IMF Working Paper

Understanding Corporate Vulnerabilities in Latin America

by Carlos Caceres and Fabiano Rodrigues Bastos

INTERNATIONAL MONETARY FUND

IMF Working Paper

Western Hemisphere Department

Understanding Corporate Vulnerabilities in Latin America

Prepared by Carlos Caceres and Fabiano Rodrigues Bastos[1]

Authorized for distribution by Hamid Faruqee

April 2016

> *IMF Working Papers* **describe research in progress by the author(s) and are published to elicit comments and to encourage debate.** The views expressed in IMF Working Papers are those of the author(s) and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

Abstract

This paper analyzes the potential risks and vulnerabilities of non-financial corporates in Latin America and Canada. We quantify the impact of company-specific, country-specific, and global factors in driving corporate spreads. Overall, we found that all these factors play a role in explaining corporate risk. In particular, country specific factors such as exchange rate and sovereign CDS spreads are significantly associated with changes in corporate spreads, underscoring the importance of solid policy frameworks. We also find that global conditions, such as the VIX, are dominant drivers of corporate spreads. In recent years, the adverse effects from deteriorating domestic conditions have been broadly offset by relatively bening global financial conditions. However, a sustained reversal in these conditions would put significant pressure on corporate risk.

Table of Contents

I. INTRODUCTION

High commodity prices and strong international liquidity have powered growth in LAC for much of the last decade, but there is now consensus that this twin-engine growth process has come to an end. As the region adjusts to a harsher external reality, several challenges and risks have surfaced. A key one relates to the health of nonfinancial corporates. This topic that has attracted growing attention from markets and policymakers, but there remains ample scope for further analysis.

Against this backdrop, this paper focuses on the drivers of corporate risk in Latin America using company CDS spreads. We put together a comprehensive dataset to study the determinants of corporate risk dynamics. In particular, we quantify the relative contributions of firm-specific fundamentals, domestic macroeconomic conditions, and global factors. This allows us to shed light on issues such as the role of exchange rate depreciations and links with the sovereign risk.

Overall, the paper finds that all three set of variables – company-specific fundamentals, country-level macroeconomic variables, and global factors – play an important role in explaining corporate risks. The firm-specific variables are divided in two different sets: a set containing company specific-fundamentals, primarily based on data reported in quarterly financial statements, and a second set containing market-based company-specific variables. We separate these two concepts as our variable of interest – implied CDS spreads – itself depends on market sentiment which is closely captured in the second set. Thus, we would like to disentangle the quantitative impact of balance sheet reported-and-accounting-based measures (i.e. "pure fundamentals") from those of market-based explanatory variables, which themselves are affected by changes in financial market sentiments.

Among firm fundamentals, we find that measures of profitability, capitalization, leverage, and liquidity all appear to be statistically significant drivers of corporate spreads. At the country level, factors such as the exchange rate and the country's sovereign CDS spreads play an important role at driving our corporate risk measure. Finally, global conditions, in particular, global risk aversion (proxied by the VIX) is a key factor in driving swings in corporate spreads throughout Latin America.

Our results are broadly in line with previous results found in the literature, though most of the studies focus on explaining corporate spreads in advanced countries. In particular, there is a vast literature examining U.S. CDS spreads. For instance Das et al (2009) looks at CDS spreads of non-financial corporates using a mixture of accounting-based and market-based variables as explanatory variables. They find that accounting-based variables are able to explain two-thirds of CDS spreads movements, comparable to market-based variables. Unlike bond spreads, Das et al (2009) suggest that CDS spreads are not affected by tax effects. Doshi et al (2013) find that macroeconomic and firm-specific information can explain most of the variation in CDS spreads over time and across firms, even with a parsimonious specification. Those findings are also confirmed by Tang & Yan (2013), whose findings imply that firm-level and market-wide variables have similar levels of explanatory power on CDS spreads.

Some studies use alternative measures of corporate spreads, for instance, corporate bond spreads. These measures tend to raise important issues of comparability across instruments, and require pairing yields of corporate bonds to those of government bonds of similar characteristics (i.e. both maturity and cash flows), which are seldom readily available and, thus, represent an important practical limitation for empirical analysis. Examples of this research branch include Elton *et al* (2001) and Avramov *et al* (2007). Elton *et al* (2001) look at the difference in the rates offered on corporate bonds and those offered on government bonds over the period 1987-1996 using monthly bond data extracted from the Lehman Brothers Fixed Income Database distributed by Warga (1998). For comparability and to ensure the no-arbitrage condition,[2] the spreads used by Elton *et al* (2001) relate to *zero-coupon bonds* of the same maturity, which need to be estimated, using the procedure proposed by Nelson and Siegel (1987). Those spreads are then decomposed along three components: expected default loss (based on transition matrices estimated by S&P and by Moody's); a tax premium (as interest payments on corporate bonds are subject to state taxes in the U.S. whilst government bonds are not); and a systemic risk premium (based on the three-factor model of Fama and French, 1993). The authors find that expected default loss and the tax premium explain less than half of the measured corporate bond spreads, whilst the systemic risk premium explains the majority of the residual risk on these corporate bonds.

Likewise, Avramov *et al* (2007) rely on corporate bond spreads computed by Datastream, which are constructed as the yield differential between the corporate bond and the U.S. Treasury curve, but accounting for the maturity and the compounding frequency of these bonds. The authors find that a parsimonious set of aggregate company-level variables, inspired from structural model (e.g. idiosyncratic volatility, price-to-book ratio, etc), explain large part of the variation in corporate spreads. They also find evidence of the existence of a common systemic factor in the variation in corporate-spread changes.

In the case of emerging markets, Cavallo and Valenzuela (2007) look at corporate bond spreads of foreign currency-denominated bonds for a set of six Latin American countries and four emerging Asian economies. In order to compare bonds with different cash flow characteristics on a more equal basis, these authors rely on *option-adjusted spreads* (OAS) from Bloomberg. They find that firm-level characteristics account for the larger share of the variance. In addition, they find that a transfer of risk from the sovereign to the private sector exists, but it is less than1 to 1. Furthermore, their findings are consistent with the popular notion that panics are common in emerging markets, owing to less informed investors that are more prone to herding.

Our paper is organized as follows. Section II presents some stylized facts regarding the evolution of corporate risk, firm fundamentals, and relevant regional trends, whereas Section III describes the dataset and the empirical methodology used for the estimation of the main

---

[2] Essentially, Elton et al (2001), argue that the yields to maturity on zero-coupon bonds are the rates that must be used to discount cash flows on riskless coupon-paying debt to prevent arbitrage. See also Duffie and Singleton (1999) for further discussion of the conditions under which the use of those rates to discount cash flows is consistent with no arbitrage.

model. Section IV presents and discusses the main findings, including policy implications. Section V concludes.

II. Stylized Facts: Recent Dynamics in firm spreads and fundamentals

During the last decade, nonfinancial corporates from financially-integrated LAC economies have benefited from a favorable funding environment. New companies gained access to international capital markets, and many have been able to lengthen debt maturities while lowering borrowing costs. This has allowed corporates to pursue new investment plans, improve cash buffers, and pay down more expensive debt. In principle, these are all positive developments for a savings-scarce region characterized by low investment rates.

However, this has been achieved at the expenses of higher leverage, significantly fueled by foreign currency debt. For instance, foreign currency bond debt in five major financially-integrated economies of Latin America (Brazil, Chile, Colombia, Mexico and Peru; "LA5" hereafter) has increased from US$ 170 billion to US$ 383 billion between 2010 and 2015 (Table 1). Moreover, the macroeconomic adjustment unfolding across the region has implied weaker domestic currencies and lower medium-term growth rates, features that are likely to persist. Hence, the favorable funding environment over the last decade also bred vulnerabilities which are coming to the fore. Not only companies are facing a currency adjustment effect in their debt stock, but also the prospects of growing out of their debt through high-return investment have diminished.

Against this backdrop, there has been growing concern about corporate risk, with market analysts and policymakers combing through scattered information, often relying on anecdotal evidence. While this approach can lead to useful insights, it is important to complement it with attempts to develop a more systemic view about the evolution of corporate vulnerabilities.

To that end, we would a need a measure of corporate risk that retains some homogeneity across a reasonable number of firms. Credit Default Swaps (CDS) spreads would be the ideal candidate, but unfortunately they are available only for a small number of firms in LAC. Thus, we turn to implied CDS spreads which closely track their market counterpart measure and are available for a much larger set of companies (Figure 1).[3] [4]

---

[3] We use implied CDS spreads calculated by Bloomberg which are based on a theoretical framework proposed by Merton (1974) that uses observable information to calculate a company's distance to default. Bloomberg augments the frameworks' basic inputs (share price, market capitalization and share-price volatility) with financial information on total debt and interest coverage. In addition, Bloomberg applies statistical tests to evaluate and calibrate its model accuracy in predicting actual defaults–see Bloomberg Credit Risk: Framework, Methodology and Usage. The search for "implied measures" that can capture intrinsic corporate risk has become fairly common given the limited number of market-based CDS spreads and other difficulties such as low liquidity and lack of homogeneity in other instruments, such as corporate bonds.

[4] We analyze the relationship of actual and implied CDS spreads for the few firms (less than 50) in our sample for which both series are available. Overall, we find that both series tend to show strong co-movement, with a positive correlation of 0.73 (statistically significant at the 1 percent level); see Figure 1.

