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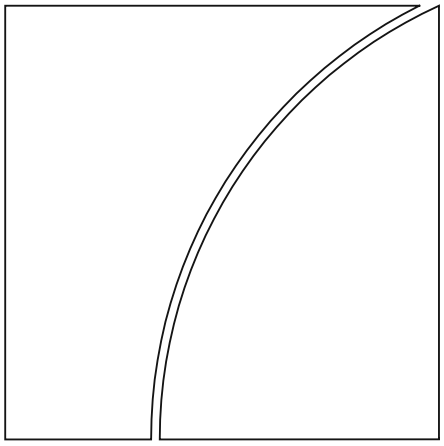

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Monetary and Economic Department

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Corporate leverage in EMEs: Did the global financial crisis change the determinants?

Snehal S. Herwadkar[1]

Abstract

Did the global financial crisis change the determinants of corporate leverage in EMEs? This paper attempts to address this issue using a panel-GMM framework and quantile-analysis with a database covering more than 2000 firms in 10 emerging market economies over a 19-year period. We find that, post-crisis, global financial market and macroeconomic conditions facilitated higher corporate leverage. Specifically, global factors such as world GDP growth and the Fed shadow rate have assumed centre stage as determinants of leverage in EMEs, while some traditional drivers like domestic growth and firm-specific factors have become less important in the post-crisis period.

Keywords: dynamic capital structure, corporate leverage, emerging market economies, global financial crisis.

JEL classification: G30, G32.

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Contents

Introduction

The global financial crisis (GFC) has brought a renewed emphasis on the role of central banks in maintaining financial stability. In emerging market economies (EMEs), corporate leverage – an indicator of corporate risk-taking – has registered a significant increase in the aftermath of the crisis. Many multilateral organisations and think-tanks (BIS, 2016, CIEPR, 2015) have recently noted concerns with regard to corporate leverage. This study investigates the determinants of corporate leverage for EMEs in the post-GFC period with a view to assessing their implications for EME policymakers.

The literature on the determinants of corporate leverage is large. Both the pecking order theory (Myers, 1984) and the market timing theory (Baker and Wurgler, 2002) emphasise the role of firm and industry-specific determinants such as the profitability of firms, asset tangibility, market-to-book value ratio, and industry leverage. Studies in a multi-country setting, notably Rajan and Zingales (1995) and Borio (1990), underscore the importance of country-specific macroeconomic and institutional factors. More recently, with a global macroeconomy characterised by abundant liquidity, low global interest rates and stagnating world growth, policymakers have been asking whether such global factors themselves are causing higher leverage among firms in EMEs (IMF, 2014).

The major contribution of our study lies in explicitly evaluating the role of exogenous global factors such as world GDP growth and the Fed shadow rate as drivers of corporate leverage in EMEs. We also assess the changing role of the traditional determinants of corporate leverage, both firm- and country-specific, in the post-crisis environment. Furthermore, we estimate and introduce a financial conditions indicator (FCI) for each EME as a domestic determinant of leverage.

The present paper is organized as follows: Section I sets out the motivation of the study; Section II presents the literature survey; in Section III we review the hypothesised linkages between the variables used in the empirical exercise and corporate leverage; Section IV documents the data and methodology used in this study; Section V presents the empirical results and Section VI concludes with policy implications.

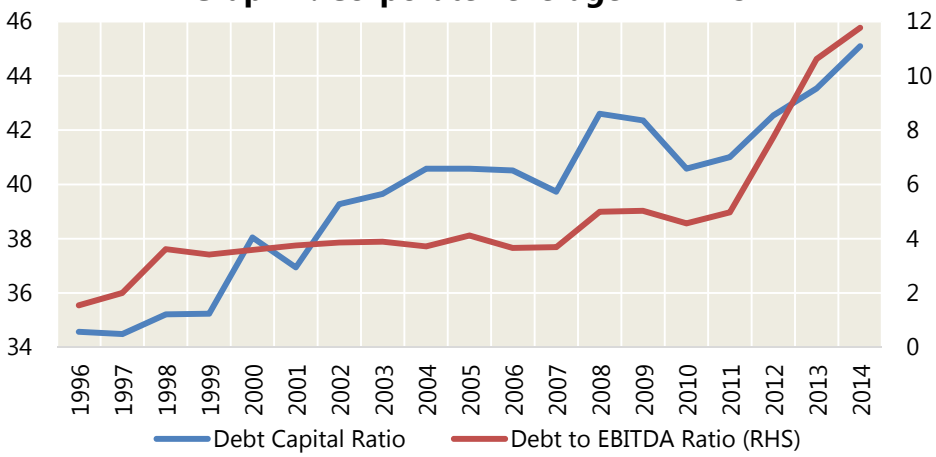
Motivation

One of the major themes of research in corporate leverage has been whether, over a period of time, the capital structure of firms is characterized by considerable inertia leading to stable leverage ratios (Hanousek and Shamshur, 2011). Recent research, however, suggests that capital structure stability is the exception, not the rule and that leverage cross-sections differ markedly over a few years, with no sign of reverting or stabilising (DeAngelo and Roll, 2015). This migration over the cross-section is substantial and pervasive; models with time-varying target leverage ratios can best replicate this behaviour in corporate leverage.

An analysis of corporate leverage data over the recent past reflects the claim that corporate leverage varies widely across years. The build-up of corporate leverage in EMEs after the GFC has been an area of policy concern. Corporate leverage in EMEs, which averaged around 49 per cent of GDP between 2003 and 2008, rose substantially

to around 55 per cent of GDP during 2009-2014 (see IMF, 2014). The increase in debt was accompanied by lower earnings in a weak macroeconomic environment and, as a result, the debt-earnings ratio also increased significantly along with an increase in the debt-capital ratio (Graph 1).

Graph 1: Corporate Leverage in EMEs



Source: Author's calculations for 10 EMEs using S&P Capital IQ database

Meanwhile, in the aftermath of the GFC, world GDP growth has remained weak, with considerable uncertainty about its revival. As a response to the financial market turmoil and its cascading effects on the real economy, interest rates in most advanced economies, led by the US Fed, remained at historically low levels.

Even though the current leverage ratios in EMEs are lower than their levels in the 1990s, policy concerns have been raised by the rapid rise in corporate leverage, especially considered against the backdrop of other macroeconomic factors such as low growth, volatile commodity prices and the risk of an imminent rise in policy rates in the advanced economies (AEs). The empirical literature suggests that the build-up and subsequent drawdown of corporate leverage is often cyclical (Mendoza and Terrones, 2008). To understand the risks of high corporate leverage, it is important to understand the causes behind this high leverage, which is the objective of the following analysis.

Literature Survey

The literature on the determinants of leverage is extensive and, in the following few paragraphs, we only touch on some of the highlights without being comprehensive. Major theories include the pecking order theory (Myers, 1984) and the market timing theory (Baker and Wurgler, 2002). Empirical evidence on which theories are best supported by the data is mixed (Frank and Goyal, 2009; Lemmon et al., 2008). Harris and Raviv's study (1991) finds that leverage increases with tax incentives favouring debt, firm size, fixed assets and growth opportunities but decreases with advertising expenditure, volatility, bankruptcy probabilities, research and development expenditures, uniqueness and profitability of the product. Other studies are less supportive of the view that collateral value, non-debt tax shields, future growth or

volatility have an effect on debt ratios (*e.g.* Titman and Wessels, 1988). Several other studies have identified factors such as industry median leverage, depreciation, liquidity, maturity of assets and financial constraints (Korajczyk and Levy, 2003; Frank and Goyal, 2009; Hanousek and Shamshur, 2011; Gungoraydinoglu and Oztekin, 2011).

