporate debt expansion before and after 2008 crisis. The exchange rate has been one of the most important determinants through the period 2000-2016, and also in the period before 2008. But after 2008, beyond some country level factors, other factors that have global origins (more accommodative monetary policy stance in USA, lower financial market volatility, global GDP growth, higher commodity prices and its interaction with the exchange rate appreciation) have become increasingly important. Among them, a factor not previously emphasized in the literature: the interaction between higher commodity prices and more appreciated exchange rates. Combined with an uncertain international scenario, this increase in debt raised financial stability concerns. Those concerns would be better addressed with an improvement in regulatory frameworks, and coordinated macro/micro prudential measures, in order to improve instruments against new financial crises.

Abstract

Keywords: corporate debt; emerging countries; economic policy

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1. Introduction

Private debt ratios, especially of non-financial firms, have grown considerably since the 2000s, in advanced (AEs) and emerging economies (EMEs). However, the 2008 global financial crisis marked a tipping point for both group of countries. In advanced economies, corporate debt levels generally peaked in 2008. In the post 2008 period, after a limited downward adjustment, corporate debt ratios continued at high levels, and in some countries actually increased, according to OECD (2017). Conversely, emerging economies corporate debt levels increased since the 2000s from lower levels than AEs. But the 2008 crisis did not interrupt this trend, with EMEs corporate debt levels continuing to increase up to 2016. The post 2008 crisis period was marked by a development of international debt markets, with bond issuance growth (especially in foreign currency), coupled by an unprecedented monetary expansion in advanced economies, that eased international financial conditions, lowered risk spreads and increased search for yield, in particular for bonds of those countries.

However, this expansion in EMEs corporate debt started to be challenged by recurrent episodes of volatility in international debt markets: in 2013, the “taper tantrum” in USA; in 2014, the fall in commodity prices (especially oil/minerals); in 2015, uncertainties in China’s foreign exchange/stock markets; in 2016, after the election of the new US president. Hence, the increase in EMEs corporate debt size (even after 2008 crisis), the changes in its profile/determinants and the financial stability concerns associated to it raised attention to this issue, which deserves a deeper analysis.

Therefore, this study main objective is to discuss the increase in corporate debt in emerging countries after 2008, aiming to understand the changes in its profile, its determinants, and its economic policy implications. The article is structured as follows. After this introduction in section 1, section 2 presents the main features related to the amount/profile of corporate debt expansion in emerging economies. Some of the main features of this

expansion in EMEs corporate debt were the increase in leverage, net foreign exchange exposure, later leading to a deterioration of debt repayment capacity in a significant share of firms.

In section 3 we do a literature review on theoretical approaches that underpin debt expansion in corporations and its features, including agents' procyclical behavior. We observe that those approaches that have been well described both in the mainstream and heterodox literature, related to concepts such as the risk-taking channel of monetary policy, herd behavior and financial instability hypothesis. We also undertake a literature review on empirical articles that seek to understand the determinants of corporate debt in emerging economies.

In section 4, it is presented our own panel analysis to explain the main determinants that were behind this expansion in corporate debt. Our contributions in this literature are to investigate the determinants of EMEs corporate debt expansion by using a dataset which goes from 2000 Q1 up to a recent period (2016 Q4), and with subsamples before and after the 2008 crisis, so we identify the main changes in the factors that explain EMEs corporate debt expansion before and after this event. Most importantly, we identify a factor which was not previously used in the literature for that purpose: the interaction between higher commodity prices and more appreciated exchange rates. Our findings suggest that the exchange rate has been one of the most important determinants that explain the increase in EMEs companies' debt expansion through the period 2000-2016, and also in the period before the 2008 crisis. But after 2008, beyond some country level factors (exchange rate, national GDP growth, firms' higher liquidity levels), other factors that have global origins (more accommodative monetary policy stance in USA, lower financial market volatility, global GDP growth, higher commodity prices and its interaction with the exchange rate appreciation) have become increasingly important to explain the increase in emerging market corporate debt expansion.

Section 5 discusses the economic policy implications of this debt increase. First, we present additional challenges faced by emerging economies' firms: currency mismatch, firms' susceptibility to creditors'/banks'/institutional investors' interests, macroeconomic volatility, that raise financial stability concerns. Next, we argue that those concerns would be better addressed if emerging countries and international institutions took additional measures, enhancing regulatory frameworks, as well as implementing macro and micro-prudential measures (preferably on a coordinated way), in order to improve instruments to face new financial crises. Section 6 closes the study with the final considerations and conclusions.

2. Features of Corporate Debt in Emerging Countries

This section presents the main features of the evolution of corporate debt in emerging economies in the recent period, with a special focus on non-financial companies.

Regarding the evolution of non-financial corporate debt in emerging countries, its amount rose from US\$ 9 trillion in March 2008 to US\$ 25.7 trillion in December 2016, according to BIS data (2017). Considering these values as percentages of countries' GDPs, growth between March 2008 and December 2016 was on average 41 percentage points (pp.), from 61% to 102% of GDP. In geographical terms, this increase occurred in all major regions that group emerging countries: Asia, Latin America, Emerging Europe, Middle East and Africa - EMEA. However, this expansion did not occur homogeneously: in Hong Kong and China, the increase in non-financial corporate debt in the period was 82 pp. and 69 pp. respectively, to levels above 166% of GDP. Chile, Turkey and Singapore also had significant increases of 38, 34 and 31 pp., respectively. In other emerging markets, the increase in non-financial corporate debt in the period was less than 30 pp., to levels generally below 100% of GDP, as can be seen in figure 1 in the appendix.

In terms of economic sectors, the ones that experienced higher debt growth were construction, real estate and mining (especially the oil and gas sub-sector), according to IMF (2015).

With regard to leverage, its degree can be measured using various indexes. Two indicators commonly used are: i) Total liabilities to total equity; ii) Total liabilities to earnings before taxes (EBT). Using a compilation of data from EMEs companies, both indicators had a significant expansion between 2007 and 2013: the first, by 88 pp. and the second, by 28 pp., according to IMF (2015).

Regarding emerging companies' foreign debt, an alternative measure of foreign exchange exposure is estimated in IMF (2015), which calculates net values excluding financial and operational hedging mechanisms¹. The study concluded that, with the exception of China², there was a significant expansion of net foreign exchange exposure of emerging companies in the period. The increase in net foreign exchange exposure level in EMEA was from 45% to 50% (5 pp.). In Latin America, it has increased from about 40% to 60% (20 pp). In general, non-tradable sectors have higher net foreign exchange exposure, because non-tradables cannot rely on the alternative of operational hedging (available for tradable sectors). Still, this operational hedging might not be enough to protect balance sheets of tradable sectors, as they are also negatively affected in occasions when commodity prices fall and exports volumes decline, with a slowdown in international trade.

Regarding the profile of non-financial corporate debt in emerging countries, there was also a significant change in its composition in post-2008 crisis period. Although most of the debt remained being funded by bank loans, an increasing share of EMEs firms' debt has been

¹ Net foreign exchange exposure is estimated using the sensitivity of the company' share price to exchange rate fluctuations according to an augmented CAPM model. It incorporates a β coefficient, which represents the foreign currency exposure of a firm, net of financial and operational ("natural") hedging mechanisms. A positive currency exposure means that the firm's share price falls when the exchange rate depreciates.

² Despite the low percentage of corporate debt denominated in dollars in China, the significant increase of leverage in sectors such as real estate and construction in recent years has drawn attention to the level of non-financial corporate debt in this country.

funded by bonds issued in capital markets (from 9% in 2007 to 17% in 2014, according to IMF 2015). In absolute terms, the amount of annual non-financial corporate debt issuance jumped from about US\$ 586 billion in 2007 to US\$ 3.025 trillion in 2014. In many countries, there was an increase in the concentration of debt issuance by major companies. In terms of sectors, the most relevant issuers were construction and oil/gas. Regarding the currency of issuance of these securities, domestic ones accounted for a larger share. However, there was an increase in the foreign share of non-financial corporate debt issuance in EMEs excluding China³, from about 40% between 2003-2007 to 45% between 2010-2014. The most used foreign currency was the dollar (usually over 80%), with the euro, yen and other currencies composing a smaller share.

It is worth mentioning that using bonds as source of funding has advantages and disadvantages for firms. The advantages are: i) Better financing conditions when compared to bank loans, such as lower costs and longer maturities and ii) Using capital markets as an alternative source of funding, even when banks are more restrictive. Among the disadvantages, it can be mentioned: i) The increasing reliance on funding from more volatile sources (i.e. institutional investors) and ii) Market investors are less stringent in monitoring firms' balance sheets than banks, fact that may encourage excessive leverage and risk-taking by firms.