Figure 1: Actual Vs Implied Corporate CDS Spreads

Latin America: *Latin America and Canada:*
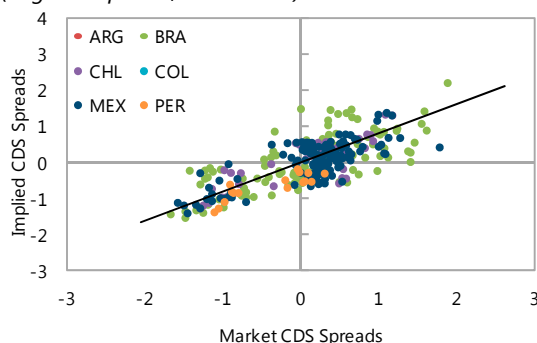
Market CDS and Implied CDS Spreads
(Log basis points; demeaned)
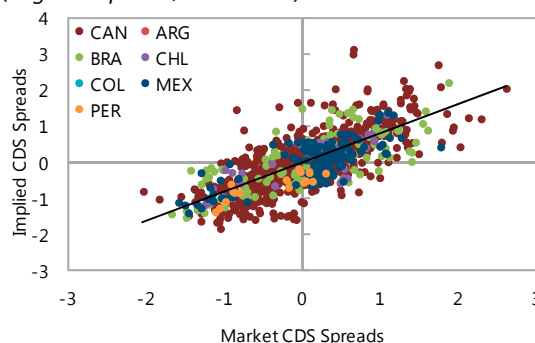
Source: Bloomberg, L.P.; and IMF staff calculations.
Note: Period: 2005-15. Implied CDS available for approximately 500 corporates. Each point represents, for each company, the difference of the log of CDS spreads at the end of each quarter and its corresponding average over the period 2005Q1 to 2015Q3.

Market CDS and Implied CDS Spreads
(Log basis points; demeaned)

Source: Bloomberg, L.P.; and IMF staff calculations.
Note: Period: 2005-15. Implied CDS available for approximately 1200 corporates. Each point represents, for each company, the difference of the log of CDS spreads at the end of each quarter and its corresponding average over the period 2005Q1 to 2015Q3.

Implied CDS spreads indicate that 2015 has indeed been a year of rising corporate risk for the average Latin American corporate. Moreover, these spreads also exhibit a more permanent deterioration component since 2011 (Figure 2). The dynamics of the last four years contrasts with what has been observed during the Global Financial Crisis, characterized by an acute and short-lived spike in corporate risk.

Examining the evolution of implied CDS spreads across countries is revealing. The year of 2011 marks the start of diverging behavior for the median corporate across countries as Argentina and Brazil decouple from other economies, displaying persistently higher corporate risk ever since. This stylized fact suggests that from 2012 onwards, idiosyncratic factors have had a more influential role in driving risk. Since 2014, this heterogeneity has also grown amongst other countries. The econometric analysis presented later in this paper will propose a strategy for comparing competing drivers behind corporate risk dynamics.

Corporate risk deterioration has been accompanied by weakening firm fundamentals. Indeed, the data reveals that leverage, profitability, capitalization and liquidity have weakened alongside with the implied CDS spreads since 2010. Table 2 provides a snapshot of several indicators based at three particular points in time over the past five years: (i) 2010Q1, (ii) 2011Q3, and (ii) 2015Q3.

The deterioration has been stronger in recent years and is more visible on the dimensions of leverage and profitability. This partly reflects the combination of exchange rate depreciations, foreign-currency debt, and marked-down growth prospects. In this context, the specter of sudden crises led by sharp exchange rate corrections has re-emerged. Basically, the typical concern is that companies would have indulged in financial excesses during good

times, much beyond of what their real growth potential could justify, and it is now a matter of time until a corporate bust ensues.

Figure 2: Evolution of Corporate Spreads in Latin America

Implied CDS Spreads: Nonfinancial Corporates in Latin America
Basis points, median (bar), top quartile (dots)

CDS Spreads 2008 -2015: Nonfinancial Corporates
Basis points, median

Source: Bloomberg, and IMF staff calculation. Implied CDS from Bloomberg. Chart based on approximately 500 companies from Argentina, Brazil, Chile, Colombia, Mexico, Panama and Peru.

Source: Bloomberg, and IMF staff calculation. Implied CDS from Bloomberg

Such a scenario remains a possibility, but the corporate resilience to currency depreciations and medium-term growth projections revisions observed in 2015 suggests that fatalism is not in order. In fact, ex ante, many would probably have considered the macroeconomic shocks during 2015 as being sufficient to trigger widespread corporate defaults in the region. Ex post, a few factors appear to have been able to stop or at least delay turmoil. High levels of international reserves provided confidence boost and ammunition for Central Banks to stabilize short-term fluctuations of the currency–though the medium-term effects and sustainability of the interventions have remained a topic of discussion. An important part of the dollar debt build-up has been accumulated in the tradable sector and by quasi-sovereigns, so natural hedges and implicit government backing have been important mitigating factors (Table 3). Also, cash buffers have remained sizeable in recent years until now, and at the same time some Latin American companies might be making more active use of financial hedges.

It would be wrong to take comfort on the 2015 corporate resilience, and fail to acknowledge that margins have been stretched thin already. The interaction of high leverage and declining profitability with a more challenging environment for macroeconomic management and long-standing growth challenges is an insidious source of corporate risk for the region. In particular, a protracted period of slower growth can lead to the erosion of existing buffers may increase short-term bias in policies without addressing long-term adjustment challenges. Hence, sound macro policies and effective growth strategies are key for mitigating risks to corporate risk.

III. DATASET AND EMPIRICAL METHODOLOGY

This section is split in two sub-sections. The first one describes our dataset and the construction of the main variables used in the analysis. The second one presents the empirical methodology used to estimate our core model and derive the main results.

A. Dataset

The chapter builds a large quarterly dataset covering the period 2005–2015 containing company-specific financial information, along with country and global variables. The sources are Bloomberg, Datastream, Haver, Markit, and the World Economic Outlook Database. The sample includes over five hundred nonfinancial firms from seven Latin American countries—Argentina, Brazil, Chile, Colombia, Mexico, Panama, and Peru.[5] Furthermore, we perform additional analysis by including a similar number of firms from Canada. While the analysis centers on Latin American firms, the inclusion of Canadian companies allows the investigation of the role of common regional shocks by providing a benchmark of a commodity-exporting advanced economy located in the same hemisphere.

An important issue in the analysis of corporate spreads using both accounting-based and market-based variables is the selection of the time series frequency. Most financial reports are available only at a quarterly frequency; however market-based variables are readily available on a daily basis. Furthermore, there does not seem to be a consensus in the literature as to which frequency is preferable,[6] and most empirical work do not provide an explanation backing their specific choice. Basing the analysis on a daily-frequency dataset, constructed from interpolated quarterly data when needed, has the advantage of increasing the number of observations, and hence the power of the estimations. However, the use of (linearly) interpolated daily series might give rise to important econometric drawbacks. For instance, where the presence of endogeneity is suspected, the researcher would use lags of the explanatory variables so that the information contained on the "right hand side" is pre-determined vis-à-vis the dependent variable, and thus the error terms. In the case of daily data from interpolated quarterly series, every observation at a given point in time embeds information from the past as well as from the relative future, which (depending on the day in question within each quarter) might be several days ahead.[7]

---

[5] The selection of Latin American countries included in our sample was dictated by data availability. In particular, market data - such as corporate or sovereign CDS spreads, or implied-CDS spreads - are not available for other Latin American countries.

[6] For instance, Das et al (2009) conduct their analysis on a quarterly frequency, by using quarterly averages of daily data. Conversely, Doshi et al (2013) construct a daily dataset by linearly interpolating quarterly data over the period 2001-2010.

[7] Of course, one could only include as explanatory variables lags greater than the number of days in any given quarter. But a model where these explanatory variables include lags of about 60 periods or more (roughly accounting for 20 working days in a given month - or 60 per quarter) are not likely to give any meaningful and intuitive results on these lags, and defeats the purpose of using high-frequency daily data in the first place.

Conversely, the use of quarterly data, constructed from averaging daily observations within each quarter, does not suffer from this potential time-related endogeneity issue, however it might "smooth away" important and interesting high-frequency dynamics in the underlying data. Weighting the pros and cons, and being mindful of the econometric drawbacks in using linearly interpolated data, we prefer to err on the cautious side and opt for using quarterly data for the estimation of our core model. Nevertheless, given that our dependent variable – market-based implied CDS spreads – is available on a daily frequency, we use the observation for the last day in every quarter instead of the simple average throughout the quarter. This ensures that our explanatory variables, which are based on averages within the quarter, precede the value of our dependent variables at every quarter in the estimation model.[8]

Another important aspect when estimating a relatively rich model that embeds a large number of firm-specific variables in a panel setting is that several of these variables might be highly collinear, both along the time and the cross-sectional dimensions. In order to mitigate potential estimation issues arising from this multi-collinearity, we collect firm-specific variables into conceptually-related groups. In addition, we use principal component analysis (PCA) to create variables for each of the following four concepts: profitability, capitalization, leverage, and liquidity.[9] [10]

The set of country-level variables in the core model include the country's sovereign CDS spread, the year-on-year rate of CPI inflation, and the depreciation rate (annual) of the bilateral exchange vis-à-vis the U.S. dollar. The commodity terms-of-trade index of Gruss (2014) is also included among the explanatory variables. Although the latter is usually viewed as being outside the control of country-specific policies (as it depends on global commodity prices), the variable itself varies from country to country.