Apart from firm-specific determinants, a growing body of literature incorporates country-level characteristics to explain corporate leverage. In an influential paper, Rajan and Zingales (1995) analysed corporate capital structures in G-7 countries and concluded that, while firm leverage is similar across countries, the differences amongst them cannot be easily explained by the institutional characteristics of these countries. Borio (1990) had earlier suggested that there are a number of institutional characteristics, including simultaneous holding of debt and equity, lower fragmentation of debt claims and government policy, which have been conducive to high debt burdens in some jurisdictions.

Within this strand of literature, some papers focus on country-specific, time-varying factors like GDP growth, inflation, stock and bond market development and deepening of the banking sector (Frank and Goyal, 2009; Kayo and Kimura, 2011). Others identify institutional factors like corruption, bank vs. market-based financial systems as explanatory variables (Gungoraydinoglu and Oztekin, 2011; Hanousek and Shamshur, 2011). Oztekin and Flannery (2012) have also found that the adjustment speed of aligning a firm's capital structure to the 'optimal leverage' ratio is influenced significantly by its country's legal and financial traditions.

At the same time, research on the impact of macroeconomic variables on corporate leverage typically reports low explanatory power of these variables, especially compared with firm-level variables (Booth et al., 2001; Kayo and Kimura, 2011; Gungoraydinoglu and Oztekin, 2011). This, however, does not mean that it is futile to pursue such studies since the low explanatory power could be due to several reasons. Frank and Goyal (2009) suggest that the explanatory power is low simply because country-level factors vary less than firm-level factors. Kayo and Kimura (2011) point out that it is important to include such factors as their inclusion improves the performance of the aggregate model.

Since the focus of the present paper is analysing the changing drivers of corporate leverage before and after the financial crisis, we do not explicitly introduce institutional factors in the model. Institutional factors – though possibly important in analysing the drivers of corporate leverage – are mostly captured through country-fixed effects dummies. This study concentrates on firm-level and macroeconomic drivers, which may have changed significantly since the crisis. While controlling for firm-level factors, we wish to understand how exogenous macroeconomic shocks affect corporate capital structure decisions.

The Choice of Variables

Firm-Specific Factors. As a starting point, we begin with five firm-specific factors that have been identified by Frank and Goyal (2009) as 'reliably important'

determinants of corporate structure.[2] These factors include tangibility, profitability, market-to-book value ratio and firm size as well as the median leverage of the industry to which the firm belongs. To these firm-specific factors, the present paper adds domestic and global macroeconomic factors as well as the financing condition indicator (FCI) as explanatory variables.

Domestic and global GDP growth: During a high GDP growth phase, stock prices generally move up, expected bankruptcy costs decline and taxable income increases. Cash held by corporates also increases. Firms are likely to raise more resources during this phase to finance their expansion plans. The value of corporate collateral follows a pro-cyclical trend and is higher during this phase. If firms raise resources through borrowing against collateral, the leverage may be pro-cyclical.

It has also been argued that during economic downturns, as managers' wealth is more adversely affected than that of shareholders, agency problems are likely to turn more severe. In this case, if issuance of debt helps to align managers' incentives with those of shareholders, leverage should be countercyclical (Frank and Goyal, 2009). Similarly, the pecking order theory suggests that leverage should decline during the expansionary phase since internal funds increase during this period.

In the present study, both domestic and global GDP growth are included as explanatory variables in recognition of the fact that, in an environment characterised by increased integration of markets, corporate leverage may be affected by international as well as domestic factors. Also, as domestic and global GDP have diverged periodically, especially in the period after the GFC, it is important to explicitly include both variables separately.

Global interest rates: The trade-off theory suggests that corporates weigh the cost and benefits of debt *vis-à-vis* equity when taking decisions about how to raise funds. In high and increasing interest rate scenarios, firms are likely to substitute equity for debt to reduce their interest expenditure, implying a negative relationship between leverage and interest rates. Research suggests that, when interest rates are low relative to historical rates, companies tend to issue more debt, even adjusting for investment spending levels and equity issuances (Barry et al., 2008).

In the present context, the unprecedented and accommodative global monetary conditions that prevailed in the aftermath of the GFC may have encouraged higher corporate leverage in EMEs through several channels. Following Caruana (2012) and He and McCauley (2013), three major transmission channels can be identified. First, EMEs tend to set lower interest rates than AEs do to offset currency appreciation pressures. Second, large-scale asset purchases in the AEs affected bond yields not only in the countries where policy actions were initiated, but also in EMEs due to portfolio rebalancing. Relatedly, the 'search for yield' following the highly accommodative monetary policy in the AEs resulted in greater capital flows to most of the EMEs. Third, any change in policy rates in the AEs quickly affects the debt-servicing burden of emerging market foreign currency-denominated debt with variable rates. Thus the widespread availability of low-cost funding in the midst of expansionary global monetary conditions helped to reduce emerging market borrowing constraints and facilitated greater corporate leverage (IMF, 2015).

[2] An extensive literature summary has been provided by Frank and Goyal (2009) and a repetition of the same is avoided here for brevity.

In the present study, the Wu-Xia shadow Federal Funds rate is used as a proxy for the global interest rate environment. In addition, we have also carried out robustness checks using two variables in separate models *viz*. US AAA corporate bond spread and the Financial Index for the AEs.

Domestic Financial Conditions Indicator

Even though the GFC did not originate in EMEs, the real and financial sectors of EMEs were adversely affected. The literature suggests that factors such as domestic stock market and government debt conditions as well as interest rates can affect the leverage decisions through the following links:[3]

a) Stock market conditions: The static trade-off theory suggests that strong stock market performance is followed by an increase in leverage as firms try to move towards their 'optimal' leverage ratio. However, the market timing theory suggests that managers actively time the equity markets to take advantage of mispricing, resulting in a negative relationship between stock market prices and leverage. Demirgüç-Kunt and Maksimovic (1996) suggest that the relationship between stock market development and corporate leverage depends on the development stage of the stock market. When a relatively underdeveloped stock market begins to develop, firms initially not only issue new equity but also tend to borrow more from the debt market. As stock market development continues, the firms begin to substitute equity for debt.

We have used three proxies to represent stock market conditions. The stock market capitalisation-to-GDP ratio represents the development of the market; the stock market returns-to-GDP ratio represents the payoffs in the stock market; and the value traded-to-GDP ratio represents market liquidity. Following the literature, the hypothesis is that each of these variables is inversely related to corporate leverage. Specifically, a well-developed and liquid stock market facilitates the issuance of equity and *ceteris paribus* less reliance on corporate debt may be expected.

b) Government debt: Several studies have suggested that an increase in government debt results in higher interest rates, which in turn crowds out private investment (e.g., literature surveys by Elmendorf and Mankiw, 1999; Hubbard, 2011). Some empirical studies have documented a negative relationship between government debt and the corporate debt of non-financial firms (Graham, Leary and Roberts, 2014). However, other studies suggest that the links between the two depend on changes in both the rates of taxation and market interest rates due to increased government borrowing and therefore the final impact could be ambiguous (Benninga and Talmor, 1988). We measure government debt burden as percent of GDP, i.e., the public debt-to-GDP ratio.

c) Domestic interest rates: Lower domestic interest rates can result in increasing investment spending, as well as debt issuance by firms to finance these investments. Barry et al. (2008) document that companies issue more debt, more debt relative to

[3] Apart from these factors, one premise that has made much headway in the recent literature is that global interest rates may play an important role in driving leverage in the non-tradable sector (see BIS Annual Report, 2017). This could be an interesting study in itself, demanding data on firm's export earnings and their foreign exchange exposure hedging and is outside the purview of this study.