Regarding the allocation of funds raised by companies through bonds, there is no consensus about their destination. The increased availability of resources for funding would have decreased entrepreneurs' minimum expected rate of return. This would have removed constraints for the implementation of several new investment projects, including ones with lower profitability. In other words, the availability of funding would have allowed an increase in the amount of investments, but also the implementation of less profitable projects. Then,

³ If we consider the total of emerging countries including China, the share of issuance in foreign currency decreased after the crisis, given the high amount of issuance in this country, mostly denominated in renminbi.

even with more favorable financing conditions, the growth in debt amounts and the fall in investments profitability led to a deterioration of EMEs firms' debt repayment capacity. A study published by the IMF (2016) showed that the percentage of EMEs companies whose earnings were lower than interest expenses (interest coverage ratio below 1, a critical situation) was around 11%, corresponding to US\$ 430 billion of "debt at risk".

Furthermore, several other studies point that bond issuance resources were less used for new investments, and more destined towards refinancing debt or buying short-term financial assets. According to IMF (2015), the allocation of funds raised by firms through bonds was higher for refinancing than for new investments⁴. Moreover, Chui et al (2014) mention that high interest rate differentials from domestic to international levels stimulated an intensification in carry trade activities by firms, which suggests the allocation of these resources for speculative purposes. A sign of those activities is the increase in companies' assets held as cash or bank deposits, which has grown significantly since 2009. The fact that this trend has not reversed after the crisis shows that the accumulation of financial resources by firms wasn't only a precautionary behavior immediately after the 2008 episode. Conversely, it was a strategy to increase financial returns, raising funds abroad with low interest rates and depositing in local banks or buying high-yield assets from institutional investors.

Other factor associated with this process was the expansion of bond issuance through offshore subsidiaries, benefiting from jurisdictions that offer tax and regulatory advantages. The headquarters of these subsidiaries are located mainly in the following countries: China, Brazil, Russia, India and South Africa. Mc Cauley et al (2015a) estimated that in the second quarter of 2015, these offshore subsidiaries held an amount of bonds of US\$ 558 billion. With

⁴ This does not mean that firms have necessarily decreased their amount of investment. Instead, it means that firms have used a larger portion of bond issuance proceeds to refinance debt or to buy short-term assets, and may have increased their investments with other resources. But with the decrease in minimum expected rates of return, the profitability of those new investments was lower.

the funds obtained abroad, an offshore subsidiary of a non-financial company can transfer funds to their home country through three channels: i) Making a direct loan for its headquarters (within-company flows); ii) Providing credit to other non-financial companies (between-company flows) or iii) Making a cross-border deposit in a bank (corporate deposit flows). Based on an analysis of emerging countries' balance of payments data performed by Avdjiev et al (2014), it was noted that capital flows to EMEs associated with all three mentioned channels have grown considerably in the period between 2009 and 2014. As most of these flows were allocated for financial, rather than real activities, evidence suggests that offshore subsidiaries of emerging companies have acted in this period also as financial intermediaries, obtaining funds from global investors through bond issuance and remitting these resources to their home countries through those three different channels. Nonetheless, it's important to point that the increase in bond issuance abroad by EMEs firms was not only due to their own strategy to enlarge their investor base and raise funds with better conditions, but it was also a consequence of the interests/demands of international investors, seeking higher yields.

Overall, the features of corporate debt presented in this section showed that non-financial companies in emerging countries expanded considerably their presence in financial markets, searching for higher profits and often acting as financial intermediaries. They increased their degree of leverage and net foreign currency exposure, especially in the post-2008 crisis period, and a significant share of them later presented deterioration in debt repayment capacity.

3. Literature Review

In this section we present a literature review on theoretical approaches that underpin debt expansion in corporations and its features (subsection 3.1), and empirical articles that

seek to understand the determinants of corporate debt in emerging economies (subsection 3.2).

3.1. Theoretical Approaches for Corporate Debt Expansion

The features of corporate debt described in section 2 (increase in leverage and net foreign currency exposure, with later deterioration in debt repayment capacity) would have as a common point *agents' procyclical behavior*, being in accordance with theoretical approaches that have been well described both in the mainstream and heterodox literature.

In the mainstream literature, Bruno and Shin (2015) highlight the "risk-taking channel of monetary policy"⁵, and its impact on financial and real variables through bank leverage. These authors develop a model where looser international financial conditions are associated with an increase in cross-border capital flows intermediated through higher leverage in the international banking system. The mechanism operates via stronger local borrower balance sheets as a result of local currency appreciation, allowing banks to lend more and take on more risk. Feyen et al (2015) argue that this mechanism would also apply for corporate foreign bond issuance. More specifically, when domestic currency appreciates, local companies' balance sheets strengthen. This would increase their external borrowing capacity, fostering higher cross-border inflows into EMEs by international investors who are willing to take on more risk. Conversely, tighter international financial conditions would lead to an appreciation of the US dollar and cross border capital outflows from EMEs, with depreciation of domestic currencies, reducing companies' external borrowing capacity and weakening their balance sheets.

In the heterodox literature, descriptions of agents' procyclical behavior date back to Keynes General Theory (1936). Assuming fundamental uncertainty and adaptive

⁵ The "risk-taking channel of monetary policy" was an expression coined by Borio and Zhu (2012), who intended to convey the impact of monetary policy on the willingness of market participants to take on risk exposures, thus influencing financial conditions and real economic decisions.

expectations, Keynes argued that each individual has the incentive to imitate other agents' average behavior (conventional or herd behavior). As long-term expectations are formed under a fragile basis, those expectations would be subject to sudden shifts, due to changes in entrepreneurs "animal spirits" that would influence their actions. This change in entrepreneurs' views could spread through the market (herd behavior), triggering a "self-fulfilling prophecy": entrepreneurs' pessimism leads them to invest less, and thus the economy enters a downward trajectory, "confirming" the initial pessimism. A more in depth analysis of firms' procyclical behavior was made by Hyman Minsky (1978, 1992) with his "Financial Instability Hypothesis". This concept was based in two central propositions: the first is that there are stable funding models and unstable ones; the second is that in prolonged periods of economic growth, stable financial relations may become unstable. Under this view, after an expansionary period with increasing liquidity and credit, firms would take more speculative and Ponzi postures⁶, deteriorating their "safety margins" (i.e. debt repayment capacity) and weakening their balance sheet positions. In this context, Minsky argued that procyclical behavior and the generation of instability and crises are features intrinsic to capitalist dynamics. Hence, he believed that a financial crisis of great magnitude did not need to be necessarily triggered by a huge adverse shock. Conversely, a reversal of expectations caused by a one-off episode would be sufficient to modify refinancing conditions and, consequently, to push firms that were already under weak balance sheet conditions to a situation of illiquidity/insolvency.

⁶ According to Minsky, three different financial postures may take place: hedge, speculative and Ponzi. The first posture - hedge - is characterized by a defensive behavior, in which gross expected income exceeds interest payments and amortization commitments in all future periods. Put differently, the agent has a safety margin that protects him from future fluctuations in interest rates. The second posture - speculative - is one in which agents' cash flow is sufficient to pay interest expenses, but not debt principal total amount. This agent usually takes funding with maturity lower than the financed project, hoping that in future periods his revenue increases in a way that would offset the initial situation of deficit. Thus, this agent operates with lower safety margins than hedge units, having to resort to periodic refinancing of its positions. The third posture - Ponzi - is one in which the agent does not have sufficient resources to cover even the interest expenses due. In this sense, the agent depends on refinancing a growing share of its debt, being more vulnerable than in previous cases against interest rates hikes, and can be taken to illiquidity and insolvency.

3.2 Empirical Literature Review on the Determinants of Corporate Debt in Emerging Countries

Articles which try to deal specifically with the issue of the determinants of corporate debt in emerging economies in a global sense (not from a single country or region, as a consequence of a local/regional crisis) became more frequent only recently, especially after 2013, when macroeconomic conditions in EMEs in general deteriorated, and institutions such as the IMF and BIS started to highlight in their reports concerns related to the growth of corporate debt in those countries. Among them, we can mention: Mc Cauley et al (2015b), Feyen et al (2015), Serena and Moreno (2016), IMF (2015).