Finally, the VIX – which can be seen as both a measure of global financial markets volatility, but also as a measure of global risk aversion (i.e. market price of risk) – represents our global conditions variables.[11]

Descriptive statistics of all the different variables included in the core model are presented in Table 5, whereas Table 6 exhibit the pair-wise (unconditional) correlations among these

---

[8] All explanatory variables whose underlying data were available at a daily or monthly frequency are converted into quarterly averages in the final quarterly database.

[9] See Table 4 for the variables included in each of the first principal components, as well as their corresponding loadings (i.e. relative weights).

[10] In order to avoid including the effects of outliers in our core estimation model, the principal components are constructed using truncations (i.e. eliminating the top and bottom 1 percentiles of the distribution) of the underlying variables.

[11] Other global variables, such as global stock prices (proxied by the S&P-500), were also included in the model but, as discussed later, were not found to play a significant role in our core estimation specification.

variables. These simple correlations already point at clear interesting relationships in our dataset. In particular, an increase in corporate risk appear to be strongly associated with an increase in corporate leverage, in share price volatility, in sovereign CDS spreads, in the VIX, or a depreciation of the exchange rate. Conversely, lower corporate risk appears to be strongly associated with higher profitability, capitalization, liquidity, share prices, and price-to-book ratios, as well as with higher commodity prices. Interestingly, most of the variables included in our sample also appear to be highly correlated among themselves. This reinforces the view that a richer structure, in which several measures are included simultaneously, is needed to properly assess the impact of each of these measures on corporate spreads.[12]

B. Empirical Methodology

Our main estimation relies on a standard panel-data setting in which our dependent variable – market-based implied CDS spreads – is modeled as a linear function of firm-specific variables, macroeconomic factors at the country-level as well as global conditions.

Algebraically, our estimation model can be written as:

$$Y_{i,t} = \alpha + \beta_1 \boldsymbol{F}_{i,t} + \beta_2 \boldsymbol{M}_{i,t} + \beta_3 \, \boldsymbol{C}_{j,t} + \beta_4 \boldsymbol{G}_t + \beta_5 \boldsymbol{D}_{rt} + \mu_i + \epsilon_{i,t}$$

where $Y_{i,t}$ denotes the log of implied CDS spread of company i at time t, our measure of corporate risk; $F_{i,t}$ and $M_{i,t}$ denote, respectively, firm-specific accounting-based variables (that is, 'fundamentals') and market-based variables; $C_{j,t}$ denotes macroeconomic variables in country j at time t, whereas G_t represents the global variables; μ_i denotes the company-specific fixed effects;[13] and $\epsilon_{i,t}$ is the error term. D_{rt} represents time dummies for two different subperiods: financial crisis (2008:Q1 to 2010:Q4) and the subsequent period (2011:Q1 to 2015:Q3). They capture changes in dynamics induced by 'level shifts', beyond what could be explained by variables in our data set. In addition, these dummies are allowed to be different between Canada and the group of LAC countries (thus the subscript for the region r), allowing one to investigate common LAC-regional factors driving risk.

The estimation methodology is based on the standard fixed effects (i.e. "within groups") estimation technique. Robust standard errors clustered by country - to account for any

---

[12] For instance, the unconditional correlation between corporate spreads and CPI inflation appears to be negative in Table 6. A possible explanation is that CPI inflation is (unconditionally) correlated with other variables such as higher economic activity, or profitability, which tend to be associated with better corporate prospects and thus with lower corporate spreads. Indeed, it will be shown that, after controlling for firm-specific fundamentals as well as country macroeconomic conditions, the (conditional) correlation between corporate spreads and CPI inflation is positive.

[13] The inclusion of firm specific fixed effects also accounts for any differences in the *average level* of corporate spreads at the industry (and country) level.

potential correlation of the residuals within each country – are used in the core estimation model.[14]

IV. MAIN RESULTS AND DISCUSSION

Overall, our estimation suggest that all groups of variables – firm-specific, country-level macroeconomic and global conditions – play an important role in explaining developments in corporate spreads in Latin America, as well as in our extended sample which includes Canada (see Table 7).[15]

In terms of firm-specific measures, we find that all the accounting-based firm fundamentals included in our model appear to be statistically significant. Indeed, higher capital ratios, higher liquidity ratios, and higher profitability all lead to a reduction in corporate risk. Conversely, higher leverage is significantly associated with higher corporate risk.

Although these results are both strong from a statistical standpoint and intuitive from an economic point of view, the elasticities obtained relate to the principal components of four "fundamental concepts", rather than the underlying fundamentals per se. The individual elasticities cannot be obtained directly from Table 7. In order to assess the impact of each individual fundamental (e.g. ROE, ROA, debt to equity, etc) on corporate risk, the estimated elasticities can be used in conjunction with the weights of each of the underlying fundamentals in their respective principal component (as per Table 4). For instance, an increase in the ROA ratio of 1 percentage point increases the "*profitability*" principal component by 0.10 units,[16] which in turn reduces the average corporate implied CDS spread in Latin America by about 2 basis points.[17] Likewise, a 5-percentage-point increase in the capital-to-assets ratio increases the "*capitalization*" component by 0.08 units, thereby reducing corporate spreads by about 6 basis points.[18] Although statistically speaking these elasticities are highly significant, their magnitudes are admittedly small. The relatively small magnitudes reflect the fact that these elasticities represent an *average* linear effect over a

---

[14] The main estimation results do not change in any noticeable way if simple or robust (unclustered) standard errors are used instead. These additional estimation results are available from the authors upon request.

[15] Although most of the core results appear to be fairly robust across the different specifications presented on Table 7, the numerical examples discussed in this section will be taken from Model (2) - or from Model (1), when discussing the results related to Canada.

[16] This uses an estimated elasticity of ROE to ROA of 1.48.

[17] Given the non-linear nature of changes in logs and different initial conditions across countries, this response ranges from a 1 basis point fall for Mexican corporates (which had the lowest median corporate spread in 3Q-2015) to a reduction of 3 basis points in the case of Brazilian corporates (which had the highest median spread).

[18] Again, this ranges from 3 basis points in the case of Mexican non-financial corporates to 10 basis points in the case of their Brazilian counterparts.

large sample of heterogeneous firms. Indeed, the intrinsic elasticities might be very large for a few companies and effectively zero for others. [19]

Turning to market-based variables at the company level, a few of these measures appear to be statistically significant in explaining corporate risk. In particular, company-specific stock price volatility and price-to-book ratios are found to be strongly associated with changes in implied CDS spreads. Even though these variables are linked to the calibration of the implied CDS spreads itself, including them in the core regression is not tautological. In fact, the variables in Block II are also relevant in explaining actual CDS spreads dynamics.[20] Moreover, these variables are incorporated with a lag in the estimation model, thus reducing any potential circularity with implied CDS spreads. Essentially, we want to know if – and by how much – other variables influence corporate risk after accounting for the market-based variables.[21] The estimated results suggest the answer is yes.

In addition to firm-specific fundamentals, macroeconomic and financial conditions both at the country-level and globally are found to be statistically associated with changes in implied corporate CDS spreads. In particular, higher sovereign CDS spreads are significantly associated with higher corporate spreads. This corroborates the existence of an important nexus between corporate and sovereign risk in the region: changes in sovereign spreads tend to lead to movements in corporate spreads in their respective countries. Hence, to the extent that policy frameworks affect country risk dynamics, they also have a direct impact on corporate risk.

Similarly, corporate spreads appear to rise when the exchange rate of the country depreciates. As expected, this effect appears to be stronger for the companies that exhibit higher levels of leverage. Importantly, we found that year-on-year changes in exchange rate play a more important role in explaining corporate spreads than the exchange rate level per se. This suggests that companies are not necessarily affected by underlying trends in the level of the exchange rate (for instance, when the exchange rate is continuously depreciating, albeit smoothly), as balance sheets would tend to adjust, but would suffer from a sharp and sudden depreciation.

---

[19] These findings are broadly consistent with the quantification of Aymanns et al (2016) in the case of financial corporations. Using a large sample of U.S. and global banks, they find that fundamentals (profitability, capitalization, asset quality, and liquidity) are significantly related to measures of bank funding cost, but their effect is small in magnitude. For instance, a 5-percentage-point fall in regulatory capital ratios would only lead an average increase in interbank funding cost of approximately 0.2 percentage points.

[20] Despite the limited number of companies in our sample for which actual CDS spreads are available, Table 12 shows that these firm-specific market-based variables are statistically significant drivers of both *actual* and *implied* CDS spreads.

[21] In fact, the exclusion of Block II does not alter in any meaningful way the elasticities obtained for the variables in other Blocks (see Table 7).

We also find that higher inflation is associated with higher corporate risk.[22] However, other macroeconomic fundamentals such as real GDP growth do not appear to play a significant role in driving risk in our core model. Of course, the latter is likely to still have indirect effects on corporate spreads through the firm-specific fundamentals included in our model. For instance, higher output growth is significantly associated with higher profitability, which is in turn an important driver of corporate spreads.