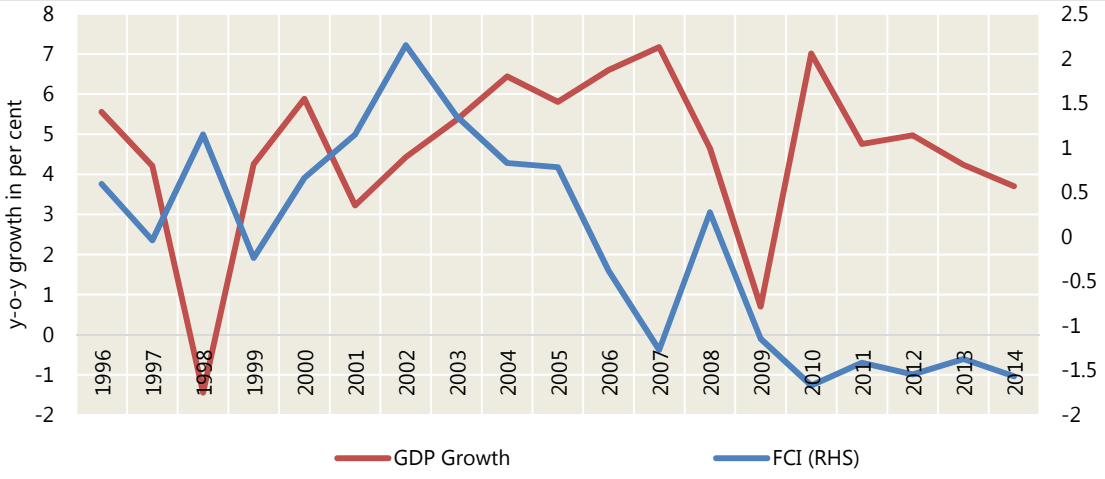
investment spending, and more debt compared with equity when interest rates are low relative to historical rates.

One way of taking cognisance of the tight financial market conditions and its impact on corporate leverage is to introduce each of the financial indicators separately in the equation. Although this will be ideal given complexity of financial markets, the distinctive features of each market and their varying predictive powers, this is far from being practical. This approach could also lead to a multicollinearity problem as these variables move in tandem with each other. In order to address this issue, the economic literature suggests construction of a financial conditions indicator that consolidates various relevant financial variables series into a single series (Khundrakapam et al., 2017). In line with the literature, we create a composite financial conditions indicator (FCI) for each country for use as an explanatory variable. Annual data sourced from CEIC on the call money rate, the interest rate spread and the real interest rate to cover the entire gamut of short-term interest rates are employed. We also include the long-term interest rate, as measured by the long-term government yield, usually on a five-to-10-year maturity instrument. Details regarding country-wise instruments used for calculation of the FCI are provided in Table 1.

We use the first principal component derived from the principal components analysis (PCA) to calculate the FCI. The choice of this technique, which uses an orthogonal transformation to convert a set of observations of possibly correlated variables into a set of values of linearly uncorrelated variables, is widely accepted in the literature (Shankar, 2014). The weights for each principal component are given by the eigenvectors of the correlation matrix of the original data. The eigenvalue of the corresponding eigenvector depicts the variance of the principal component.

The FCI in Graph 2 represents the average of country-wise FCI for issuance of corporate debt. Low levels correspond to tight financing conditions which may give impetus to higher corporate leverage. Thus the corporate leverage and FCI are expected to be inversely related. The chart indicates that adverse macroeconomic conditions in the post-GFC period coincided with poorer financing conditions for corporates.

Graph 2: Domestic Growth and Financing Conditions in EMEs



Source: FCI- Author's calculations based on CEIC data;
GDP growth- average GDP growth of EMEs in the sample based on World Bank data

The expected signs of determinants of corporate leverage are summarised in Table 2.

Data and Methodology

This study concentrates on 10 major EMEs, viz., Brazil, China, India, Indonesia, Malaysia, Mexico, the Philippines, Russia, South Africa and Thailand. Annual data for firms with a total asset size of more than US$ 1 billion in 2014 were chosen for this study. The balance sheet data were sourced from S&P Capital IQ. Other major EMEs such as Chile, Peru and Turkey were also considered for the study but had to be deleted for lack of consistent data.

Data from all of the corporates, whether currently operational or not, were included in the sample to minimize 'survival bias'. These companies consist of public and private non-financial corporates from eight major industry groups, viz., energy, materials, industrials, consumer discretionary, consumer staples, healthcare, telecommunication services and utilities. Financial corporations and banks were not included in the sample because the regulations governing their leverage are well specified across major jurisdictions and these institutions are well supervised.

In sum, annual data for 2,331 corporates for 1996-2014 were used for this study. Further, country-specific and global data were collected from a variety of sources, including the World Economic Organization, Bloomberg, Federal Reserve of Atlanta, the Federal Reserve Bank of St. Louis, the BIS and the World Bank. A detailed list of these variables, their description and data sources is given in Table 3. Summary statistics are presented in Table 4. The data were appropriately winsorized at 90 per cent to reduce the effects of possibly spurious outliers.

The starting point for any empirical estimation of corporate leverage is defining corporate leverage because opinions differ considerably. While some authors advocate the use of long-term debt in the numerator when calculating leverage, others choose total debt or total liabilities. Another issue is what should be the denominator in leverage or debt burden calculations. While some authors use total assets as the denominator, Goyal and Packer (2017) prefer the use of debt plus equity. In the present paper, we report the results for a measure of leverage which is total book debt divided by earnings, viz., the debt-to-earnings (EBITDA) ratio.[4] However, we have also carried out robustness checks using other indicators such as the debt-to-capital ratio, debt-to-equity ratio and liabilities-to-asset ratio. The results are largely in line with those we report in this paper.

To test the impact of firm-specific, domestic and global macroeconomic factors on corporate leverage, we use the partial adjustment model, which is well accepted in the literature (Flannery and Rangan, 2006; Gungoraydinoglu and Oztekin, 2011; IMF, 2015; Korajczyk and Levy, 2003; Oztekin and Flannery, 2012). We start by assuming that every firm has a desired level of long-term leverage, Lev*ij,t.

In the present paper, the firm-specific factors considered are profitability, tangibility, market-to-book value ratio, size of firm and the median industry leverage.

[4] The debt-to-earnings ratio is widely accepted as an appropriate indicator of a firm's debt repayment capacity; a high debt-to-earnings ratio indicates high corporate leverage relative to income and thus less repayment capacity or vulnerability to default. (See IMF, 2015 and IMF, 2017).

The country-specific macroeconomic factors are GDP growth and FCI, while global macroeconomic factors that may affect corporate leverage are global GDP and the Fed shadow rate. Further, an interaction term that captures the impact of firm-level, country-level and global macroeconomic factors on each other is introduced. Incorporating these factors, the baseline reduced form model is:

$$Lev^*_{ijt} = \beta_f X_{ijt-1} + \beta_m Y_{ijt-1} + \beta_{fm} X_{ijt-1} Y_{ijt-1} + \mu_i \quad \ldots\ldots\ldots\ldots\ldots \quad (I)$$

where Lev^*_{ijt} is the desired long-term leverage of firm 'i' in country 'j' at time 't'. β_f, β_m and β_{fm} are coefficient vectors to be estimated. X_{ijt} and Y_{jt} are vectors of firm-level and macroeconomic factors affecting corporate leverage respectively. X_{ijt} Y_{ijt} is the interaction term between firm-level and macroeconomic factors.

With reference to equation (I), rebalancing costs may slow down the firm's adjustment towards this level. Thus, the partial adjustment model is:

$$Lev_{ij,t} - Lev_{ij,t-1} = \lambda (Lev^*_{ij,t} - Lev_{ij,t-1}) + \epsilon_{ij,t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (II)$$

where 'λ' is the adjustment parameter.

Combining (I) and (II) and rearranging, we get,

$$Lev_{ij,t} = (1-\lambda) Lev_{ij,t-1} + \lambda \beta_f X_{ij,t-1} + \lambda \beta_m Y_{ijt-1} + \lambda \beta_{fm} X_{ij,t-1} Y_{ijt-1} + \lambda \mu_i + \epsilon_{ij,t} \quad (III)$$

Equation III implies that the leverage of firm 'i' from country 'j' at period 't' depends on its past leverage, firm-specific factors such as profitability, market-to-book value etc., domestic macroeconomic factors and global macroeconomic factors.