In particular, the study presented in IMF (2015) uses private databases of more than 1 million non-financial firms for 24 emerging market economies, during the period 2004–2013. They run a panel regression model where their dependent variable is the change in leverage (change of total liabilities/book equity), and their main explanatory variables are grouped into three categories: Firm Indicators (e.g. measures of size, profitability and asset tangibility), Country Macro Indicators (i.e. International Country Risk Guide - ICRG), Global Indicators (price of oil, US shadow interest rate, VIX, Global GDP), as well as some interactions among those variables and dummies for firm fixed effects. Their main result is that a decrease in the US shadow rate is associated with faster leverage growth, with a higher effect for the subsample 2010-2013.

4. Determinants of Corporate Debt Expansion in Emerging Countries

The objective of this section is to explain what factors were behind the expansion of corporate debt observed in emerging countries' companies during the period 2000-2016. We undertake a panel analysis where we present a number of factors, with domestic and global origins, in order to check whether they were significant to explain corporate debt in EMEs

corporations. In particular, we aim to identify the main changes in the explanatory factors of EMEs corporate debt expansion before and after the 2008 crisis.

4.1 Data

Our dataset gathers 15 emerging countries: Brazil, Chile, Czech Republic, China, Hungary, India, Indonesia, Malaysia, Mexico, Poland, Russia, South Africa, South Korea, Thailand, Turkey. All those countries are emerging markets according the BIS definition, and are listed on the MSCI EME index⁷, which provides aggregate indicators for firms in each of those countries. Their geographical distribution is the following: Latin America (3 - Brazil, Chile, Mexico); Emerging Europe, Middle East and Africa (6 - Czech Republic, Hungary, Poland, Russia, South Africa, Turkey); Emerging Asia: (6 - China, India, Indonesia, South Korea, Malaysia, Thailand).

The time period analyzed is 2000 Q1-2016 Q4, with quarterly data. We also compare sub-samples for periods before the 2008 financial crisis (2000 Q1-2007 Q4), and after the crisis financial crisis (2009 Q1 - 2016 Q4). In our model, the dependent variable for corporate debt expansion - *Leverage* - is measured as companies' *Debt to Equity ratio* in each of the countries, obtained from MSCI country indexes. The explanatory variables are divided into two big groups: *Country* and *Global* factors.

Country Factors: Represent factors that are linked with individual features in each country, whether microeconomic (firms' fundamentals) or macroeconomic (aggregate economic indicators).

Microeconomic Factors: Balance sheet indicators, based on reports from publicly traded companies, which are compiled by MSCI to compose indexes for each indicator in its respective country. They measure companies' main accounting aspects:

⁷ An index created by Morgan Stanley Capital International (MSCI) that is designed to measure equity market performance in global emerging markets. It captures large and mid cap representations, covering about 85% of the market capitalization in each country.

- i) Profitability: return on assets (ROA)
- ii) Solvency ratio: free cash flow per share /short and long term debt
- iii) Liquidity: current ratio (current assets/current liabilities)
- iv) Asset quality: tangible assets per share

Macroeconomic Factors: Main country indicators supposed to be relevant for companies' leverage

- i) Real GDP growth (% YoY). Our source to this data was the IMF International Financial Statistics (IFS) database.
- ii) Monetary Policy Rate (% YoY), obtained on the BIS statistics database.
- iii) Real Effective Exchange Rate (REER). Our source was the BIS statistics database.

Global Factors: Include elements that have global implications, or are common for the world economy as a whole.

- i) Monetary policy rate of four main central banks (Fed, ECB, BOE, BOJ). Measured through the "Shadow Short Rate (SSR)", based on the short-term policy interest rate, but accounting the stance and direction of monetary policy (level and slope), including the use of unconventional measures. The term structure of interest rates is used to find what policy rate would generate the observed yield curve if the policy rate could be taken to negative values. The "shadow rate" curve is obtained from calculating the value of a call option to hold cash at the ZLB and subtracting it from the actual yield curve. Our source to those rates was Kripnner (2016).
- ii) Real Global GDP growth (% YoY). Our source was the IMF IFS database.
- iii) Commodity price: All Commodity price index, compiled by the IMF. It is composed by weighted averages US dollar prices (2005=100) of non-fuel (edible, industrial inputs) and energy commodities.

- iv) VIX: Index of market's expectation of US stock market (S&P 500) volatility over the next 30-day period, calculated by the Chicago Board Option Exchange (CBOE). Proxy for market sentiment/global risk aversion, as described by several authors such as Rey (2015) and the ones mentioned in subsection 3.2.

4.2 Model Specification and Methodology:

Regarding the model specification, our main panel regression is the following:

$$\Delta \log Leverage = c + \Delta \log CountryFactors + \Delta \log GlobalFactors + \varepsilon$$

This specification broadly follows the one used in IMF (2015). The dependent and independent variables are all presented in quarterly log changes, and we also do proper stationarity tests to make sure there are no unit roots in the series. In order to control for omitted variable bias, we make the option to use first differences, as we aim to control for unobserved heterogeneity among selected countries across time. To address a possible endogeneity problem on microeconomic factors (higher firm leverage influencing contemporaneous balance sheet indicators - profitability, liquidity, solvency, asset tangibility), the variables that measure them are lagged by one quarter, so that balance sheet indicators in the previous quarter will eventually explain leverage.

On an alternative specification, we also include an interaction term between two important variables, namely Commodity Price Index and the Real Effective Exchange Rate, so we can analyze how the introduction of this interaction term affects the model results.

$$\Delta \log Leverage = c + \Delta \log CountryFactors + \Delta \log GlobalFactors + \Delta \log Interaction + \varepsilon$$

The interaction term captures a singular relationship that exists between commodity prices and exchange rate movements, particularly in emerging commodity exporting countries. The idea is that an increase in global commodity prices would result in an improvement of commodity exporters' terms of trade, raising prospective currency inflows

and leading to appreciation of foreign exchange in those countries, therefore reinforcing easing borrowing conditions for firms, especially abroad. This special link between commodity prices and exchange rates is documented by Kohlscheen et al (2017), who affirm this link goes beyond the global risk appetite (i.e. the one driven by the simultaneous movement of investors into / out of commodity markets and high-yielding currencies during risk-on/risk-off episodes), but do not use it with the purpose of explain the rise in corporate debt. The introduction of an interaction term between two explanatory variables could raise a question about the presence of multicollinearity in the model. But multicollinearity is not considered an issue for the model as a whole when using interaction terms, once the p-value for the interaction is not affected by the multicollinearity, according to authors such as Goldberger (1991) and Allison (2012)⁸.

The methodology employed was a Feasible Generalized Least Squares (FGLS) estimation on the previous regressions. In the panel estimation, we add weights that follow the Cross Section Seemingly Unrelated Regression (SUR) method, to include robustness to groupwise heteroskedasticity, autocorrelation and cross section dependence. On the coefficient covariance, we also use the Cross Section SUR method, but with a modified specification (Panel-Corrected Standard Errors PCSE), which has an increased accuracy in hypothesis testing⁹.

⁸ Those authors explain that, before creating the interactions, one can reduce the correlations by subtracting the means (centering) the variables. But the p-value for the interaction will be exactly the same, regardless of whether or not one centers the variables. And all the results for the other variables (including the R2) will be the same in either case. So the multicollinearity has no adverse consequences in this situation. Furthermore, they explain that multicollinearity main problem is variance inflation, which imply high standard errors for the variables, and p-values less likely to be below a critical threshold. If confidence intervals are still small enough to have significant p-values in spite of sizable standard errors, then it is very likely that the actual effect of each variable is being isolated. That is what we observe in the results in the 2009-2016 sample, where each of the variables REER, Commodity Prices and Commodity Prices*REER have different coefficients, which are significant and whose values exceed the ones of the respective standard errors, supporting that individual coefficient effects are being properly isolated in the model.

⁹ The Cross Section Seemingly Unrelated (SUR) method uses an error structure clustered by period. The method proceeds in two stages: (i) The model is estimated by OLS and the residuals are used to build a consistent estimator of the errors covariance matrix; (ii) Using this consistent estimator on the errors covariance matrix, one can implement a Feasible GLS estimation. The method is also known as Parks estimator, once the classic

Table 1 in the appendix presents a summary of the expected signs of the relationships between the dependent variable with each one of the explanatory variables. Regarding the expected signs addressing the relationship between microeconomic factors and leverage, they can be positive or negative, and depend on the theoretical approach adopted. There would be a positive correlation between the variable and leverage if one considers the trade-off theory, and a negative correlation if it is considered the pecking order theory¹⁰. In general terms, the argument in favor of the trade-off theory supposes that firms with higher levels of profitability, solvency, liquidity and asset tangibility face lower expected costs of financial distress and find interest tax deductions more valuable, thus having higher incentives to take on more debt. Conversely, the argument supported by the pecking order theory assumes that firms with higher levels of profitability, solvency, liquidity and asset tangibility dispose of more internal funds and may rely less on external funds, hence there would be less incentive to increase leverage.