Global factors such as commodity prices and, in particular, the VIX are dominant drivers of corporate spreads. This is not surprising given that the VIX is often considered as a proxy for global risk aversion – or the market price of risk. In other words, during periods or episodes where the VIX is high, investors require a higher return in compensation for the higher perceived risk (i.e. a risk premium), which translates into higher corporate risk. Given the importance of the commodity sector for most of the economies in our sample, it is also not surprising to see that higher commodity prices tend to be associated with lower corporate spreads. Again, more 'fundamental' global measures (such as global output growth) do not appear to be statistically significant drivers of corporate spreads in our core estimation model. But, as in the case of country-specific fundamentals, these global factors are highly correlated with other important explanatory variables in the regression, such as global commodity prices and the VIX itself.[23]

Finally, two level shifts were found to be highly significant in our regression model. The first corresponds to an increase in average level of corporate implied CDS spreads during the global financial crisis, proxied with a dummy for the period 1Q-2008 to 4Q-2010. Interestingly, the magnitude of this level shift was found to be essentially the same for all countries in our sample, except for Canada. The estimated level shift represented a sizeable increase in corporate spreads of about 77 basis points for all the Latin American countries in our sample, and 41 basis points in the case of Canada. Basically, the differential could be seen as a risk premium that Latin American corporate would need to pay relative to their Canadian counterparts in times of stress. A second level shift was found over the period starting in 1Q-2011 till the end of our sample (3Q-2015), which marked a period of continuous – albeit moderate – economic softening in the region, and in emerging markets more broadly.[24] Again, this second dummy represented an additional increase of about 55 basis points in corporate spreads throughout Latin America, and about 35 basis points for Canadian corporates.

---

[22] The relationship is only statistically significant for the overall sample, which includes Canada, and for the sample of LA5 countries.

[23] For instance, the correlation between G7 real GDP growth and the VIX is about -0.67, and statistically significant at the 1 percent level.

[24] Following the economic rebound after the global financial crisis, real GDP growth in Brazil peaked in mid-2010 and has been slowing ever since. Likewise, China's real GDP growth peaked around the same time, and has been following a downward trend since then.

Overall, the estimation results in Table 7 reflect a set of parsimonious models, in which the different blocks comprise a few variables with similar characteristics (i.e. firm-specific, country-specific, or common to the entire sample). Furthermore, the estimated elasticities are fairly robust to the exclusion of specific blocks or the use of time effects instead of macroeconomic variables (Table 8). Nevertheless, most of these variables, in particular those that present mainly a time series variation – such as the domestic and global condition variables – tend to exhibit a relatively large degree of co-movement. Thus, the conditional elasticities represent only the direct impact that these variables have on corporate spreads, as the former might still have an indirect impact on corporate spreads through other variables that are also included in the model.

To quantify the overall (i.e. direct and indirect) effects of these domestic and global conditions on corporate spreads, we conduct further regression analysis in which we omit all other time-varying variables as well as including and excluding the firm-specific variables from our core model (Table 9). These additional elasticities might be useful, for instance, when performing stress tests based on scenarios in which each exogenous variable is individually shocked. Furthermore, as mentioned earlier, there are other variables such as the country's real output growth, G7 real GDP growth (as a proxy of global growth), or the level of the S&P-500 (as a proxy of global equity prices), that do not appear to be statistically significant drivers of corporate spreads in our core model. This is likely due to their high correlation with other explanatory variables in our model. However, in more restricted estimation settings, or when these are introduced individually, their corresponding elasticities appear to be statistical significant. For completeness, these estimation results are presented in Table 10.[25]

When looking at changes in corporate spreads, the relative contributions of all the measures listed above would depend upon the period of consideration. In particular, two periods of interest within the past decade are analyzed. The choice of these two periods is based on the observed dynamics of corporate risk. The first period, from 1Q-2007 to 1Q-2009 (Period I), represents the period of sharp increased in market-based risk measures due to the global financial crisis. The second and more recent period, from 4Q-2011 to 3Q-2015 (Period II), has been marked by the economic deceleration throughout the region following the recent negative trends in commodity prices.

During Period I, average implied CDS spreads of all the Latin American corporates in our sample increased by more than 350 basis points. In relative terms, this number was broadly

---

[25] An additional variable that could potentially have an impact on corporate spreads is interest rates. A priori, one could expect that a rise in interest rates increases corporate risk, owing to the resulting increase in the cost of funding. However, global interest rates (proxied by, for instance, the yield on 10-year U.S. Treasury bills) are strongly and positively correlated with global economic growth as well as output growth at the country level. Likewise interest rates are negatively correlated with the VIX. In other words, interest rates tend to fall in 'bad times' and tend to rise in 'good times'. This leads to an overall *negative* correlation between global interest rates and corporate spreads. Longstaff and Schwartz (1995) find that, consistent with the implications of theoretical valuation models, corporate credit spreads are strongly negatively related to the level of interest rates. This result is also consistent with the empirical findings of Cavallo and Valenzuela (2007) for emerging markets.

the same across countries.[26] Over this period, the deterioration of global financial conditions contributed significantly to the increase in corporate spreads (see Figure 3). The increase in the VIX alone contributed to about a quarter of the total increase in spreads during that period. This was compounded, to some extent, with the softening in commodity prices during the crisis.

Likewise, country specific factors also contributed significantly to the increase in corporate spreads during Period I. Most notably, the increase in sovereign CDS spreads contributed to about 11 percent, on average, of the increase in corporate spreads recorded their respective countries (ranging from 6 percent in Brazil to 33 percent in Panama). This supports our previous conclusion regarding the existence of an important nexus between sovereign and corporate risk. However, firm-specific factors, both market-based and accounting-based ('fundamentals'), did not contribute markedly to the overall increase in market-based corporate risk during the global financial crisis. All firm-specific factors combined contributed to less than 10 percent of the increase in corporate spreads (roughly equivalent to 35 basis points) during Period I for our entire sample, and as little as 4 percent (about 10 basis points) in the case of Chile.

Figure 3: Contribution to Changes in Implied CDS Spreads over Periods I and II
(log-basis points, mean)
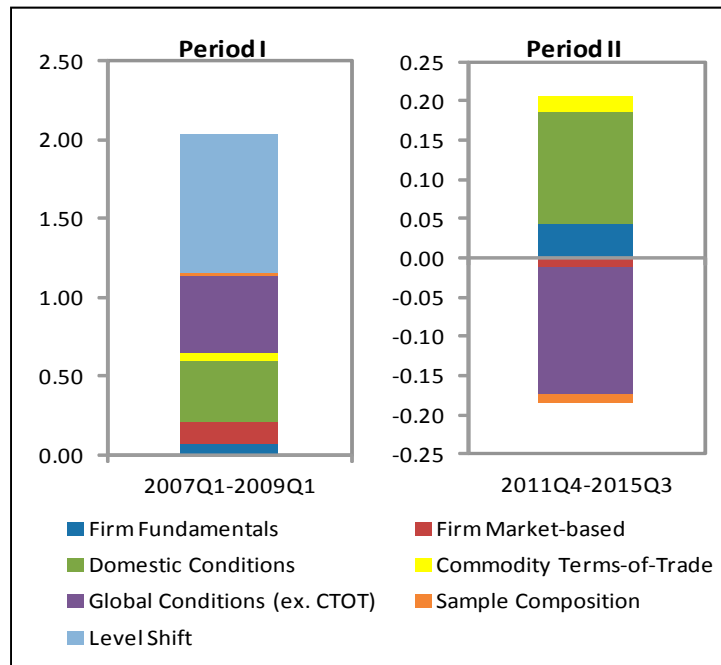
Source: IMF staff calculations. Note: this decomposition is based on the estimation results for the sample of Latin American firms only (see Model (2) in Table 7).

---

[26] Given that the underlying numbers refer to log-changes, the absolute magnitudes would also depend on the initial conditions. For instance, the average increase in Colombian corporate spreads was about 200 basis points during Period I, whilst that of Brazilian corporates was almost 400 basis points. The regional average is closer to Brazil's given the relatively large number of Brazilian firms included in our sample.

Turning to the most recent period (Period II), the relatively benign global conditions - mainly characterized by relatively low levels observed in the VIX with an overall positive trend in global equity prices seen over the past four years or so – has been contributing to downwards pressures on corporate spreads (Figure 3). At the same time, domestic factors, notably the fast depreciation of exchange rates, have been the largest contributors to upward pressures on corporate spreads. Commodity prices have also contributed in pushing corporate spreads up, but to a lesser extent. Overall, the contribution from domestic and global conditions broadly offset each other during this period. Indeed, the overall increase in corporate spreads during Period II has been relatively muted compared to that of Period I (as shown in Figure 2). Finally, the deterioration in firm-specific fundamentals (lower profitability and higher leverage) has also been pushing corporate spreads up during the most recent period.

Another interesting feature of the contribution analysis is that, whilst in Period I the contribution of the different factors was broadly the same across countries (Figure 4; top panel), there is a significant heterogeneity across countries in Period II (Figure 4; bottom panel). In particular, in countries such as Argentina, Brazil and Colombia, the deterioration in domestic macroeconomic variables is the largest contributor to the upward pressure on corporate spreads over the most recent period.[27] [28] In contrast, in the case of Peru, it is the worsening of firm-specific fundamentals – as well as that of firm specific-market variables – which are the largest contributor behind the upward pressures on corporate spreads. In the cases of Chile and Mexico, the contribution from relatively weaker domestic conditions appears to be contained. In fact, markets seem to have a relatively benign view regarding the prospect for the corporate sector in these two countries, evidenced by the downward contribution of firm-specific market-based measures (e.g. firm-stock price volatility, price-to-book ratios, etc) on corporate spreads. Finally, in the case of Panama, the only net commodity importer in our sample, the fall in commodity prices, combined with a low inflation environment and stable exchange rate,[29] is contributing to lower corporate spreads in the most recent period.

Recently, different trends in corporate risk have been observed across sectors. For instance, implied CDS spreads in the energy and industrial sectors have increased more rapidly than elsewhere (Figure 5). In particular, the contributions from firm-specific variables (both accounting and market-based) tend to vary noticeably across sectors. In order to investigate the relationship between commodity prices and corporate risk in greater detail, we consider additional specifications by (i) replacing the country-specific terms of trade with the actual

---

[27] Although the relative magnitudes of the *log-changes* is broadly the same for these three countries, in *absolute* terms, however, the upward contribution from worsening domestic conditions is larger for Argentina and Brazil (both over 100 basis points) compared to that of Colombia (around 70 basis points).