Country- and time-specific dummies are also added to the specification.

Thus, the aim of the empirical estimation is to check whether the impact of individual βs on corporate leverage is statistically significant (i.e., $\beta \neq 0$). Further, the sign of the coefficient (i.e., $\beta < 0$ or $\beta > 0$) is expected to be in line with the suggested hypotheses.

Equation (III) represents a dynamic panel model since it consists of an endogenous lagged dependent variable ($Lev_{ij,t-1}$) and other potentially endogenous explanatory variables. It is now well recognized that the application of OLS on dynamic panel models may yield biased and inconsistent estimators. One method of addressing this problem is to use the Generalized Method of Moments (GMM) proposed by Arellano and Bond (1991). However, these econometric techniques have been criticised for neglecting the crucial stationarity and cointegration aspects of panel data. In view of this, we first check for stationarity of the panel series using the tests given in Levin, Lin and Chu (2002) and Im, Pesaran and Shin (2003). Our results indicate that all the series under consideration are I(0), and therefore are stationary. Since the stationarity issue is resolved, the GMM technique can be applied without hesitation.

While estimating Equation (III) using GMM, we control for potential endogeneity of the firm-specific variables and the interaction term using lags of the same variables as instruments. We take a limited number of lags in order to maintain parsimony in the number of instruments following Roodman (2009). We employ the Sargan test for over-identified restriction in the GMM dynamic panel model. We ensure that there are no second-order serial correlations in the first difference residuals given by AR (2). Apart from testing for the entire sample period 1996-2014, we examine two sub-samples, viz. 1996-2007 and 2009-2014, to test whether the drivers of leverage have changed significantly over the two periods.

Empirical Results

Firm-specific factors

Measuring corporate leverage in terms of the debt-to-earnings ratio, and assessing its determinants over the entire period (1996-2014) as well as for two sub-periods for the sample of EME corporates, we arrive at a number of interesting results (Table 5). Firm-specific factors such as profitability, tangibility, market-to-book value ratio and firm size emerge as important determinants of corporate leverage.

The coefficients on profitability of the firm are significant across both sub-samples as well as the entire period, with a negative sign, which is consistent with the dynamic trade-off theory as well as the pecking order theory.

The coefficients on tangibility are significant for the entire sample period and the pre-GFC period, with a negative sign. In the literature there are two contrasting views about the expected sign of tangibility in explaining corporate leverage. The trade-off theory suggests that tangible assets such as property, plant and equipment are easier for outsiders to value than intangibles, such as the value of goodwill from an acquisition. This reduces the expected distress costs, which may result in a positive relationship between tangibility and leverage. On the other hand the pecking order theory suggests that low information asymmetry relating to tangible assets makes equity issuances relatively less costly and therefore the leverage ratio is lower for firms with higher tangibility. Our findings are in line with the latter view. Although empirically, a positive relationship between asset tangibility and corporate leverage has been found robust in the US and other advanced economies, our findings are consistent with other papers that highlighted how the behaviour of capital structure determinants is different in transition economies as compared with the advanced economies. In particular, Cornelli et al. (1996) Delcoure (2007); and Joeveer (2006) have documented a negative relationship between asset tangibility and leverage.

Our results imply that firms with more tangible assets found tapping the equity market more lucrative and were thus less leveraged in the pre-financial crisis period. In the post-crisis period, however, tangibility ceases to be a significant determinant of corporate leverage, possibly suggesting that the debt issuing conditions were lucrative for all firms, irrespective of whether they had high or low levels of tangible assets.

The market-to-book value ratio is also significant both before and after the GFC, and the coefficient has a positive sign, which is consistent with the pecking order theory.

Firm size, the coefficient of which is not found to be significant before the GFC, turns out to be significant in the post-financial crisis period, with a positive sign. This implies that larger firms are more leveraged in the post-financial crisis period.

The coefficients of lagged leverage are significant across the full sample period as well as for both sub-samples, all with a positive sign. This is consistent with the theoretical framework, which suggests that corporates attempt to attain an optimal level of leverage, but adjustment costs prevent instantaneous adjustment to that level. The positive sign of the lagged coefficient is also consistent with the findings of Lemmon, Roberts and Zender (2008), who document a remarkable level of persistence in firm leverage ratios.

Industry leverage, which is often considered a 'catch-all variable' that subsumes correlated but otherwise omitted variables such as competition, heterogeneity in the type of assets, business risk, technology or regulation, is significant in both sub-periods as well as the full sample period.

Macroeconomic factors

For the sample consisting of all the EMEs, domestic GDP growth is an important determinant of corporate leverage, both before and after the GFC, with a positive sign, which is consistent with the hypothesis that corporate leverage is pro-cyclical. On the other hand, it is interesting that changes in the country's FCI, the coefficient of which was statistically not significant in the pre-crisis period, acquired significance in the post-crisis period, with a negative sign. This crucial result shows that changes in financial conditions were immaterial to corporate leverage decisions in the pre-crisis period but influenced capital structure in the post-crisis period.

The result that lagged world GDP growth is an important determinant of leverage in the pre-crisis as well as the post-crisis period is also along expected lines. The coefficient of changes in the Fed shadow rate, which was statistically insignificant in the pre-crisis period, turned significant in the post-crisis period, with a negative sign. This crucial result suggests that the historically low global interest rates created an environment that encouraged corporations to raise more debt.

Sample excluding China

We recognise that Chinese firms face certain domestic macroeconomic conditions that are likely to bias our results. For example, even though the People's Bank of China (PoBC) recently liberalised interest rates, they were maintained artificially below market rates for a long time (The Economist, 2015). Directed credit was also part of the policy framework before the recent liberalisation measures. Thus the impact of changed macroeconomic, especially global, conditions may not have been transmitted fully and consistently to the Chinese corporates' balance sheets through the entire sample period. Since our sample is dominated by Chinese firms (out of the sample of 2,331 firms, 1,305 firms are Chinese), an analysis of the sample excluding China is carried out (Table 5) as a check on the robustness of the results. This analysis reveals three significant outcomes that are distinct from those obtained for the 'all EMEs' sample.

First, while in the 'all EMEs' sample, profitability was a significant determinant across all the sub-periods, in the 'excluding China' sample it emerges as a significant determinant, with a negative sign, only in the post-crisis period. This implies that less profitable firms are more leveraged in the post-crisis period.

Second, while the market-to-book value ratio was an important determinant of corporate leverage in both sub-periods in the 'all EMEs' sample, it is a statistically significant determinant only in the post-crisis period for the 'excluding China' sample. The market-to-book value ratio, which is usually interpreted as a proxy for the growth potential of firms, is positively related to the corporate leverage, consistent with the pecking order theory. This result implies that firms with higher investment and growth potential raised more debt in the post-crisis period. Juxtaposing this result, however, against the reality that corporate investments remained virtually stagnant in the post-crisis period presents an anomaly. Some analysts suggest that, in the post-crisis

period, corporates in developed countries borrowed at cheap rates but this never translated into higher investments but only pushed up corporate savings or shareholder pay-outs (Bowley, 2010). Whether this phenomenon happened in the case of EMEs as well needs to be carefully analysed, but is beyond the scope of this paper.

Third, the 'excluding China' sample results suggest that global macroeconomic factors, viz., world GDP growth and the Fed shadow rate, emerge as statistically significant only in the post-crisis phase. This is different from the 'all EMEs' sample, where only the Fed shadow rate turned statistically significant in the post-crisis period. The analysis of the 'excluding China' sample thus reinforces the hypothesis that global macroeconomic variables, which were not significant determinants of corporate leverage in the pre-crisis period, became influential determinants in the post-crisis period.