For macroeconomic factors, the expected signs are that higher levels of leverage would be associated with: a higher level of real GDP growth (higher domestic demand would foster an expansion in leverage); lower domestic monetary policy rate (lower policy rates would increase borrowing and leverage by firms); higher REER level (more appreciated exchange rate would allow higher leverage, especially in foreign currency).

reference for this method is Parks (1967). On its turn, the Panel-Corrected Standard Errors (PCSE) was an alternative specification of the Parks estimator developed by Beck and Katz (1995), which preserves the weighting of observations for autocorrelation, but uses a sandwich estimator to incorporate cross-sectional dependence when calculating standard errors. Moundigbaye et al (2017) show that the Parks estimator has the highest degree of efficiency in panel analysis when the ratio T/N is above 1.5 (case of our samples). In addition, the PCSE specification on the coefficient covariance improves the accuracy of hypothesis testing.

¹⁰ Under the literature of Corporate Finance, two main different approaches try to explain the determinants of corporate leverage, according to Adair and Adaskou (2015). On the one hand, the trade-off theory supposes that firms choose how to allocate their resources comparing the tax benefits of debt with the bankruptcy costs associated, targeting an optimal debt ratio. On the other hand, the pecking order theory assumes that firms prefer a sequential choice over funding sources. They avoid external financing if they have internal financing available and avoid new equity financing whenever they can engage in new debt financing. Debt funding would be preferred than equity funding because the cost of debt is usually lower, once it's a deductible expense. Additionally, although equity financing is less risky as regards cash flow commitments, it dilutes share ownership, control and earnings. According to the authors, there is no consensus in the literature, with evidence supporting both theories, varying according to each different situation.

When it comes to global factors, the expected signs are that higher levels of leverage would be associated with: a higher level of real global GDP growth (higher global demand would foster an expansion in leverage); higher commodity prices (higher commodity prices would incentivize more investments in this sector by EMEs companies and an increase in leverage); lower VIX (lower volatility in financial markets would encourage investors sentiment and an expansion in leverage); lower international interest rates. In particular, the transmission of a more accommodative stance by main central banks (including the implementation of quantitative easing programs - QEs) into an increase in corporate debt would occur through two ways: i) stock channel (QEs leading to lower risk premia and better financing conditions); flow channel (central bank asset purchases inducing portfolio rebalancing across countries, "crowding out" investors towards corporate bonds). According to Lo Duca et al (2016), the channel which would be more relevant for EMEs companies would be the first one.

Regarding the interaction term, its expected sign is positive, once it's composed by the product of two terms with expected positive signs (commodity prices and REER).

4.3 Results

Table 2 in the appendix summarizes our estimation output results. Analyzing the results of the table as a whole, we observe that the signs of the coefficients are according to previously expected. For microeconomic factors, the signs are positive, in accordance with the trade-off theory of corporate finance. One of the main explanatory factors for leverage would be the real effective exchange rate (REER), once this variable is significant in all specifications, and it has the largest coefficient in most samples (except 2009-2016). Its positive sign means an exchange rate appreciation in EMEs is linked to an increase in firms' debt/equity ratios.

Observing the full sample (2000 Q1-2016 Q4), we see that beyond the REER, other variables that presented statistical significance were: i) At the microeconomic level, the ones related to firms' profitability (return on assets), liquidity (current ratio) and asset tangibility (tangible assets per share), all positively related to leverage; ii) At the global level, the variable which represents USA monetary policy stance (US shadow short rate) and the VIX (proxy for global risk aversion), both negatively related to leverage, meaning leverage tends to increase when those variables are lower.

In the sample 2000 Q1-2007 Q4, the most significant variables are at country level: the exchange rate (REER) and firms' profitability (return on assets). Other variables are also significant: at micro level, firms' solvency ratio (free cash flow per share /short and long term debt); at the global level, the VIX. Even so, the degree of significance of those two variables is lower (p-values closer to 10%).

In the sample 2009 Q1- 2016 Q4, several variables are significant: at the micro level, firms' liquidity and asset tangibility indexes; at the macro level, REER and real GDP growth; at the global level, the VIX and US shadow short rates are strongly significant; the UK shadow short rate is also significant, albeit at a lower level¹¹. In the specification with the interaction term, also appear as significant firms' profitability in the micro level, and Global GDP growth at global level. And most importantly, in this specification Commodity Prices and the interaction Commodity Price*REER are strongly significant and have the largest coefficients. Their positive sign mean an increase in commodity prices, and the interaction between higher commodity prices and exchange rate appreciation in EMEs are linked to an increase in firms' leverage. This finding is in accordance with data which shows that a large

¹¹ The fact that Fed's accommodative policies have a higher impact on EMEs corporate debt and capital flows to emerging economies in general, when compared to other major central banks (BOE, BOJ, ECB), can be understood, among other factors, by the role of the dollar as a benchmark for offshore credit in most emerging markets and at a global level. This result is in accordance with other studies in the literature, such as Chen et al (2017).

share of EMEs corporate debt after 2008 was taken by commodity sector industries, as was previously described in section 2.

In order to better analyze the changes in the determinants of corporate debt expansion between the time periods of the study, we perform Wald tests to check the joint significance of independent variables' coefficients. We divide the coefficients into two big groups: country coefficients and global coefficients. Country coefficients are then split into two smaller groups: Micro (firm factors) and Macro (aggregate economic factors). Global coefficients are also divided into two groups: one that gathers main central banks' monetary policy rates (US, Euro, UK and Japan shadow short rates), and a second that accounts for other global variables in the model (global GDP growth, commodity price index and VIX). In the specification that considers the interaction term $\text{Commodity Price} * \text{REER}$, the term was included in the domestic macro factors (as the REER), due to its particular influence according to each country. In order to verify the statistical significance of each coefficient block, we test two hypotheses: i) If the coefficients are different in the 15 countries; ii) If the coefficients are different from zero in the 15 countries. Thus, an answer “Yes” implies the joint coefficients have statistical significance as a group, while an answer “No” means they don't have joint statistical significance. The results are reported in Table 3 in the appendix.

The results in both specifications (without and with the interaction term) are similar, and analyzing them one can reach the following conclusions. Before the 2008 crisis, the main determinants of debt expansion were in the group of *country* factors (as shown by the high significance of the return on assets in domestic microeconomic factors, and the REER in domestic macroeconomic factors). Conversely, after the 2008 crisis, while country factors remain important, factors in the *global* group also gain ground both in the block related to international interest rates (e.g. US shadow short rate), as well as in the block related to other

global variables (VIX, commodity prices, Global GDP growth). Those results are consistent with other studies available in the literature previously mentioned in subsection 3.2.

As a robustness analysis, we removed China from the country sample, in order to test if its faster pace of credit growth when compared to other countries and its profile more reliant on local currency debt were introducing some bias on the results. However, the results kept broadly similar to the full country sample, with the same variables appearing as significant and in the same degree of significance, as reported in table 4 in the appendix.

Overall, our findings suggest that the exchange rate has been one of the most important determinants that explain the increase in EMEs companies' debt through the period 2000-2016, and also in the period before the 2008 crisis. But after 2008, beyond some country level factors (exchange rate, national GDP growth, firms' higher liquidity levels), other factors that have global origins (more accommodative monetary policy stance in USA, lower financial market volatility, global GDP growth, higher commodity prices and its interaction with the exchange rate appreciation) have become increasingly important to explain emerging market corporate debt expansion.

5. Challenges for Emerging Firms and Economic Policy Implications

The analysis in the previous session showed that the expansion of leverage in EMEs companies turned those firms more sensitive to the movements of the international economy. Hence, if firms are more sensitive to those movements, a reversal of international favorable conditions (i.e.: monetary policy tightening in advanced economies, increase in risk aversion) may generate adverse effects in countries (e.g.: currency depreciation, lower liquidity), increasing firms' borrowing costs and worsening their debt rollover conditions, turning their balance sheets weaker. Those facts were already observed in previous episodes - in 2013, the “taper tantrum” in USA; in 2014, the fall in commodity prices (especially oil/minerals); in

2015, uncertainties in China's currency/stock markets; in 2016, after the election of the new US president - and could occur again.