[28] In the case of Colombia, this is mainly due to the sharp depreciation of the exchange rate. In Brazil, the largest contributor is the exchange rate depreciation, followed by an increase in sovereign CDS spreads. In Argentina, the sharp increase in sovereign CDS spreads is the main culprit, with a somewhat more moderate additional contribution coming from the relatively high inflation rate in the country.

[29] Panama is a *de jure* dollarized economy.

prices of oil or copper, and (ii) allowing for the impact of commodity prices on corporate risk to differ across industries. Our findings indicate that higher international oil and copper prices are associated with lower corporate risk, consistent with the results using country-specific terms of trade (Table 11).[30] Moreover, and notwithstanding practical shortcomings regarding the sectoral classification of firms in our sample,[31] we find that commodity prices have a more pronounced impact on commodity-related sectors. Indeed, the impact of all commodity price measures is somewhat stronger in the energy sector.

In summary, global market factors, such as the VIX, as well as country-specific factors, such as sovereign CDS spreads and changes in exchange rates, played a key role in driving corporate spreads up during the global financial crisis, whilst firm specific factors had a more muted contribution. In contrast, during the most recent period (Period II), relatively accommodative global market conditions have been putting downward pressure on corporate spreads, whereas the deterioration in country-specific factors, such as a weakening macroeconomic outlook combined with falling exchange rates, and that of firm-specific (fundamental and market-based) measures have been contributing to an underlying rise in corporate risk in most countries.

Overall these two opposite forces – global factors pushing spreads down; and domestic conditions pushing spreads up – have broadly offset each other over the past years, leading to broadly flat corporate spreads over Period II. However, this points to the inherent risk of a potential reversal in the relatively sanguine global market conditions (for instance, a sharp correction in global equity and bond prices and/or a sharp increase in the VIX) on corporate spreads. In that case, global conditions would add to the existing upward pressures on corporate spreads coming from the weakening of domestic conditions, which could be further amplified by risks related to market perceptions of company-specific vulnerabilities.

V. CONCLUSIONS

We quantify the impact of company-specific, country-specific, and global factors in driving corporate spreads of non-financial firms in Latin America and Canada. Overall, we found that all these factors tend to play an important role in explaining corporate implied CDS spreads.

Among firm-specific fundamentals, higher profitability, capitalization, and liquidity are all associated with lower corporate spreads. Conversely, high leverage is found to be associated with higher spreads. In addition, country specific factors such as exchange rate and sovereign CDS spreads are also significantly associated with changes in corporate spreads. The positive

---

[30] In this set-up, oil and copper prices act as global variables common to all firms in the sample, capturing common external shocks such as economic developments in China. Oil and copper prices display important correlations with country and firm-specific variables, in particular with the commodity terms of trade index as well as among themselves.

[31] For instance, , a few large corporates that are related to the oil and gas industry are not classified under a single banner, but instead appear either in the "energy" sector or in the "materials" sector.

and significant sensitivity of corporate spreads to sovereign spreads suggest that there is indeed an important market-based corporate-sovereign nexus in Latin America. Finally, global conditions such as commodity prices and the VIX are also important drivers of corporate spreads, and the VIX is particularly influential.

In term of policy considerations, countries should look closely at the development of both domestic macroeconomic conditions and firm-specific fundamentals. In particular, macroeconomic stability and sound policies (which will likely be reflected in the level of sovereign spreads) are key to contain any additional upward pressures on corporate spreads. Furthermore, the findings suggest that sharp exchange rate depreciations put pressure on corporate risk, particularly if leverage is high and currency exposures not hedged. This calls for enhanced monitoring of corporate balance sheets and the use of macroprudential tools (for instance, higher capital and liquidity requirements for foreign currency-related exposures) to contain any potential buildup of risks related to currency mismatches.

Policymakers should monitor more actively developments in firm-specific fundamentals (e.g. capitalization, leverage, liquidity, etc). This is particularly crucial for large systemic corporates – often in the commodity-related sector – and those firms that might pose significant spillover risks to other sectors of the economy. Regulators should strengthen consolidated supervision of highly interconnected groups (especially those where financial and non-financial corporates are highly interlinked),[32] operating at home and abroad. Furthermore, in the case of insolvent companies, restructuring and bankruptcy legislation should be enhanced to minimize both administrative costs and economic losses related to default. Moreover, policymakers should facilitate the deleveraging process, and create an environment that would help Latin American corporates to attract foreign investors. Finally, Latin American policymakers should take advantage of relatively benign global financial conditions (e.g. still favorable global financing conditions, relatively low market volatility, etc) to push through needed reforms and macroeconomic adjustments to restore corporate profitability and allow firms to rebuild buffers.

---

[32] For example, in the case a non-financial firm and a bank are both owned by the same group.

Figure 4: Contribution to Changes in Implied CDS Spreads in Selected Countries over Periods I and II
(log-basis points, mean)

Top Panel: Period I (2007Q1 – 2009Q1)

Bottom Panel: Period II (2011Q4 – 2015Q3)

Legend:
- ■ Firm Fundamentals
- ■ Firm Market-based
- ■ Domestic Conditions
- ■ Commodity Terms-of-Trade
- ■ Global Conditions (ex. CTOT)
- ■ Sample Composition
- ■ Level Shift
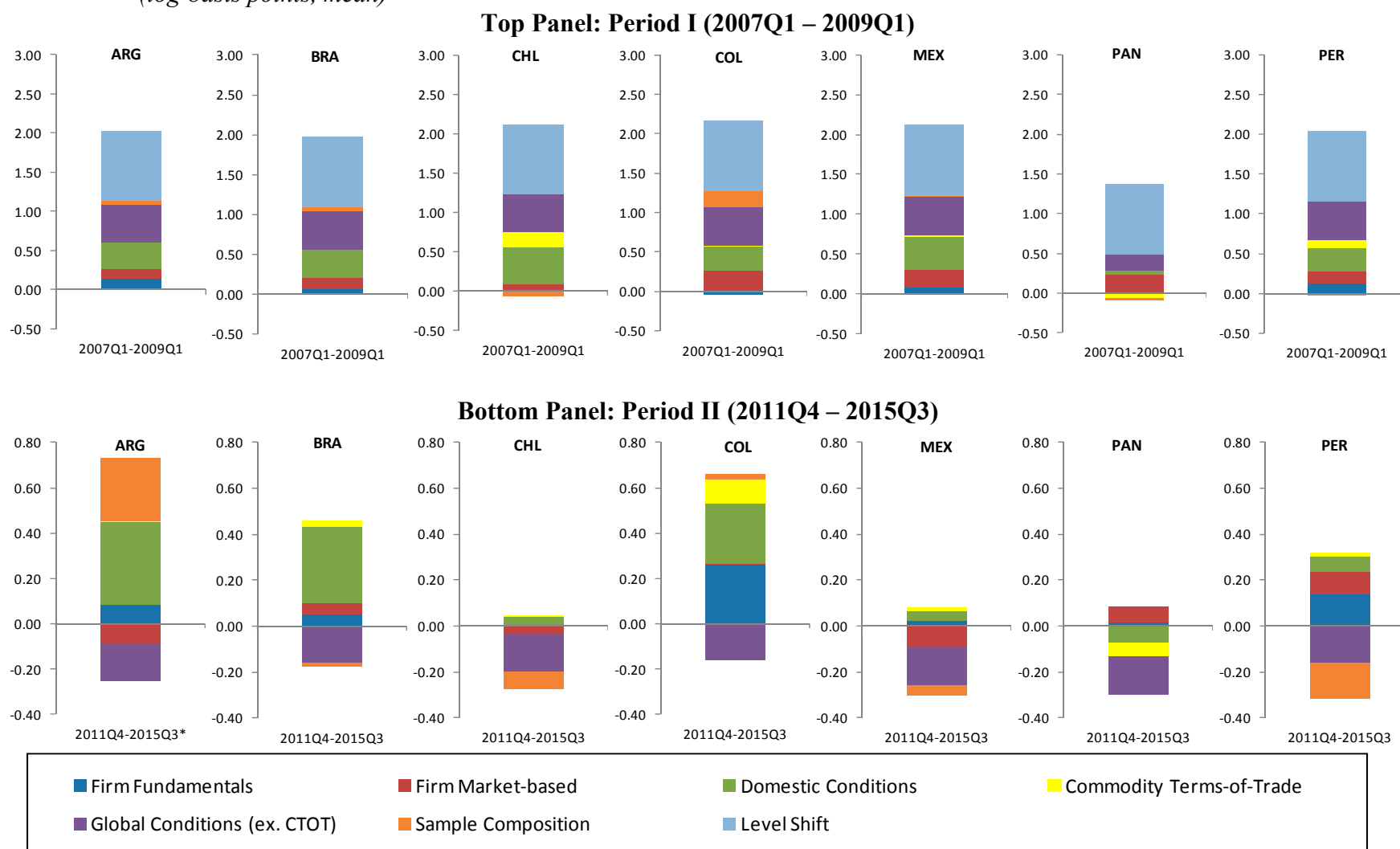
Source: IMF staff calculations. Notes: a few explanatory variables for Argentina are only available up to 2015Q2. This decomposition is based on the estimation results for the sample of Latin American firms only (see Model (2) in Table 7).