Generalised Method of Moments (GMM)

Recognising that application of OLS on dynamic panel models may yield biased and inconsistent estimators, we also employed the Generalised Method of Moments (GMM) proposed by Arellano and Bond (1991) (Table 6). This exercise also emphasises the importance of firm-specific factors such as firm size, industry level of leverage and lagged leverage. More importantly, global macroeconomic factors, viz., world GDP growth and changes in the Fed shadow rate, emerged as significant determinants of EME corporate leverage in the post-financial crisis period.

Quantile Regression

In order to evaluate whether macroeconomic changes after the GFC affected firms at different levels of corporate leverage differently, quantile regressions are used (Table 7). While the overall results are in line with the results presented earlier, one striking result is that, in the post-crisis period, the changes in the Fed shadow rate affected firms at different corporate leverage levels differently. In particular, a low Fed shadow rate resulted in more corporate leverage for the lowest quantile firms. This implies that firms which were less leveraged ex-ante were influenced the most by the lower global interest rate regime, in the sense that they increased their leverage the most. By contrast, firms which were in the highest quantile ex ante were more likely to reduce their leverage with lower interest rates, as evident in the positive coefficient sign.

Small firms vs. large firms

We also examine whether small firms and large firms differed in their responses to the GFC. Within the sample 'excluding China', which consists of firms with an asset size of more than US$ 1 billion, we segregate firms further based on their asset size; firms with an asset size greater than the median are classified as 'large', while firms with an asset size less than the median are classified as 'small'. The analysis reveals significant differences in the determinants of leverage for large and small firms (Table 8).

While earlier results suggested that more profitable corporates tend to be less leveraged, the present bifurcation between small and large firms sheds further light

on this point. The coefficient of profitability is significant only for large firms in the post-crisis period; and the negative sign implies that in the post-financial crisis period, large corporates with less profitability increased their corporate leverage. In the post-financial crisis period, as corporate profitability declined, retained earnings also shrank. Larger firms, which in normal circumstances have access to greater retained earnings, found themselves in an environment characterised by lower retained earnings but a low cost of external funding and the availability of abundant liquidity. Our results suggest that these pull and push factors may have together resulted in higher leverage for large corporations.

In the case of small firms, our results indicate that the build-up of leverage was higher for firms with lower tangible assets but higher growth potential in the post-crisis period, while these factors were not influential in corporate structure decisions in the pre-crisis period.

More importantly, in the case of small firms, the coefficients of world GDP growth and the Fed shadow rate are statistically significant only in the post-financial crisis period, which indicates the important influence of global developments for small firms in the post-crisis period. The GMM results for this exercise are reported in Table 9.

Robustness Checks

The US AAA Corporate Bond Spread

As a robustness check, instead of the Fed shadow rate, we employed the spread between the US AAA corporate bond yield and the yield on 10-year treasury constant maturity papers as an explanatory variable. Since AAA is the safest form of corporate debt, the spread between these bonds and risk-free treasuries can reflect changing attitudes towards systemic risk and demand for US Treasuries as a safe haven asset.[5] The result is in line with our earlier conclusion that the GFC changed the determinants of the corporate leverage of EMEs. The result suggests that, while the AAA spread has been a significant determinant of corporate leverage during the entire sample period, the sign of the coefficient of spread, which was negative in the pre-crisis period, has reversed to positive in the post-crisis period (Table 10). Thus, the response of corporate leverage to the US AAA spread has undergone a change in the post-crisis period as compared with the earlier period. In the period before the GFC, a widening US AAA spread resulted in a decline in the corporate leverage of EMEs. This result may indicate that, before the GFC, growing uncertainty in the US, as reflected in the widening spread, resulted in a flight to safety to US treasuries and a declining willingness to lend to EME corporates.

In the post-crisis period however, while the macroeconomic conditions in the US remained stagnant, there were unprecedented liquidity injections by central banks. The positive coefficient on the AAA spreads in the leverage regressions suggests that the investment in US treasuries that accompanied quantitative easing by monetary authorities in the US may have increased the AAA spreads due to a safe haven effect,

[5] For example, Elton et al (2001) show that apart from taxes and expected default, the AAA spread can be explained as a reward for bearing systemic risk.

but at the same time increased leverage in EM corporates thanks to increased global liquidity.

Financial Conditions Index for AEs

One of the limitations of the above mentioned analysis is that, while we use the financial conditions indicator of EMEs as an explanatory variable – combining and reflective of a variety of financial market rates – we use only a single explanatory variable, either the Fed shadow rate or the US AAA spread to represent the financial conditions in the advanced economies. Given the interaction between various financial markets and their implications for EME corporate leverage, it will be interesting to study the robustness of our results with a financial conditions indicator for advanced economies as an explanatory variable instead of the single shadow rate or the US AAA spread. We use the financial index created by the St. Louis Fed which combines data on 18 series: seven interest rate series, six yield spreads and five other indicators that capture market volatility.[6] This index effectively captures the relatively high interest rate environment before GFC and the historically low interest rates post-GFC. The results are summarised in Table 11. The coefficient of AE-FCI is not significant in the pre-GFC period but significant with a negative sign in the post-GFC period. This result further substantiates our main finding that the low interest rates in the AEs in the post-GFC period have been significant drivers of corporate leverage in EMEs.

Model performance on individual countries

As a further robustness check, we also employed the model separately on each individual country for the period 1996-2014 (Table 12). The model generally fits well, with the exception of Indonesia and Malaysia. The results highlight cross-country differences in the drivers of corporate leverage.

Conclusions

This paper presents evidence that changed macroeconomic conditions contributed significantly to the sharp rise in corporate leverage in EMEs in the post-crisis period. The set of macroeconomic factors include international factors, such as global GDP growth and US Federal Reserve policy, highlighting the possibility of global financial spillovers to EMEs through the corporate leverage route in the post-crisis period.

A variety of panel data models and quantile analyses suggest that large but less profitable firms have raised more resources from the debt market in the post-crisis period. This could be because the post-crisis period was characterised by abundant global liquidity, which possibly resulted in less strict credit evaluations, favouring less profitable firms. That the prolonged low interest rate regime contributed to the build-up of corporate leverage raises the possibility that, as policy rates normalise in advanced economies and policy rate cycles turn in EMEs, some of recent increases in

[6] Details regarding construction of the index are available at: https://files.stlouisfed.org/files/htdocs/publications/net/NETJan2010Appendix.pdf

leverage are likely to be reversed. The challenges for policymakers will be to ensure their financial sectors are resilient to the deleveraging process.

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Table 1: Country-specific variables used in the construction of the FCI

	Bond Market	Money Market	Stock Market
Indonesia	Debt GDP Ratio	Call rate-1 month Interest spread Real interest rate Money market rate	Stock traded to GDP ratio Market cap. to GDP ratio Equity return
Thailand	Debt GDP Ratio G-Sec yield	Interest spread Real interest rate Money market rate	Stock traded to GDP ratio Market cap. to GDP ratio Equity return
South Africa	Debt GDP Ratio G-Sec yield 10 years	Interest spread Real interest rate	Stock traded to GDP ratio Market cap. to GDP ratio Equity return
Russia	Debt GDP Ratio Long term G-sec yield	Interest spread Real interest rate Money market rate	Stock traded to GDP ratio Market cap. to GDP ratio Equity return
Philippines	Debt GDP Ratio Long term G-sec yield	Call rate Interest spread Real interest rate Money market rate	Stock traded to GDP ratio Market cap. to GDP ratio Equity return
Mexico	Debt GDP Ratio G-Sec yield 10 years	Interest spread Real interest rate	Stock traded to GDP ratio Market cap. to GDP ratio Equity return
Malaysia	Debt GDP Ratio G-Sec yield 10 years		Stock traded to GDP ratio Market cap. to GDP ratio Equity return
India	G-Sec yield 10 years	Call rate Real interest rate	Stock traded to GDP ratio Market cap. to GDP ratio Equity return
China		Interest spread Real interest rate	Stock traded to GDP ratio Market cap. to GDP ratio Equity return
Brazil	Debt GDP Ratio	Interest spread Money market rate	Stock traded to GDP ratio Market cap. to GDP ratio Equity return