5.1 Challenges faced by Emerging Country Firms

Beyond the international scenario surrounded by uncertainties, other challenges faced by emerging country companies are: i) Currency mismatch problems; ii) Susceptibility to the interests of creditors, banks and institutional investors and iii) Macroeconomic volatility.

5.1.1 Currency Mismatch

Currency mismatch occurs when there is a discrepancy between agents' financial commitments and revenues denominated in foreign currency, due to uncertainty in the behavior of foreign exchange rates. In this context, companies could be in better financial health if they had enough *hedge* - funds in exchange for liabilities in foreign currency. It is known that many of them have "natural" hedges, once most of their revenues are denominated in foreign currencies, which in principle would make them less vulnerable to local currency depreciation. Other possibility would be to manage currency exposures through financial derivatives. However, it is difficult to measure the existing amount of those derivative instruments due to the lack of transparency of this information in many emerging economies. International data regarding non-financial companies' hedge is not disclosed in a clear and timely form, especially in EMEs¹². Indeed, many firms acquire loans through their subsidiaries abroad, turning more difficult to know in which degree their net foreign currency exposure is really found. Moreover, hedging guarantees are not static. In the case of exporting firms, there may be a drop in revenue due to a reduction in their products' price or in the

¹² BIS data compilation related to foreign exchange derivatives that includes emerging countries occurs each three years through the "Triennial Central Bank Survey of foreign exchange and derivatives market activity". Still, data disclosed does not segregate the amounts of non-financial companies' derivatives. It only discloses the total amount of "non-financial customers", category that includes firms, households and government entities altogether. In addition, Borio et al (2017) estimate that the amount of dollars borrowed by non-banks outside the USA in FX derivatives markets was around 13-14 trillion US\$ at end March 2017. However, those estimates do not segregate neither emerging countries (they consider developed and emerging countries as a whole), nor corporations (consider governments and private non-bank agents in the total amount).

amounts exported. Furthermore, the hypothesis that access to developed financial markets would ensure proper hedging¹³ can be refuted by the case of exporting companies from South Korea, Brazil and Mexico. Those companies incurred in heavy losses in the 2008 financial crisis because they were involved in foreign exchange derivative transactions with the intention to speculate, as Chui et al (2014) report. In fact, they made hedge contracts that had lower costs, but were more risky, once they would be forced to sell their dollars at below market prices if domestic currency depreciated. As these companies were betting on a continued appreciation of local currencies, they engaged in several of those contracts, but once their domestic currency depreciated after 2008, they were forced to execute their positions, incurring in losses. Thus, companies which adopt a strategy to increase balance sheet exposure to foreign currency, but hope that hedge contracts will provide full insurance, may be taking a risky step. This happens because future expectations may not be fulfilled, and in occasions of foreign exchange volatility, market liquidity shrinks and it is more difficult to roll over hedge contracts. Therefore, the availability of funds for hedge is reduced at times they are most needed.

5.1.2 Susceptibility to the Interests of Creditors, Banks and Institutional Investors

Other critical element for emerging market companies is their susceptibility to creditors', banks' and institutional investors' interests. As discussed in section 2, non-financial corporate debt profile has changed over the last years: although bank loans remained the main source of funding, resources obtained through bond markets had a significant increase in their share. This fact adds more complexity to companies' decisions.

With regard to bank loans' funding, banks had to adapt to the new supervisory and regulatory framework after the 2008 crisis, which required, among other things, an increase in

¹³ This hypothesis refers to the assumption that firms with access to more developed domestic derivatives markets, or to international derivatives markets (e.g. Korea, Mexico, Brazil), would have a higher probability of their foreign currency exposures being hedged, when compared to other companies that do not have the same access to those markets.

capital requirements. According to BIS (2015), banks' core tier 1 expanded on average from 7% in 2011 to 11% in 2014, mainly through retained earnings. But the scenario of low global interest rates reduced net interest income over the period. In this context of increased capital requirements and downward pressure in profitability, banks, when observed an increase in emerging firms' default ratios, tended to tighten their lending conditions: reduced terms, increased interest rates and rationed credit. This would further aggravate the problems of indebtedness and defaults among companies.

With regard to companies financing through bond market funding, its expansion in the period did not occur by accident. It is known that raising funds through bond markets has some advantages when compared to bank loans, among which the following: i) The possibility of issuing debt on better terms (longer maturities, lower interest rates, in some cases in domestic currency) and ii) A more diversified investor base. However, this form of financing has a particularly volatile nature, since it is characterized by: i) The influence of investors' procyclical behavior, which may induce herd effects in bond prices; ii) The presence of collective action problems, since it is more difficult to control capital outflows from a diversified scope of market investors than from a more limited and regulated set of international banks.

Additionally, it is worth mentioning that the rise of finance and institutional investors linked to non-financial corporations' portfolios has strongly influenced their behavior. Within a broader movement of financialization¹⁴ (observed since the 1970s, but with increasing importance in more recent decades), it has been shaped a new framework for the structure and management of corporations, the shareholder value. The shareholder value framework submitted corporate governance decisions to financial markets' purposes, and encouraged

¹⁴ The concept of financialization is related to the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies (Epstein, 2005).

exacerbation of risky positions by increasing speculation and leverage, according to Lazonic (2004). In the shareholder value framework, the fundamental objective is to maximize the wealth of shareholders. In this sense, companies are subordinated to the prices, evaluations and interests determined by capital markets, which shape their resource allocation. So, stock investors react or reducing share prices (if they judge the company has taken bad decisions according to their interests), or increasing share prices (if they consider the opposite). Stock options and other types of incentive-based compensation plans were also implemented in order to align the interests of companies' shareholders and managers. Thus, complying with CEO's and institutional investors' requests for rapid gains and higher earnings in the short term, firms were encouraged to expand financial transactions and riskier operations. This behavior has left firms more exposed to fluctuations in macroeconomic indicators, financial markets and asset prices. Therefore, non-financial corporations have become increasingly linked to the interests of these investors.

Most of the bonds issued by firms were acquired by institutional investors such as insurance funds, pension funds, hedge funds, mutual funds, usually controlled by asset management companies. In general, asset management companies' business models (.i.e. the adoption of benchmarks and the importance given to market peers' performance as well as the investment structures they offer (e.g. collective investment vehicles) encourage short-term behavior that may be disruptive in the face of adverse shocks¹⁵. In the case of EMEs' asset management companies, this short-term bias is even more pronounced, since the funds they operate have a smaller number of benchmarks and a more correlated profile than their counterparts in advanced economies. As a result, financial shocks are more likely to

¹⁵ In some cases, asset management companies work with structures whose risks are borne ultimately by retail investors (e.g. defined contribution pension funds, rather than defined benefit pension funds), according to the BIS (2015). In general, retail investors have smaller resources, shorter investment horizons, and therefore are less prepared to absorb losses.

simultaneously affect a wide range of investors in EMEs funds. Hence, one of the main risks for corporations would be a sudden withdrawal of those investors.

5.1.3 Macroeconomic Volatility

Regarding the adversities posed by macroeconomic volatility, it can be noted that emerging economies are more susceptible to shocks and instability, due to their structural characteristics. First, it is clear that emerging firms have higher funding costs in international markets. BIS data (2016a) show that corporate spreads paid by emerging firms are consistently higher than those paid by U.S. and European companies, when compared to their peers in high-yield and investment-grade markets. This fact is generally associated to their nation's sovereign spreads, which impose them a clear competitive disadvantage in international markets. Another sign of deterioration in emerging countries firms' credit perspective is the increase in the number of downgrades performed by rating agencies in recent years. They may face higher losses because spreads/credit ratings of similar sectors/countries were negatively affected, even if their own conditions have not changed. In fact, at a time of many uncertainties in the international economy, it is expected that emerging markets are more subject to large movements in capital flows and, consequently, to exchange rate volatility. Once we compare data from foreign exchange volatility (VXY Index¹⁶) for emerging currencies and for G7 currencies, we note that emerging market currencies are more volatile in most occasions during the period 2000-2016. It is important to mention that such scenario is riskier for emerging market companies, because it may increase their debts' amounts and service payments, and also affect loans' refinancing conditions.

5.2 Economic Policy Implications

Since the financial crises experienced in the 1990s, emerging countries have sought to implement a number of defense mechanisms to prevent external crises. From companies'

¹⁶Index calculated by JP Morgan (Volatility Indices -VXY) that monitors aggregate currency volatility through a weighted average of the values, based on three-month at-the-money forward options.

point of view, they expanded their amount of private assets held abroad. However, in times of instability, the main shortcoming of this mechanism is its low liquidity.