Figure 5: Evolution of Corporate Spreads across Sectors

Implied CDS Spreads Across Sectors
(log-basis points, median)
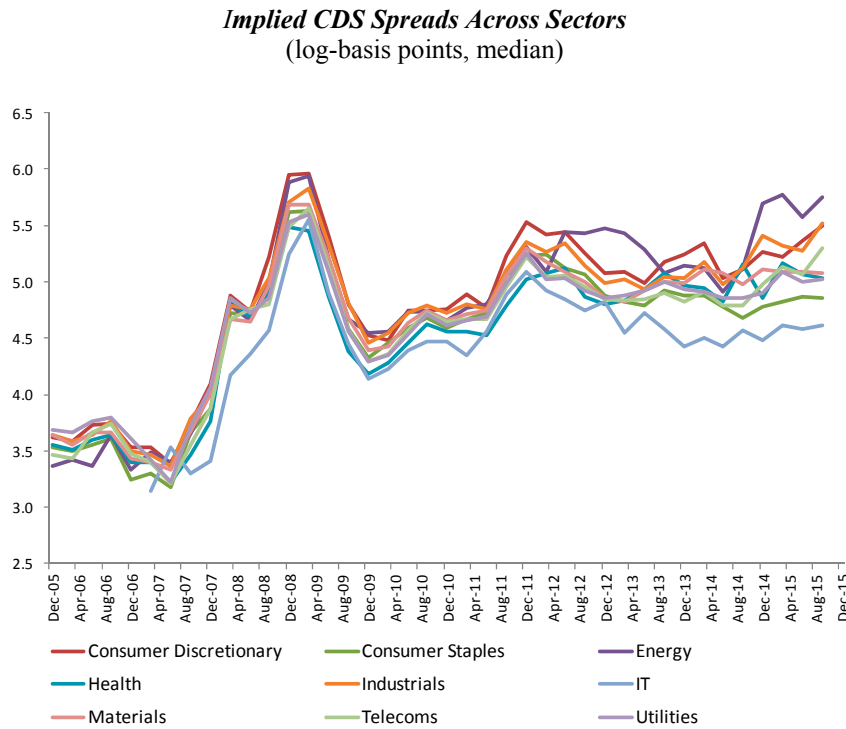
Contribution of Firm-Specific Variables to Changes in
Implied CDS Spreads over Period II
(log-basis points)
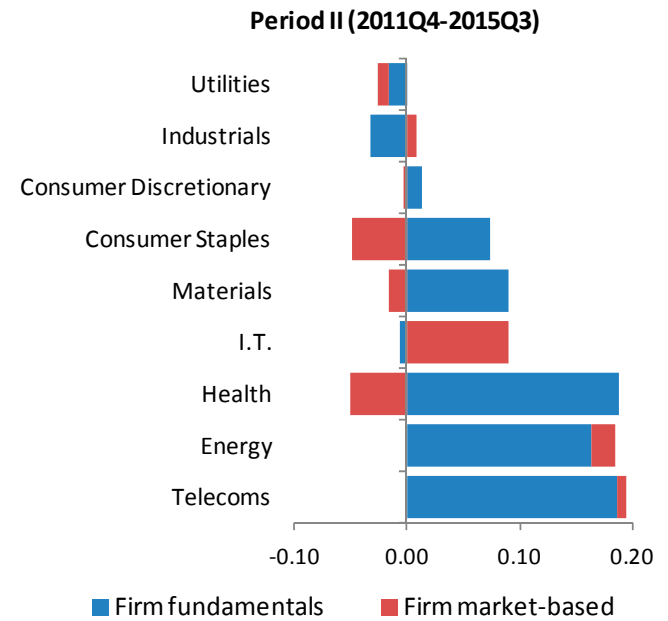
Source: IMF staff calculations.

Table 1: Corporate Bond Issuance in LA5 Economies

Non-Financial Corporates: Bond Debt

	2010		2015	
	USD billion	*Share*	USD billion	*Share*
LA5				
Total	291.3	*100*	504.9	*100*
Foreign currency	170.2	*58.4*	383.3	*75.9*
Local currency	121.1	*41.6*	121.7	*24.1*
Brazil				
Total	152.7	*100*	228.7	*100*
Foreign currency	70.4	*46.1*	159.4	*69.7*
Local currency	82.4	*53.9*	69.3	*30.3*
Chile				
Total	17.5	*100*	41.7	*100*
Foreign currency	16.6	*94.5*	40.2	*96.5*
Local currency	1.0	*5.5*	1.4	*3.5*
Colombia				
Total	9.3	*100*	23.4	*100*
Foreign currency	5.0	*54.0*	17.7	*75.5*
Local currency	4.3	*46.0*	5.7	*24.5*
Mexico				
Total	106.3	*100*	195.9	*100*
Foreign currency	74.6	*70*	153.2	*78.2*
Local currency	31.7	*30*	42.7	*21.8*
Peru				
Total	5.4	*100*	15.3	*100*
Foreign currency	3.6	*66.7*	12.8	*83.9*
Local currency	1.8	*33.3*	2.5	*16.1*

Source: Dealogic and IMF staff calculation.

Table 2: Evolution of Implied CDS and Selected Firm Fundamentals in Latin America and Canada

	ARGENTINA						BRAZIL						CHILE						COLOMBIA					
	2010Q1		2011Q3		2015Q3		2010Q1		2011Q3		2015Q3		2010Q1		2011Q3		2015Q3		2010Q1		2011Q3		2015Q3	
	Obs	Median	Obs	Median	Obs	Median	Obs	Median	Obs	Median	Obs	Median	Obs	Median	Obs	Median	Obs	Median	Obs	Median	Obs	Median	Obs	Median
Implied CDS (basis points)	45	91.0	46	171.0	52	285.0	177	97.0	190	185.5	196	343.0	91	79.0	96	153.5	108	135.5	9	70.0	13	143.0	24	207.0
Debt to Equity (percent)	69	28.0	71	35.0	47	54.4	246	58.2	283	57.6	214	76.7	136	42.3	143	46.1	144	53.3	36	16.7	34	18.1	12	70.2
Debt to Asset (percent)	70	15.2	71	18.0	49	21.4	277	26.3	312	27.5	236	33.0	136	22.8	144	25.2	147	27.2	36	10.9	34	11.3	12	32.2
Net Debt to Equity (percent)	69	13.5	71	24.1	47	25.6	239	37.4	278	38.3	214	52.4	133	30.7	141	35.3	143	41.6	36	5.2	34	10.2	12	56.8
Net Debt to EBITDA (ratio)	56	0.6	55	0.9	42	1.0	168	1.4	195	1.5	182	2.5	78	2.0	102	1.8	128	2.2	3	0.1	10	2.4	6	3.0
Return on Asset (percent, 12-month roll.)	67	4.7	71	5.0	49	5.9	256	4.7	270	3.5	250	1.8	136	3.8	133	4.6	149	2.9	21	3.7	31	3.1	17	2.9
Return on Equity (percent, 12-month roll.)	66	8.5	71	10.2	42	14.7	207	14.4	234	10.4	215	7.6	132	9.9	129	9.6	139	7.1	21	5.7	31	5.3	11	5.8
Cash to Current Liabilities (ratio)	71	0.3	72	0.2	51	0.2	277	0.4	309	0.4	258	0.4	140	0.3	145	0.2	150	0.2	36	0.3	35	0.4	18	0.3
EBITDA to Interest Rate (ratio)	62	4.3	62	5.3	41	3.2	227	4.5	237	3.6	197	2.3	116	9.1	123	6.9	141	7.1	14	2.8	19	4.1	6	1.9
Price to Book Ratio (ratio)	56	1.0	61	1.4	53	2.4	195	1.9	215	1.4	197	1.0	131	1.3	133	1.5	133	0.9	15	1.5	14	1.8	29	1.0

	MEXICO						PANAMA						PERU						CANADA					
	2010Q1		2011Q3		2015Q3		2010Q1		2011Q3		2015Q3		2010Q1		2011Q3		2015Q3		2010Q1		2011Q3		2015Q3	
	Obs	Median	Obs	Median	Obs	Median	Obs	Median	Obs	Median	Obs	Median	Obs	Median	Obs	Median	Obs	Median	Obs	Median	Obs	Median	Obs	Median
Implied CDS (basis points)	68	87.5	71	151.0	80	122.0	4	116.5	6	157.0	9	148.0	57	82.0	55	166.0	43	207.0	769	174.0	889	287.0	1084	411.0
Debt to Equity (percent)	87	40.9	93	45.8	94	53.6	8	57.7	13	81.4	2	129.0	116	26.7	113	20.4	94	35.5	1105	1.3	1169	2.0	843	19.1
Debt to Asset (percent)	90	22.8	94	23.2	96	27.2	8	26.8	13	36.6	2	40.3	117	13.8	114	14.3	94	20.3	1159	1.7	1205	2.0	878	12.8
Net Debt to Equity (percent)	86	27.8	93	33.0	94	38.9	8	42.5	13	48.5	2	94.3	116	14.1	113	10.1	94	22.8	1087	-6.5	1157	-6.8	839	7.8
Net Debt to EBITDA (ratio)	78	1.2	83	1.3	91	1.7	3	2.0	7	2.1	2	3.5	82	0.7	59	0.3	67	1.5	446	1.2	517	1.2	476	1.8
Return on Asset (percent, 12-month roll.)	83	4.1	88	4.4	95	2.6	3	10.0	8	6.9	2	4.3	102	6.3	111	8.7	99	2.5	1038	-4.9	1132	-4.0	1132	-5.2
Return on Equity (percent, 12-month roll.)	82	8.7	84	8.7	91	6.7	3	13.1	8	16.3	2	12.3	101	13.9	109	14.7	93	4.2	946	-5.8	1056	-4.7	818	-5.7
Cash to Current Liabilities (ratio)	89	0.4	94	0.4	97	0.3	6	0.5	11	0.2	2	0.5	118	0.3	116	0.2	99	0.2	1158	0.8	1211	0.9	1151	0.4
EBITDA to Interest Rate (ratio)	86	6.1	88	6.9	92	7.1	7	2.6	12	6.3	2	6.7	105	10.5	79	14.1	69	7.4	721	1.7	728	3.8	451	2.2
Price to Book Ratio (ratio)	79	1.5	80	1.5	90	1.9	8	1.7	9	2.1	14	1.7	72	1.3	73	1.3	66	0.8	1048	1.6	1151	1.6	1147	0.9

Source: Bloomberg and IMF staff calculations.