Data source: CEIC data

Table 2: Expected Signs of Determinants of Leverage

Determinants of Leverage	Expected sign	Previous Literature
Firm-level factors		
Lagged leverage	Positive/negative	Gungoraydinoglu and Oztekin (2011), Hovakimian and Titman (2006), Frank and Goyal (2009)
Profitability	Positive/negative	Haas and Peeters (2006), Rajan and Zingales (1995)
Tangibility	Positive/negative	Rajan and Zingales (1995), Haas and Peeters (2006)
Market-to-Book value	Positive/negative	Haas and Peeters (2006), Frank and Goyal (2009)
Firm Size	Positive/negative	Gungoraydinoglu and Oztekin (2011), Almeida and Campello (2007).
Industry Leverage	Positive/negative	Frank and Goyal (2009)
Macroeconomic Factors		
Domestic/World GDP	Positive/negative	Frank and Goyal (2009), Gungoraydinoglu and Oztekin (2011), Oztekin and Flannery (2012)
Fed shadow rate	Negative	Gray and Stone (1999), IMF (2015)
Domestic Financing Conditions		
FCI	Negative	Not explored in earlier literature

Table 3: Definitions and data sources

Variable	Indicators	Definition	Source
Firm-specific variables			
Leverage	Debt to equity Debt to capital Liabilities to asset Debt to Earnings	Ratio of total debt to equity Total Debt / (Total Preferred Equity + Total Common Equity + Total Debt+ Minority Interest, Total (Incl. Fin. Div)) (Total Current Liabilities + Total Long-Term Liabilities) / Total Assets Total Debt/EBITDA	S&P Capital IQ
Profitability	Return on assets Return on Equity	EBIT/Average of current and previous year's assets Net income divided by shareholders' equity	S&P Capital IQ
Market-to-book value		Sum of market value of equity and book value of debt divided by book value of assets	S&P Capital IQ
Asset size	Size by total assets	Total assets in logs in 2014	S&P Capital IQ
Tangibility	Tangible assets to total assets	Net Property, Plant & Equipment/Total assets	S&P Capital IQ
Industry leverage		Mean of current years' leverage for all the firms in that particular industry	S&P Capital IQ
Country-Specific Macroeconomic Variables			
Domestic GDP Growth	GDP growth	Annual growth in GDP at constant market prices	World Bank
Global Macroeconomic Variables			
Fed Shadow rate	Fed shadow rate and effective Fed rate	Wu-Xi Fed shadow rate since January 2009. Effective Fed Fund rate prior to that.	Board of Governors of the Federal Reserve System, and Wu and Xia (2015)
World growth rate			IMF, World Economic Outlook
US-Spread		Moody's Seasoned AAA Corporate Bond Yield Relative to Yield on 10-Year Treasury Constant Maturity, Percent, Not Seasonally Adjusted	St. Louis Fed Economic Research
FCI-AEs		St. Louis Fed Financial Stress Index	St. Louis Fed Economic Research

Table 4: Descriptive Statistics

	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis
Industry Leverage	5.12	4.40	21.50	0.90	3.36	3.04	13.93
Debt to Earnings	3.98	2.48	17.10	0.00	4.46	1.63	5.06
FCI	-0.2	-0.54	15.65	-10	2.89	0.19	6.23
Domestic GDP Growth	6.99	7.75	14.16	-13.13	3.72	-0.95	5.03
Fed Shadow Rate	2.34	1.88	6.35	-2.74	2.89	-0.18	1.62
Asset	8803.76	2437.40	904535.60	1000.90	34172.47	14.84	302.95
Tangibility	38.88	36.90	109.93	0.00	23.92	0.25	2.10
Market-to-book ratio	0.36	0.78	1.26	-7750	52.56	-147.35	21728.86
World GDP Growth	3.83	3.93	5.70	0.03	1.32	-0.93	4.35

Table 5: Drivers of Corporate Leverage in EMEs-Including and Excluding China

Dependent variable: Debt Earnings Ratio-Panel with time effect

	1996-2014		1996-2007		2009-2014	
	EMEs	EMEs excl. China	EMEs	EMEs excl. China	EMEs	EMEs excl. China
Past leverage	0.692*** (0.006)	0.682*** (0.009)	0.638*** (0.009)	0.657*** (0.013)	0.603*** (0.01)	0.617*** (0.014)
Profitability	-0.012*** (0.002)	-0.004** (0.002)	-0.007*** (0.002)	-0.002 (0.002)	-0.042*** (0.01)	-0.013** (0.006)
Tangibility	-0.004*** (0.001)	-0.006*** (0.001)	-0.008*** (0.002)	-0.006*** (0.002)	-0.001 (0.00)	-0.007*** (0.002)
Market-to-book value	0.094*** (0.025)	0.035 (0.022)	0.057*** (0.022)	0.020 (0.023)	0.828*** (0.27)	0.619* (0.331)
Firm size	0.034*** (0.015)	0.046** (0.022)	-0.020 (0.024)	0.044 (0.033)	0.098*** (0.03)	0.031 (0.043)
Industry leverage	0.033*** (0.008)	0.083*** (0.011)	0.052*** (0.028)	0.072* (0.040)	0.019*** (0.01)	0.025** (0.012)
Domestic GDP Growth	0.053*** (0.007)	0.036*** (0.012)	0.032*** (0.010)	0.018 (0.017)	0.066*** (0.01)	0.028 (0.021)
Change in FCI	-0.072*** (0.011)	-0.023* (0.013)	-0.008 (0.013)	-0.023 (0.015)	-0.246*** (0.03)	-0.042 (0.034)
World GDP Growth	0.074*** (0.017)	0.040 (0.026)	0.078*** (0.038)	0.030 (0.055)	0.180*** (0.03)	0.109* (0.041)
Changes in Fed Shadow Rate	-0.323*** (0.012)	-0.037** (0.017)	-0.035 (0.025)	-0.042 (0.035)	-0.393*** (0.04)	-0.254*** (0.043)
Adjusted R-squared	0.51	0.489	0.422	0.461	0.436	0.419
LM test statistics	0.24		0.75		1.300	
Breakpoint test F stat at 2008	2.92***					

Note: 1) The regressions include unreported interaction terms as well as year and country dummies. 2) The standard errors are reported in parentheses below the coefficient estimates 3)***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 6: Drivers of Corporate Leverage in EMEs – Including and excluding China

Dependent variable: Debt-Earnings Ratio-GMM

	1996-2014		1996-2007		2009-2014	
	EMEs	EMEs excl. China	EMEs	EMEs excl. China	EMEs	EMEs excl. China
Lagged leverage	0.944*** (0.086)	1.029*** (0.090)	0.188 (0.177)	0.472* (0.270)	0.802* (0.457)	1.906 (1.384)
Profitability	0.082 (0.06)	0.074 (0.065)	-0.097 (0.16)	-0.229 (0.205)	0.019 (0.171)	0.152 (0.424)
Tangibility	0.005 (0.006)	0.007 (0.015)	-0.014*** (0.005)	0.000 (0.030)	0.004 (0.001)	-0.001 (0.060)
Market-to-book value	-2.121 (2.403)	-2.327 (7.952)	0.608 (0.571)	7.893 (5.631)	-0.116 (2.75)	-9.831 (12.515)
Firm size	-0.119*** (0.044)	-0.056 (0.289)	-0.346*** (0.128)	-0.273 (0.467)	-0.020 (0.13)	0.080 (0.344)
Industry leverage	0.105*** (0.041)	0.078 (0.095)	0.664*** (0.239)	1.164 (1.335)	0.043 (0.07)	0.003 (0.101)
Domestic GDP Growth	0.030* (0.018)	-0.025 (0.587)	0.080*** (0.046)	1.120 (0.940)	0.049 (0.06)	-0.809 (1.451)
Change in FCI	-0.250* (0.153)	-0.080 (0.150)	-0.377*** (0.103)	0.339 (0.312)	-0.219*** (0.09)	0.886 (1.918)
World GDP Growth	0.127*** (0.039)	-0.057 (0.456)	0.023 (0.110)	0.330 (0.635)	0.212*** (0.06)	0.922 (1.668)
Changes in Fed Shadow Rate	-0.301*** (0.138)	0.242 (0.550)	-0.119 (0.106)	-0.958 (0.614)	-0.294*** (0.08)	0.150 (0.621)
Sargan test p-val	0.38	0.406	0.28	0.417	0.42	0.427

Note:

1) The GMM estimates are based on the Arellano and Bond (1991) model.