From governments' point of view, they have also made an effort to create a series of sovereign lines of defense against potential external macroeconomic and financial risks. One set of lines of defense that can be mentioned was the accumulation of foreign reserves - which increased as an average in EMEs from 10% of GDP in mid-1990s to 30% in 2014, according to BIS (2015) - as well as currency swap agreements between central banks and precautionary lines with multilateral institutions (e.g. IMF). However, there are problems with this set of mechanisms: i) The difficulty in directing official foreign exchange reserves to solve liquidity shortages in the private sector; ii) Governments reluctance to use official reserves, for reasons of not wanting to convey wrong incentives to agents or to run out of tools in case of a deeper crisis; iii) Resistance to sign assistance programs with the IMF, once those programs are generally associated to tough conditionalities.

A second set of safeguards was the reform in the macroeconomic framework, which incorporated in many countries monetary policy with inflation targeting, fiscal rules and a flexible exchange rate regime. On the one hand, this new macroeconomic framework has turned emerging markets more solid under international investors' view, as they perceived emerging countries with more tools and flexibility to deal with problems arising from external shocks. Note that on such occasions, the usual policy recommendations would be: i) More restrictive monetary policy; ii) Countercyclical fiscal policy and iii) More flexible exchange rate regimes.

On the other hand, it is known that macroeconomic policies are only partial shields to crises episodes. In particular, in the case of monetary policy, although it can be tightened to prevent asset price booms and an increase in leverage, this tightening is not a good alternative when is done very quickly, because the forced contraction could result in losses in

output/employment and a higher foreign debt level. Moreover, it can become ineffective in occasions of adverse international financial conditions and strong capital outflows, with the rise in interest rates turning indebted companies even more vulnerable. Regarding fiscal policy, emerging countries at the moment do not have the same “fiscal space” for countercyclical policies they had right after the 2008 crisis, as governments are dealing with issues related to the increase in public deficits/debts since then. Moreover, fiscal instruments usually have more obstacles to be implemented, once they require parliamentary approval. Nevertheless, some authors suggest changes in tax laws that may inhibit excessive increase in agents’ debt levels. First, removing tax incentives for companies to raise funds through debt rather than equity, which exist in several countries (BIS, 2016b). Second, in times of economic growth, the imposition of higher tax rates for more leveraged companies and lower tax rates for less leveraged firms. The resources collected with such taxes should be destined to a fund that would serve as a liquidity buffer to be used in times of financial adversity (BIS, 2015). However, in this second case the real effectiveness of this measure cannot be ensured, once it has not been tested yet.

Therefore, emerging countries have the challenge - beyond traditional macroeconomic policies to prevent from external and domestic vulnerabilities - to implement actions to mitigate currency mismatch and high leverage in their firms. This should be done not only through monetary and fiscal policies, but also with an improvement in regulatory frameworks, as well as and macro and micro-prudential measures, preferably on a coordinated basis, as it will be argued in the sequence.

5.2.1 Improvement in Regulatory Frameworks

Recognizing the existence of regulatory shortcomings is a key factor to try to solve problems that became clear since the 2008 crisis. Regulatory actions taken since then (i.e.

Basel III rules¹⁷) have not been able to address properly problems such as excessive leverage growth and procyclical market behavior on the whole financial sector. In this sense, there is a demand for additional reforms on regulatory frameworks. In order to monitor systemic risks more properly, the potential range of regulation needs to be broadened to all financial activities, especially in the non-banking sector. As suggested by Auvray, Dallery, Rigot (2016)¹⁸, to institutional investors (insurance companies, pension funds, hedge funds, mutual funds), generally controlled by asset management companies. For the case of asset management companies, it would be advisable to adopt the following measures, according to BIS (2015): i) Impose restrictions on fast redemptions and sudden changes in funds' portfolio composition, that would reduce liquidity risks and serve as stabilizers in temporary adverse shocks; ii) Establish limits on leverage, seeking to contain the amplification of shocks; iii) Encourage the extension of managers' investment horizon and the implementation of precautionary buffers, which would increase the capacity of these companies to absorb losses.

Other issue to be developed is the improvement of financial/ non-financial institutions' resolution schemes, in order to establish proper roles for public/private participation in such schemes, so as to mitigate financial stability risks/ moral hazard with government support. Regulators need to be able to enforce restructuring or closure of institutions which face financial problems or bankruptcy. According to IMF (2015), legal frameworks should be improved, so that regulatory agencies have mandates and tools consistent with their objectives. Their duties and responsibilities need to be clear for future accountability.

¹⁷ Basel III rules were established by the Basel Committee on Banking Supervision in January 2013, with gradual implementation until January 2019. Some of the major innovations introduced were the following requirements for banks: i) on the capital side, the creation of countercyclical and conservation capital buffers; and ii) on the liquidity side, short-term (liquidity coverage ratio, a month under a simulated stress scenario) and long-term reference indexes (net stable funding ratio, a year with stable funding conditions).

¹⁸ Beside the increase in the supervision of institutional investors, these authors propose an alternative structure for corporate governance, not based on shareholder value. On their proposal, decisions would be taken by a board composed by shareholders, managers, workers and other company stakeholders, in which those members would have equal powers. This would try to avoid that financial interests always have the last word within companies' decision process.

Obviously, many corporate interests can be challenged in a reform of resolution frameworks, so that political lobbies may create obstacles for the implementation of the necessary reforms (i.e. limits for "too big to fail" institutions).

5.2.2 Macroprudential Actions

Macroprudential actions can be implemented with two basic objectives: enhancing the resilience of the financial sector (measures to avoid the buildup of financial imbalances and significant exposure against financial shocks), or smoothing the credit cycle (countercyclical action to mitigate an expected credit boom or bust). There is a wide variety of macroprudential tools, but for each one of those objectives, there would be some set of measures that would be more appropriate. In the case of enhancing the resilience of financial sector, authors such as Claessens et al (2014) and Boar et al (2017) argue in favor of: i) capital-based instruments (countercyclical capital requirements, leverage restrictions, general or dynamic provisioning) and ii) liquidity-based requirements. When the goal is to smooth the credit cycle, those authors support: i) asset-side instruments (credit growth limits, maximum debt-service- to- income-ratios, limits to bank exposures to individual agents, such as maximum loan-to-value ratios); ii) changes in reserve requirements; and iii) currency instruments (limits on foreign currency mismatches, net open positions and differential treatment of deposit accounts in foreign currency).

Evidence in the literature is broadly in favor of the use of macroprudential policies, when implemented in a proper way. Boar et al (2017) show that countries that implement macroprudential policies have stronger and less volatile GDP growth. Claessens et al (2014) show that measures destined to control credit growth over borrowers (debt to income, loan to value ratios) and financial institutions (limits on credit growth, foreign currency lending) are effective on preventing excessive asset growth. Gambacorta and Murcia (2017) show that macroprudential policies are effective in stabilizing credit cycles, with propagation effects for

measures aimed at smoothing the credit cycle (average of one quarter) more rapid than for measures aimed at enhancing the resilience of the financial sector (average of one year). However, those actions are not perfect, and can generate distortions when not implemented in an adequate way. But one can affirm that when properly implemented, those policies are important tools for monitoring risks in the economy from a systemic point of view. They also turn companies' balance sheets more solid, as well as their interactions with banks and other agents of the economy.

As each country has its own institutional framework and economic condition, one cannot prescribe a “single book” of recommendations, valid for all countries at the same time, or even for emerging countries as a whole, due to their very diverse nature. However, some researchers such as the authors of IMF (2015) point to a general set of guidelines for macroprudential initiatives that would be interesting to be taken by emerging countries on a preventive basis, in order to avoid excessive risk taking by EMEs companies. In the short term, the proposed actions would be to limit corporate risks with leverage and foreign exchange exposure, and their impacts on other interrelated sectors, such as banks. For example, reserve requirements/risk weights over certain assets could be increased, as well as limits for leverage in real estate markets (debt-to-income and debt- service coverage ratios) and foreign exchange positions could be introduced. Capital flow management measures, to deal with excessive flows that pose systemic financial risks, could also be considered. In the long term, other measures would be recommended, among which: i) Changes in tax codes, removing tax benefits in favor of excessive debt growth; ii) Promoting the development of local financial markets, and encouraging greater participation of domestic investors.