Table 3: Sectoral Composition of Bond Issuance in LA5 Countries

Non-Financial Corporates: Bond Debt
2015 Breakdown

	2015	
	USD billion	*Share*
LA5	504.9	*100*
Energy	168.7	*33*
Materials	103.7	*21*
Consumer	76.7	*15*
Utilities	42.8	*8*
Industrials	41.1	*8*
Other non-financial	71.9	*14*
LA5	504.9	*100*
Selected quasi-sovereigns	157.7	*31.2*
Petrobras (BRA)	52.8	*10.5*
Eletrobras (BRA)	2.8	*0.5*
PEMEX (MEX)	70.3	*13.9*
Comision Fed Elec (MEX)	10.6	*2.1*
ECOPETROL (COL)	9.9	*2.0*
CODELCO (CHL)	11.3	*2.2*

Source: Dealogic, Bloomberg and IMF staff calculation.
Sectoral shares and company-specific data from
Bloomberg.

Table 4: First Principal Components of Firm-Specific Fundamentals

Component	weights
Profitability	
Return on assets (ROA)	0.7071
Return on equity (ROE)	0.7071
Cummulative variation (%): 95.7	
Capitalization	
Reported capital-to-total assets ratio	0.7071
Retained earnings-to-total assets ratio	0.7071
Cummulative variation (%): 84.9	
Leverage	
Reported 'leverage' (debt-to-equity) ratio (log)	0.5801
Debt-to-equity ratio (log)	0.5800
Debt-to-assets ratio (log)	0.5718
Cummulative variation (%): 98.1	
Liquidity	
Current assets-to-current liabilities ratio (log)	0.3906
Rurrent assets-to-total liabilities ratio (log)	0.3797
Reported cash ratio (log)	0.4262
Cash-to-total assets ratio (Log)	0.3754
Cash-to-current liabilities ratio (log)	0.4342
Cash-to-total liabilities ratio (log)	0.4383
Cummulative variation (%): 80.7	

Source: Bloomberg and IMF staff calculations.

Table 5: Descriptive Statistics of Variables included in Core Estimation Model

Latin American Countries:

Variables	(1) Median	(2) Mean	(3) s.d.	(4) Min	(5) Max
Dependent variable:					
Implied CDS spreads (log)	4.820	4.812	0.801	1.946	8.115
Firm-specific fundamentals:					
Profitability, principal component	0.619	0.620	0.659	-4.717	3.414
Capitalization, principal component	0.124	0.132	0.301	-1.300	1.075
Leverage, principal component	0.684	0.419	1.323	-7.566	3.297
Liquidity, principal component	-0.498	-0.581	1.213	-7.588	3.454
Size (percent of country's GDP)	0.126	0.617	1.694	1.5E-05	21.930
Firm-specific market variables:					
Share price	21.820	1198.0	24233.0	0.017	1.8E+06
Share price volatility	30.830	34.490	19.990	0.000	186.300
Price-to-book ratio	1.624	2.237	2.261	0.096	22.220
Country-specific variables					
CPI inflation (year over year)	4.634	5.179	3.070	-1.934	24.180
Sovereign CDS (log)	4.817	4.921	0.959	2.614	9.332
Exchange rate change (year over year)	2.162	4.387	14.840	-23.670	55.730
Global conditions					
Commodity terms-of-trade index (log)	0.004	0.003	0.019	-0.111	0.062
VIX (log)	2.908	2.936	0.349	2.400	4.066
Number of Observations	11,237	11,237	11,237	11,237	11,237
Number of Firms	515	515	515	515	515

Canada:

Variables	(1) Median	(2) Mean	(3) s.d.	(4) Min	(5) Max
Dependent variable:					
Implied CDS spreads (log)	5.004	5.072	0.995	0.693	8.726
Firm-specific fundamentals:					
Profitability, principal component	0.362	0.002	1.338	-9.735	2.735
Capitalization, principal component	0.168	0.107	0.499	-8.344	1.047
Leverage, principal component	0.122	-0.313	1.799	-6.934	3.104
Liquidity, principal component	-0.314	-0.336	1.790	-6.592	6.377
Size (percent of country's GDP)	0.025	0.162	0.418	5.4E-05	4.458
Firm-specific market variables:					
Share price	7.019	24.1	161.0	0.017	4.7E+03
Share price volatility	44.690	56.500	40.570	12.980	306.100
Price-to-book ratio	1.621	2.277	2.622	0.046	33.150
Country-specific variables					
CPI inflation (year over year)	1.786	1.699	0.829	-0.864	3.427
Sovereign CDS (log)	3.393	3.082	1.000	1.012	4.611
Exchange rate change (year over year)	1.065	1.105	9.616	-16.470	23.990
Global conditions					
Commodity terms-of-trade index (log)	0.002	0.001	0.008	-0.021	0.011
VIX (log)	2.857	2.918	0.345	2.400	4.066
Number of Observations	13,561	13,561	13,561	13,561	13,561
Number of Firms	822	822	822	822	822

Source: Bloomberg and IMF staff calculations.

Note: Latin American Countries include Argentina, Brazil, Chile, Colombia, Mexico, Panama, and Peru.

Table 6: Unconditional Cross-Correlations of Variables included in the Estimation Model

		Implied CDS spreads (log)	Actual CDS spreads (log)	Profitability, principal component	Capitalization, principal component	Leverage, principal component	Liquidity, principal component	Size (percent of country's GDP)	Share price	Share price volatility	Price-to-book ratio	CPI inflation (yoy)	Sovereign CDS spread (log)	Exchange rate change (yoy)	Commodity terms-of-trade index (log)	VIX (log)
		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)
Implied CDS spreads (log)	(A)	1														
Actual CDS spreads (log)	(B)	0.713 ***	1													
Profitability, principal component	(C)	-0.440 ***	-0.263 ***	1												
Capitalization, principal component	(D)	-0.294 ***	-0.325 ***	0.352 ***	1											
Leverage, principal component	(E)	0.102 ***	0.284 ***	0.030 ***	-0.406 ***	1										
Liquidity, principal component	(F)	-0.017 ***	0.090 ***	-0.224 ***	0.234 ***	-0.381 ***	1									
Size (percent of country's GDP)	(G)	-0.086 ***	0.070 **	0.095 ***	0.005	0.086 ***	-0.087 ***	1								
Share price	(H)	-0.009 *	-0.049 *	-0.007 *	0.020 ***	-0.040 ***	-0.005	-0.005	1							
Share price volatility	(I)	0.618 ***	0.479 ***	-0.480 ***	-0.165 ***	-0.168 ***	0.223 ***	-0.136 ***	-0.038 ***	1						
Price-to-book ratio	(J)	-0.125 ***	-0.146 ***	-0.148 ***	-0.264 ***	0.008 *	0.159 ***	-0.017 ***	0.000	0.012 **	1					
CPI inflation (y-o-y)	(K)	-0.082 ***	-0.030 *	0.212 ***	-0.045 ***	0.096 ***	-0.227 ***	0.051 ***	0.002	-0.187 ***	-0.034 ***	1				
Sovereign CDS (log)	(L)	0.100 ***	0.025	0.187 ***	-0.022 ***	0.093 ***	-0.242 ***	0.077 ***	0.010 **	-0.183 ***	-0.132 ***	0.648 ***	1			
Exchange rate change (y-o-y)	(M)	0.281 ***	0.218 ***	-0.008 *	-0.021 ***	0.057 ***	-0.058 ***	0.007 *	0.001	0.058 ***	-0.111 ***	0.199 ***	0.295 ***	1		
Commodity terms-of-trade index (l	(N)	-0.039 ***	0.125 ***	0.025 ***	0.015 ***	0.002	0.035 ***	-0.007 *	0.006	-0.074 ***	0.025 ***	-0.017 ***	0.008 **	-0.124 ***	1	
VIX (log)	(O)	0.187 ***	0.351 ***	-0.028 ***	-0.008 *	0.000	-0.011 **	-0.003	-0.002	0.159 ***	-0.062 ***	0.092 ***	0.242 ***	0.209 ***	-0.069 ***	1

Source: Bloomberg, Haver, International Financial Statistics, and IMF staff calculations.

Notes: *** denotes statistical significance at the 0.1 percent level; ** denotes statistical significance at the 1 percent level; and * denotes statistical significance at the 10 percent level.