2) The regressions include unreported interaction term as well as year and country dummies.

3) The standard errors are reported in parentheses below the coefficient estimates.

4) ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

5) The Sargan test reports the p-values for the null hypothesis that the instruments used are not correlated with the residuals.

Table 7: Quantile Regression Results-EMEs Excluding China

Dependent variable: Debt-Earnings Ratio

	1996-2014			1996-2007			2009-2014		
	25th %tile	Median	75th %tile	25th %tile	Median	75th %tile	25th %tile	Median	75th %tile
Lagged Leverage	0.61***	0.84***	0.97***	0.57***	0.80***	0.98***	0.54***	0.82***	0.95***
	(0.02)	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.03)	(0.02)	(0.01)
Profitability	0.00	0.00	0.00***	0.00	0.00	0.00***	-0.01***	-0.01***	-0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Tangibility	0.00	0.00***	0.00***	0.00	0.00	0.00	0.00***	0.00**	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Market-to-book value ratio	0.01	0.00	0.01***	0.00***	0.00	0.01***	0.64***	0.41***	0.29
	(0.61)	(0.02)	(0.00)	(0.00)	(0.00)	(0.00)	(0.16)	(0.14)	(0.20)
Firm size	0.07***	0.05***	0.00	0.04***	0.04***	-0.01	0.10***	0.03*	-0.04
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Industry Leverage	0.03***	0.05***	0.06***	0.02	0.03***	0.03	0.00	0.02***	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)	(0.01)
Domestic GDP Growth	0.00	0.01***	0.01	0.00	0.00	0.01	0.01	0.02***	0.01
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Changes in FCI	0.00	-0.01	-0.02***	0.00	-0.01	-0.02***	-0.02	-0.01	0.00
	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.02)
World GDP Growth	0.02***	0.02***	0.04***	0.01	0.06***	0.03	0.05***	0.04***	0.06**
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.04)	(0.02)	(0.01)	(0.02)
Changes in Fed Shadow Rate	-0.04***	-0.03***	0.00	-0.01	-0.02*	-0.03	-0.38***	-0.15***	0.25***
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.05)	(0.04)	(0.06)
Pseudo R-squared	0.33	0.42	0.45	0.31	0.40	0.43	0.26	0.36	0.41
No. of Obs	7006	7006	7006	3206	3206	3206	3196	3196	3196

Note: 1) The regressions include unreported interaction terms as well as year and country dummies. 2) The standard errors are reported in parentheses below the coefficient estimates 3)***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 8: Drivers of Corporate Leverage in EMEs excluding China- Small Firms vis-à-vis large firms

Dependent variable: Debt-Earnings Ratio Panel with time effect

	1996-2014		1996-2007		2009-14	
Variable	Large Firms	Small Firms	Large firms	Small Firms	Large firms	Small Firms
Lagged Leverage	0.657***	0.692***	0.647***	0.654***	0.586***	0.621***
	(0.012)	(0.014)	(0.017)	(0.022)	(0.021)	(0.021)
Profitability	-0.003*	-0.022***	-0.002	-0.019	-0.046***	-0.005
	(0.002)	(0.007)	(0.002)	(0.013)	(0.012)	(0.007)
Tangibility	-0.008***	-0.004*	-0.007***	-0.004	-0.007***	-0.007**
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Market-to-book value ratio	0.121	0.138***	-0.153	0.125	0.213	0.811*
	(0.271)	(0.046)	(0.380)	(0.084)	(0.447)	(0.499)
Asset size	0.032	0.089*	0.033	0.064	-0.085	0.283**
	(0.029)	(0.048)	(0.044)	(0.072)	(0.061)	(0.123)
Industry Leverage	0.076***	0.083***	0.081	0.055	0.020	0.026
	(0.015)	(0.018)	(0.051)	(0.065)	(0.015)	(0.019)
Domestic GDP Growth	0.052***	0.024	0.026	0.007	0.060**	0.014
	(0.016)	(0.019)	(0.023)	(0.028)	(0.027)	(0.033)
Change in FCI	0.012	-0.030	0.019	-0.051*	0.014	0.007
	(0.018)	(0.026)	(0.020)	(0.031)	(0.039)	(0.061)
World GDP Growth	0.013	0.036	0.058	-0.039	0.079	0.118*
	(0.035)	(0.040)	(0.071)	(0.091)	(0.054)	(0.064)
Changes in Fed Shadow rate	-0.033	-0.050*	-0.086**	0.031	-0.203***	-0.303***
	(0.021)	(0.028)	(0.044)	(0.058)	(0.053)	(0.071)
Adjusted R-squared		0.513		0.474		0.423

Note: 1) The regressions include unreported interaction terms as well as year and country dummies. 2) The standard errors are reported in parentheses below the coefficient estimates 3)***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 9: Drivers of Corporate Leverage in EMEs Excluding China-Small firms vis-à-vis large firms

Dependent variable: Debt-Earnings Ratio-GMM

Variable	1996-2014		1996-2007		2009-14	
	Large Firms	Small Firms	Large Firms	Small Firms	Large Firms	Small Firms
Past Leverage	0.560 (5.773)	1.021*** (0.085)	0.728*** (0.199)	0.896*** (0.141)	0.193 (0.619)	1.700 (1.749)
Profitability	-0.024 (2.182)	0.048 (0.117)	0.020 (0.057)	-0.012 (0.090)	-0.299 (0.336)	-0.219 (0.769)
Tangibility	-0.016 (0.186)	0.005 (0.011)	0.006 (0.024)	0.055* (0.031)	0.024 (0.044)	0.025 (0.177)
Market-to-book value ratio	4.165 (42.178)	-3.461 (6.007)	-1.550 (3.964)	-0.277 (2.363)	8.891 (9.722)	-10.380 (22.920)
Asset size	-0.601 (6.284)	-0.370 (0.958)	0.211 (0.291)	-0.077 (0.281)	0.006 (0.402)	1.189 (10.323)
Industry Leverage	0.206 (1.721)	0.117 (0.157)	0.623 (1.105)	1.390 (1.380)	0.006 (0.080))	-0.067 (0.203)
Domestic GDP Growth	-0.149 (5.289)	-0.302 (0.791)	-0.104 (0.595)	1.171** (0.603)	0.489 (0.710)	0.514 (2.386)
Change in FCI	0.160 (2.391)	0.123 (0.454)	0.183 (0.289)	0.015 (0.304)	-0.533 (0.804)	-0.408 (1.985)
World GDP Growth	0.478 (9.249)	0.318 (0.593)	0.561 (0.537)	-0.245 (0.479)	-0.505 (0.821)	-0.826 (1.186)
Changes in Fed Shadow rate	-0.021 (2.179)	0.358 (0.837)	-0.258 (0.394)	-1.232** (0.643)	0.228 (0.442)	0.923 (3.553)

Note:

1) The GMM estimates are based on the Arellano and Bond (1991) model.