5.2.3 Microprudential Actions

At the microprudential level, supervisory authorities should improve data collection mechanisms from financial and non-financial companies. In particular, promote an

improvement in the measurement and disclosure of data related to foreign currency exposure, hedge and offshore issuances, which in many emerging countries are still inadequate. Monitoring should also include stress tests, where interest rate/ exchange rate volatility and currency mismatches are taken into account. Supervisory authorities should increase the accuracy of their tools of control and analysis, because as seen in the 2008 crisis, the opacity of balance sheets led to an increase in financial system's instability. Those authorities need to consider in their analysis that liquidity risk can become insolvency risk for each individual institution. Systemic risk should also be incorporated into the supervisory analysis through more broad-based indicators, such as the degree of interconnectivity within institutions. Aspect to be highlighted is that more attention needs to be given to tail risk. The 2008 crisis demonstrated that VaR (Value at Risk) models have failed to determine the magnitude of the losses observed.

In terms of incentives, is a need to reduce stimulus to excessive borrowing/ lending of certain types. For instance, avoid incentives for companies in non-tradable sectors to borrow in foreign currency. In these situations, those companies have local currency revenues, but liabilities in foreign currency, which turn them more exposed to default risks in occasions of domestic currency depreciation.

5.2.4 Coordinated Actions

Despite the efforts to improve the efficiency and reduce the asymmetries of the global financial regulatory framework, each country has its particular institutional arrangement and current economic situation, and hence implements its own set of regulations and macro/micro-prudential measures. Regarding macroprudential policies, one of the shortcomings they present is that, when adopted on an ad-hoc and temporary basis, to act on specific market segments, those policies allow agents to discover ways to evade/circumvent them, opening the

doors for regulatory arbitrage. Moreover, their improper use can lead to distortions in other economic sectors in the same country or in other countries.

Therefore, a first recommendation would be to seek greater coordination in countries' regulatory frameworks, in order to avoid loopholes, and that macroprudential policies targeted to a specific sector or country do not harm other sectors/countries. Second, instead of adopting macroprudential measures on a reactive, ad-hoc and temporary basis, choose to implement them preventively, jointly and on a medium/long-term basis. Thus, such measures could act on an ex-ante way (preventing imbalances), and be continuously monitored and assessed to correct eventual distortions and ensure proper calibration, so that their overall objectives are achieved in the long term (IMF, 2013).

In addition, due to the close relationship between macroprudential and financial supervision with antitrust, fiscal and monetary policies, it is advocated an improvement in the coordination among those policies. In particular, with appropriate coordination between monetary and macroprudential policies, central banks and financial supervision authorities could take balanced decisions in the two spheres, being able to ensure macroeconomic and financial stability at the same time (BIS, 2016b). Another good example of properly coordinated actions would be the creation of mechanisms that drive companies' incentives to less short-term/speculative actions, and more towards medium-long term/ real investments. A way to do so would be to implement proper industrial policies, with the support of institutions such as national/multilateral development banks, which can provide more adequate conditions for financing development in the long term. Policies should target strategic sectors: infrastructure, health, education, SMEs, "decent jobs" creation, innovation/technology, energy/ecological transition. This could reduce financial stability concerns, and at the same time foster more private/public investments in the real economy, towards sustained economic growth.

6. Conclusions

This study explored corporate debt expansion in emerging markets after the 2008 crisis, its profile, main determinants, the challenges faced by firms related to this issue, and discussed economic policy implications for those countries. Some of the main features of this expansion in EMEs corporate debt were the increase in leverage, net foreign exchange exposure, later leading to a deterioration of debt repayment capacity in a significant share of them. Those features would have as a common point agents' procyclical behavior, being in accordance with theoretical approaches that have been well described both in the mainstream and heterodox literature, related to concepts such as the risk-taking channel of monetary policy, herd behavior and financial instability hypothesis.

Our contributions in this literature are to investigate the determinants of EMEs corporate debt expansion by using a dataset which goes from 2000 Q1 up to a more recent period (2016 Q4), and with subsamples before and after the 2008 crisis, so we identify the main changes in the factors that explain EMEs corporate debt expansion before and after this event. Most importantly, we identify a factor which was not previously used in the literature for that purpose: the interaction between higher commodity prices and more appreciated exchange rates. Our findings suggest that the exchange rate has been one of the most important determinants that explain the increase in EMEs companies' debt through the period 2000-2016, and also in the period before the 2008 crisis. But after 2008, beyond some country level factors (exchange rate, national GDP growth, firms' higher liquidity levels), other factors that have global origins (more accommodative monetary policy stance in USA, lower market volatility, global GDP growth, higher commodity prices and its interaction with the exchange rate appreciation have become increasingly important to explain emerging market corporate debt expansion.

Hence, if EMEs companies are more sensitive to the movements of the global economy, a reversal of international favorable conditions may generate adverse effects, increasing firms' borrowing costs, worsening their debt rollover conditions and weakening their balance sheets. In this context, difficulties posed by the international economic scenario - uncertainties in major economies (USA, China, Europe) as well as large swings in emerging currencies and commodity prices - together with problems related to currency mismatch; susceptibility to the interests of creditors/ institutional investors/ banks and macroeconomic volatility may put into question the financial sustainability of these companies. Moreover, it was seen that, although in recent decades several sovereign macroeconomic lines of defense have been developed by EMEs governments to combat economic/financial crises, the capacity of such lines to fulfill private firms' needs in occasions of crises is uncertain, due to the mentioned problems.

Ultimately, we draw attention to the need for policies oriented not only to enhance macroeconomic fundamentals, but also to improve regulatory frameworks, as well as micro and macroprudential instruments. They should be implemented in a coordinated way, in order to strengthen the monitoring of individual and systemic risks, increasing balance sheets resilience. Therefore, these countries would have better tools to face new financial crises, attenuating the moments of greater instability, and could pursue better strategies towards sustainable growth in the medium/long-term.

7. References

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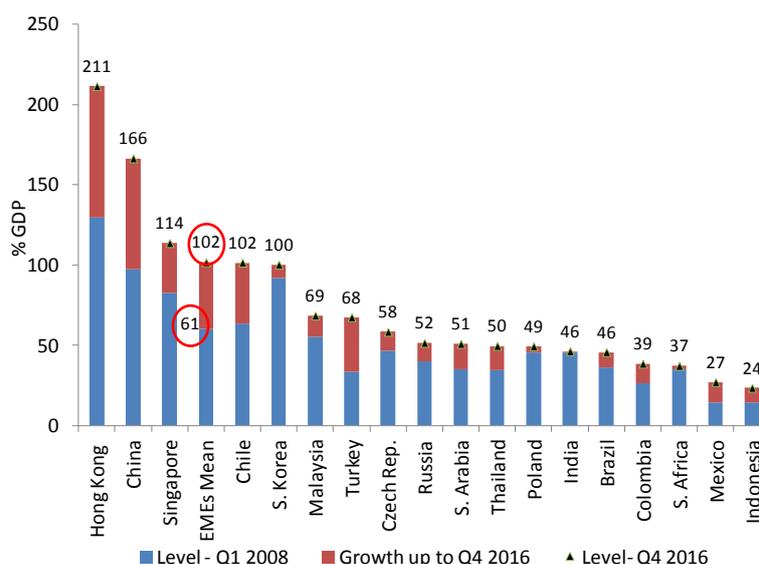
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Appendix

Figure 1- Credit to Non-financial Corporations - Q1/2008 to Q4/2016 (% GDP)



Note: EMEs mean is composed by the 18 countries in the figure, plus Argentina, Hungary and Israel, which were excluded from the figure because they have presented negative corporate credit growth in the period (-4 pp., -7 pp. and -22 pp., respectively). Source: BIS (2017).

Table 1- Expected sign for Relationship between Leverage and Explanatory Variables

Explanatory Variable	Expected Sign	Reference in Literature
Microeconomic Factors		
Profitability: Return on assets	Positive/ Negative	Adair and Adaskou (2015) IMF (2015a)
Solvency ratio: Free cash flow per share /Short & long term debt	Positive/ Negative	Adair and Adaskou (2015) IMF (2015a)
Liquidity: Current ratio	Positive/ Negative	IMF (2015a)
Asset Quality: Tangible assets per share	Positive/ Negative	Adair and Adaskou (2015) IMF (2015a)
Macroeconomic Factors		
Real GDP Growth	Positive	Feyen et al (2015) IMF (2015a)
Monetary Policy Rate	Negative	IMF (2015a) Lo Duca et al (2016)
Real Effective Exchange Rate	Positive	Feyen et al (2015) IMF (2015a)
Global Factors		
Monetary policy rate of Fed, ECB, BOE, BOJ	Negative	Feyen et al (2015) IMF (2015a) Lo Duca et al (2016)
Real Global GDP Growth	Positive	Feyen et al (2015) IMF (2015a)
Commodity Price	Positive	IMF (2015a) Kohlscheen et al (2017)
VIX	Negative	Mc Cauley et al (2015b) Serena and Moreno (2016)
Interaction		
Commodity Price*REER	Positive	-

Table 2- Panel Estimation Output Results

Dependent Variable: Debt to Equity						
Independent Variables	2000 Q1 - 2016 Q4		2000 Q1 - 2007 Q4		2009 Q1 - 2016 Q4	
	No Interaction	Interaction	No Interaction	Interaction	No Interaction	Interaction
Country						
Return on Assets (1 lag)	0.029*** (0.011)	0.029*** (0.011)	0.045*** (0.013)	0.048*** (0.013)	0.011 (0.010)	0.020** (0.010)
Free Cash Flow/Short Long Term Debt (1 lag)	0.002 (0.003)	0.002 (0.003)	0.010* (0.005)	0.009* (0.006)	0.002 (0.002)	0.003 (0.002)
Tangible Assets per share (1 lag)	0.024* (0.013)	0.024* (0.013)	0.006 (0.013)	0.005 (0.014)	0.028* (0.017)	0.024 (0.017)
Current ratio (1 lag)	0.109*** (0.023)	0.108*** (0.023)	0.038 (0.027)	0.037 (0.027)	0.188*** (0.021)	0.199*** (0.020)
Real GDP Growth	0.001 (0.004)	0.001 (0.004)	0.006 (0.007)	0.005 (0.007)	0.009*** (0.003)	0.007*** (0.002)
Monetary policy rate	-0.015 (0.018)	-0.015 (0.018)	-0.024 (0.023)	-0.027 (0.024)	-0.004 (0.016)	-0.001 (0.016)
REER	0.396*** (0.068)	0.381*** (0.069)	0.591*** (0.095)	0.587*** (0.098)	0.131*** (0.047)	0.185*** (0.050)
Global						
US shadow short rate	-0.009* (0.005)	-0.009* (0.005)	-0.004 (0.033)	-0.002 (0.036)	-0.008*** (0.002)	-0.006*** (0.002)
UK shadow short rate	-0.000 (0.003)	-0.001 (0.003)	-0.300 (0.088)	-0.309 (0.094)	-0.003* (0.001)	-0.002* (0.001)
EUR shadow short rate	-0.002 (0.012)	-0.002 (0.012)	-0.222 (0.085)	-0.236 (0.091)	-0.006 (0.005)	-0.009 (0.004)
Japan shadow short rate	-0.013 (0.007)	-0.013 (0.007)	-0.017 (0.006)	-0.017 (0.006)	-0.041 (0.008)	-0.054 (0.007)
Global GDP Growth	0.008 (0.010)	0.009 (0.010)	0.022 (0.037)	0.014 (0.039)	0.004 (0.004)	0.008** (0.004)
Commodity price	0.065 (0.041)	0.003 (0.088)	0.109 (0.063)	0.106 (0.096)	0.020 (0.026)	0.335*** (0.049)
VIX	-0.034*** (0.009)	-0.033*** (0.010)	-0.068* (0.015)	-0.068* (0.016)	-0.024*** (0.005)	-0.024*** (0.004)
Interaction						
Commodity Price*REER	-	0.053 (0.062)	-	0.006 (0.067)	-	0.265*** (0.035)
Other Information						
Number of quarters	66	66	30	30	32	32
Observations	913	913	373	373	480	480
R2 (GLS weighted)	0.092	0.094	0.204	0.196	0.316	0.401

Notes: All variables are measured in log changes. P values: *, **, ***, denote statistical significance at the 10, 5 and 1 percent level, respectively. Robust standard errors are in parenthesis.

Table 3 - Joint Significance on Independent Variables' Coefficients (Wald Test):

Coefficient Group	2000 Q1 - 2016 Q4		2000 Q1 - 2007 Q4		2009 Q1 - 2016 Q4	
	No Interaction	Interaction	No Interaction	Interaction	No Interaction	Interaction
Domestic Microeconomic Factors						
Different in all countries	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***
Different from zero in all countries	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***
Domestic Macroeconomic Factors						
Different in all countries	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***
Different from zero in all countries	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***
Domestic Micro & Macro Factors						
Different in all countries	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***
Different from zero in all countries	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***
US, UK, Euro Area, Japan Shadow Short Rates						
Different in all countries	Yes*	Yes*	No	No	Yes***	Yes***
Different from zero in all countries	No	No	No	No	Yes***	Yes***
World GDP, Commodity Price, VIX						
Different in all countries	Yes**	Yes**	Yes*	Yes*	Yes***	Yes***
Different from zero in all countries	Yes***	Yes***	Yes*	Yes*	Yes***	Yes***
All Global Factors						
Different in all countries	Yes***	Yes***	Yes*	Yes*	Yes***	Yes***
Different from zero in all countries	Yes***	Yes***	Yes*	Yes*	Yes***	Yes***

Note: P values: *, **, ***, denote statistical significance at the 10, 5 and 1 percent level, respectively.

**Table 4 - Results for model with full country sample and model without China
Specification Without Interaction**

Dependent Variable: Debt to Equity						
Independent Variables	2000 Q1 - 2016 Q4		2000 Q1 - 2007 Q4		2009 Q1 - 2016 Q4	
	Full Country Sample	Without China	Full Country Sample	Without China	Full Country Sample	Without China
Country						
Return on Assets (1 lag)	0.029*** (0.011)	0.024*** (0.012)	0.045*** (0.013)	0.049*** (0.014)	0.011 (0.010)	0.003 (0.012)
Free Cash Flow/Short Long Term Debt (1 lag)	0.002 (0.003)	0.001 (0.003)	0.010* (0.005)	0.010* (0.006)	0.002 (0.002)	0.001 (0.002)
Tangible Assets per share (1 lag)	0.024* (0.013)	0.037* (0.014)	0.006 (0.013)	0.023 (0.017)	0.028* (0.017)	0.039* (0.017)
Current ratio (1 lag)	0.109*** (0.023)	0.112*** (0.025)	0.038 (0.027)	0.018 (0.030)	0.188*** (0.021)	0.180*** (0.023)
Real GDP Growth	0.001 (0.004)	0.002 (0.004)	0.006 (0.007)	0.010 (0.007)	0.009*** (0.003)	0.005*** (0.003)
Monetary policy rate	-0.015 (0.018)	-0.015 (0.018)	-0.024 (0.023)	-0.015 (0.025)	-0.004 (0.016)	-0.017 (0.015)
REER	0.396*** (0.068)	0.421*** (0.071)	0.591*** (0.095)	0.568*** (0.107)	0.131*** (0.047)	0.181*** (0.058)
Global						
US shadow short rate	-0.009* (0.005)	-0.009* (0.005)	-0.004 (0.033)	-0.015 (0.040)	-0.008*** (0.002)	-0.007*** (0.002)
UK shadow short rate	-0.000 (0.003)	-0.001 (0.003)	-0.300 (0.088)	-0.224 (0.110)	-0.003* (0.001)	-0.002* (0.001)
EUR shadow short rate	-0.002 (0.012)	-0.008 (0.012)	-0.222 (0.085)	-0.227 (0.105)	-0.006 (0.005)	-0.003 (0.004)
Japan shadow short rate	-0.013 (0.007)	-0.016 (0.007)	-0.017 (0.006)	-0.013 (0.007)	-0.041 (0.008)	-0.033 (0.008)
Global GDP Growth	0.008 (0.010)	0.006 (0.010)	0.022 (0.037)	0.039 (0.045)	0.004 (0.004)	0.001 (0.004)
Commodity price	0.065 (0.041)	0.077 (0.043)	0.109 (0.063)	0.113 (0.079)	0.020 (0.026)	0.046 (0.026)
VIX	-0.034*** (0.009)	-0.027*** (0.010)	-0.068* (0.015)	-0.096* (0.018)	-0.024*** (0.005)	-0.018*** (0.004)
Other Information						
Number of quarters	66	66	30	30	32	32
Observations	913	847	373	343	480	448
R2 (GLS weighted)	0.092	0.098	0.204	0.209	0.316	0.275

Notes: All variables are measured in log changes. P values: *, **, ***, denote statistical significance at the 10, 5 and 1 percent level, respectively. Robust standard errors are in parenthesis.