2) The regressions include unreported interaction term as well as year and country dummies.

3) The standard errors are reported in parentheses below the coefficient estimates.

4) ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 10: Drivers of Corporate Leverage in EMEs excluding China
Robustness test-US Spread
Dependent variable: Debt Earnings ratio-panel with time effects

	1996-2014	1996-2007	2009-2014
Past leverage	0.681*** (0.009)	0.656*** (0.013)	0.616*** (0.014)
Profitability	-0.004** (0.002)	-0.002 (0.002)	-0.014** (0.006)
Tangibility	-0.005*** (0.001)	-0.006*** (0.002)	-0.007*** (0.002)
Market-to-book value	0.035 (0.022)	0.020 (0.023)	0.641** (0.331)
Firm size	0.039* (0.022)	0.045 (0.033)	0.029 (0.043)
Industry leverage	0.077*** (0.011)	0.075* (0.040)	0.030*** (0.012)
Domestic GDP growth	0.033*** (0.012)	0.030* (0.018)	0.029 (0.021)
Change in FCI	-0.002 (0.015)	-0.002 (0.017)	0.024 (0.034)
World GDP growth	0.050* (0.028)	-0.097 (0.071)	0.325*** (0.057)
US Spread	0.221*** (0.076)	-0.283* (0.156)	3.983*** (0.611)
Adjusted R-squared	0.49	0.46	0.42
LM statistics	0.95	0.85	0.63

Note: 1) The regressions include unreported interaction terms as well as year and country dummies. 2) The standard errors are reported in parentheses below the coefficient estimates 3)***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 11: Drivers of Corporate Leverage in EMEs excluding China
Robustness test - AEs FCI

Dependent variable: Debt Earnings ratio-panel with time effects

	1996-2014	1996-2007	2009-2014
Past leverage	0.681*** (0.009)	0.657*** (0.013)	0.615*** (0.014)
Profitability	-0.004** (0.002)	-0.002 (0.002)	-0.014** (0.006)
Tangibility	-0.006*** (0.001)	-0.006*** (0.002)	-0.007*** (0.002)
Market-to-book value	0.037* (0.022)	0.021 (0.023)	0.636* (0.331)
Firm size	0.040* (0.022)	0.044 (0.033)	0.018 (0.043)
Industry leverage	0.072*** (0.012)	0.070* (0.040)	0.017 (0.012)
Domestic GDP growth	0.044*** (0.013)	0.025 (0.018)	0.030 (0.022)
Change in FCI	-0.004 (0.015)	-0.007 (0.017)	0.011 (0.034)
World GDP growth	0.003 (0.029)	-0.048 (0.079)	0.075* (0.041)
FCI-AEs	-0.051 (0.040)	-0.076 (0.129)	-0.393*** (0.060)
Adjusted R-squared	0.489	0.461	0.421
LM statistics	0.968	0.801	0.609

Note: 1) The regressions include unreported interaction terms as well as year and country dummies. 2) The standard errors are reported in parentheses below the coefficient estimates 3)***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 12: Country Regressions

Dependent variable: Debt-Earnings Ratio 1996-2014

Explanatory Variables	Brazil	China	India	Indonesia	Malaysia	Mexico	Philippines	Russia	South Africa	Thailand
Book Leverage	0.215***	-0.104***	0.668***	-0.067	-0.199***	0.162***	-0.112***	-0.681***	-0.489***	-0.300***
	(0.004)	(0.021)	(0.009)	(0.144)	(0.050)	(0.001)	(0.015)	(0.041)	(0.071)	(0.042)
Profitability	0.155***	-0.413***	0.023	-0.224	0.635**	-0.064***	-0.017***	-0.133***	0.001	-0.051
	(0.010)	(0.040)	(0.072)	(0.634)	(0.384)	(0.006)	(0.005)	(0.016)	(0.032)	(0.065)
Tangibility	0.037***	-0.059***	0.187***	-0.044	0.199	0.023***	-0.035***	-0.048***	-0.014	-0.017
	(0.003)	(0.008)	(0.015)	(0.398)	(0.183)	(0.002)	(0.007)	(0.009)	(0.014)	(0.041)
Market-to-Book Value	-0.791***	-0.792***	0.695***	34.005	0.731	0.110***	-0.823	0.960***	0.769***	-0.875
	(0.107)	(0.204)	(2.274)	(45.032)	(0.650)	(0.045)	(0.522)	(1.156)	(1.922)	(2.161)
Firm Size	0.859***	0.426***	-0.571	0.696	-0.361	0.844***	0.282*	0.150	0.448***	0.908***
	(0.138)	(0.315)	(0.019)	(7.096)	(0.413)	(0.033)	(0.157)	(0.204)	(0.640)	(0.975)
Domestic GDP Growth	0.110	0.539**	-0.060***	-38.878	-0.031	-0.021***	-0.032	-0.173	-0.837	0.966
	(0.190)	(3.203)	(0.085)	(164.884)	(0.057)	(0.007)	(0.025)	(0.804)	(7.504)	(2.773)
Inflation	-0.279	-0.530***	0.700***	-0.547	0.044	0.065***	0.168***	0.950***	-0.755	-0.276
	(0.281)	(1.970)	(0.142)	(14.271)	(0.491)	(0.004)	(0.021)	(0.709)	(8.113)	(6.280)
Credit GDP Ratio	0.092	-0.155	-0.139	-3.522	-0.563	-0.016***	-0.011	-0.135	0.098	0.271
	(0.070)	(0.182)	(0.043)	(9.855)	(0.409)	(0.003)	(0.012)	(0.308)	(1.342)	(2.954)
Government Debt GDP	-0.282**	0.564***	-0.083**	3.819	0.908	0.069***	0.002	-0.605	0.512	-0.433
	(0.150)	(1.965)	(0.014)	(6.560)	(2.807)	(0.003)	(0.008)	(0.403)	(3.353)	(7.563)
Value Traded GDP Ratio	-0.287**	-0.045**	-0.092***	-3.132	-0.197	0.055***	-0.004	-0.605***	-0.003	0.930
	(0.018)	(0.026)	(0.051)	(18.283)	(0.359)	(0.003)	(0.033)	(0.211)	(1.378)	(4.515)
World GDP Growth	0.017	0.325***	-0.142***	7.577	1.327	0.082***	0.012	-0.598	0.308	-0.966
	(0.179)	(0.484)	(0.052)	(62.492)	(3.546)	(0.016)	(0.022)	(1.552)	(5.462)	(5.071)
Fed Shadow Rate	0.418***	-0.909	0.122**	-10.347	-0.224	0.118***	0.056	-0.095	0.165	0.353
	(0.123)	(0.728)	(0.686)	(21.019)	(4.513)	(0.005)	(0.029)	(0.701)	(2.504)	(3.599)
No. of Observations	1,565	8,207	168	579	555	787	331	778	561	544
Sargan Test	0.20	0.40	0.2	0.90	0.88	0.44	0.71	0.98	0.74	0.54
m-value AR(1)	-1.46*	-4.39***	-1.72**	-9.16***	-11.12***	-1.55*	-2.03***	-5.19***	-2.98***	-1.85***
m-value AR(2)	-0.90	-0.44	-1.16	-3.56***	-2.86**	-1.11	-1.24	1.45	-1.32	-0.41

The estimates are based on Arellano and Bond (1991) GMM model. The regressions include unreported interaction term as well as year dummies. The standard errors are reported in parenthesis below the coefficient estimates. ***, ** and * indicate significance at the 1%, 5% and 10% levels. AR(1) and AR(2) denote the P-values for the first and second order autocorrelation in the residuals. Sargan test reports the p-values for the null hypothesis that the instruments used are not correlated with the residuals.

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