Table 7: Core Model – Estimation Results

Variables	Core Model			Excluding Block #2		
	LAC + CAN (1)	LAC (2)	LA5 (3)	LAC + CAN (4)	LAC (5)	LA5 (6)
Block 1: Firm-specific fundamentals:						
Profitability, principal component	-0.100***	-0.080***	-0.080***	-0.130***	-0.134***	-0.129***
	(0.006)	(0.006)	(0.007)	(0.001)	(0.008)	(0.010)
Capitalization, principal component	-0.089*	-0.370***	-0.366***	-0.165***	-0.310***	-0.353***
	(0.042)	(0.023)	(0.031)	(0.025)	(0.031)	(0.044)
Leverage, principal component	0.112***	0.076***	0.080***	0.093***	0.081***	0.071**
	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.02)
Liquidity, principal component	-0.029***	-0.030**	-0.025*	-0.055***	-0.035**	-0.029*
	(0.004)	(0.012)	(0.011)	(0.009)	(0.013)	(0.011)
Size (percent of country's GDP)	0.021	0.005	0.006	0.019	0.007	0.007
	(0.011)	(0.006)	(0.006)	(0.010)	(0.005)	(0.005)
Block 2: Firm-specific market variables:						
Share price	-3.60e-06	-4.80e-06	-4.65e-06			
	(0.000)	(0.000)	(0.000)			
Share price volatility	0.008***	0.007***	0.007***			
	(0.000)	(0.001)	(0.001)			
Price-to-book ratio	-0.050***	-0.050***	-0.047***			
	(0.001)	(0.003)	(0.003)			
Block 3: Domestic variables:						
CPI inflation (year over year)	0.023**	0.012	0.031**	0.014*	0.010	0.039**
	(0.008)	(0.009)	(0.007)	(0.007)	(0.014)	(0.009)
Sovereign CDS (log)	0.008	0.115***	0.199***	0.0187	0.154***	0.253***
	(0.043)	(0.029)	(0.043)	(0.055)	(0.029)	(0.036)
Exchange rate change (year over year)	0.005***	0.004**	0.004**	0.009***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Block 4: Global variables:						
Commodity terms-of-trade index (log)	-1.568*	-1.726***	-0.877*	-1.587**	-1.938**	-0.636
	(0.743)	(0.407)	(0.343)	(0.618)	(0.664)	(0.381)
VIX (log)	0.366***	0.378***	0.299***	0.552***	0.461***	0.351***
	(0.022)	(0.051)	(0.056)	(0.059)	(0.059)	(0.0444)
Dummy variables:						
Dummy "crisis" (LAC)	0.983***	0.881***	0.853***	0.890***	0.837***	0.811***
	(0.056)	(0.024)	(0.042)	(0.034)	(0.031)	(0.049)
Dummy "crisis" (CAN)	0.285**			0.309**		
	(0.104)			(0.097)		
Dummy "recent" (LAC)	1.381***	1.290***	1.219***	1.326***	1.253***	1.174***
	(0.075)	(0.043)	(0.041)	(0.051)	(0.038)	(0.036)
Dummy "recent" (CAN)	0.463***			0.412***		
	(0.105)			(0.107)		
Constant	2.886***	2.029***	1.854***	2.706***	1.803***	1.622***
	(0.093)	(0.066)	(0.089)	(0.073)	(0.084)	(0.150)
Number of Observations	24,798	11,237	10,128	30,972	14,396	12,806
R-squared	0.668	0.819	0.822	0.580	0.771	0.777
Number of Firms	1,337	515	454	1,522	593	524

Note: Robust standard errors in parentheses - *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Source: IMF staff calculations.

Notes: CAN = Canada. LAC includes Argentina, Brazil, Chile, Colombia, Mexico, Panama, and Peru. LA5 includes Brazil, Chile, Colombia, Mexico, and Peru.

Table 8: Robustness of Estimation Results

Variables	Excluding Blocks #3 and #4			Excluding Blocks #1 and #2			With Time Effects		
	LAC + CAN (1)	LAC (2)	LA5 (3)	LAC + CAN (4)	LAC (5)	LA5 (6)	LAC + CAN (7)	LAC (8)	LA5 (9)
Block 1: Firm-specific fundamentals:									
Profitability, principal component	-0.095***	-0.070***	-0.066***				-0.116***	-0.0783***	-0.0764***
	(0.007)	(0.010)	(0.012)				(0.00109)	(0.00479)	(0.00503)
Capitalization, principal component	-0.065	-0.398***	-0.384***				-0.0736*	-0.395***	-0.381***
	(0.043)	(0.040)	(0.045)				(0.0370)	(0.0581)	(0.0686)
Leverage, principal component	0.115***	0.078***	0.083***				0.118***	0.0737***	0.0788**
	(0.01)	(0.01)	(0.02)				(0.00788)	(0.0139)	(0.0172)
Liquidity, principal component	-0.028***	-0.033**	-0.032*				-0.00918	-0.0273**	-0.0248*
	(0.005)	(0.013)	(0.015)				(0.00864)	(0.00882)	(0.00909)
Size (percent of country's GDP)	0.025**	0.009	0.009				0.0346*	0.00739	0.00764
	(0.009)	(0.007)	(0.007)				(0.0161)	(0.00676)	(0.00699)
Block 2: Firm-specific market variables:									
Share price	-155e-05***	-143e-05***	-136e-05***				1.73e-06	-7.79e-06*	-6.84e-06
	(0.000)	(0.000)	(0.000)				(5.37e-06)	(3.59e-06)	(3.66e-06)
Share price volatility	0.010***	0.012***	0.012***				0.00733***	0.00782***	0.00789***
	(0.000)	(0.000)	(0.000)				(0.000363)	(0.000337)	(0.000396)
Price-to-book ratio	-0.055***	-0.066***	-0.067***				-0.0446***	-0.0470***	-0.0503***
	(0.003)	(0.004)	(0.004)				(0.00379)	(0.00500)	(0.00389)
Block 3: Domestic variables:									
CPI inflation (year over year)				0.004	0.0105	0.0416***			
				(0.010)	(0.014)	(0.009)			
Sovereign CDS (log)				-0.0372	0.173***	0.278***			
				(0.062)	(0.031)	(0.034)			
Exchange rate change (year over year)				0.0122***	0.00765***	0.00721***			
				(0.001)	(0.001)	(0.001)			
Block 4: Global variables:									
Commodity terms-of-trade index (log)				-3.423**	-2.195*	-0.754			
				(1.154)	(1.041)	(0.634)			
VIX (log)				0.474***	0.399***	0.284***			
				(0.038)	(0.064)	(0.018)			
Dummy variables:									
Dummy "crisis" (LAC)	1.232***	1.216***	1.223***	1.003***	0.893***	0.869***			
	(0.036)	(0.036)	(0.041)	(0.038)	(0.036)	(0.049)			
Dummy "crisis" (CAN)	0.495***			0.444***					
	(0.010)			(0.116)					
Dummy "recent" (LAC)	1.519***	1.506***	1.500***	1.441***	1.324***	1.245***			
	(0.041)	(0.038)	(0.043)	(0.053)	(0.044)	(0.042)			
Dummy "recent" (CAN)	0.556***			0.569***					
	(0.00791)			(0.121)					
Constant	3.845***	3.438***	3.431***	3.845***	3.438***	3.431***	4.186***	3.596***	3.589***
	(0.014)	(0.035)	(0.038)	(0.014)	(0.035)	(0.038)	(0.0234)	(0.0388)	(0.0473)
Number of Observations	24,799	11,238	10,128	24799	11238	10128	24,799	11,238	10,128
R-squared	0.627	0.758	0.753	0.627	0.758	0.753	0.632	0.858	0.855
Number of Firms	1,337	515	454	1337	515	454	1,337	515	454
Time Effects	No	No	No	No	No	No	Yes	Yes	Yes

Note: Robust standard errors in parentheses - *** p<0.01, ** p<0.05, * p<0.1.

Source: IMF staff calculations.

Notes: CAN = Canada. LAC includes Argentina, Brazil, Chile, Colombia, Mexico, Panama, and Peru. LA5 includes Brazil, Chile, Colombia, Mexico, and Peru.

Table 9: Impact of Domestic and Global Macroeconomic Factors - Estimation Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(8)	(9)	(8)	(9)	(10)	(11)
Variables	Core	CPI inflation		Sovereign CDS		Exchange rate		Commodity terms-of-trade		Copper price		Oil price		VIX	
Block 1: Firm-specific fundamentals:															
Profitability, principal component	-0.080***	-0.076***		-0.075***		-0.058***		-0.063***		-0.0568***		-0.0657***		-0.088***	
	(0.006)	(0.009)		(0.009)		(0.009)		(0.010)		(0.012)		(0.009)		(0.008)	
Capitalization, principal component	-0.367***	-0.369***		-0.313***		-0.339***		-0.410***		-0.363***		-0.380***		-0.452***	
	(0.023)	(0.032)		(0.019)		(0.025)		(0.046)		(0.047)		(0.045)		(0.043)	
Leverage, principal component	0.076***	0.077***		0.083***		0.076***		0.076***		0.0767***		0.0780***		0.074***	
	(0.012)	(0.013)		(0.014)		(0.008)		(0.014)		(0.013)		(0.013)		(0.015)	
Liquidity, principal component	-0.030**	-0.032**		-0.036*		-0.036**		-0.029*		-0.0354*		-0.0356**		-0.029**	
	(0.012)	(0.011)		(0.018)		(0.014)		(0.012)		(0.015)		(0.013)		(0.011)	
Size (percent of country's GDP)	0.005	0.015*		0.010		0.008		-0.001		0.0051		0.00748		0.007	
	(0.006)	(0.007)		(0.007)		(0.007)		(0.007)		(0.007)		(0.007)		(0.007)	
Block 2: Firm-specific market variables:															
Share price	-4.80e-06	-9.05e-06***		-1.40e-05**		-9.42e-06***		-7.00e-06		-9.36e-06***		-1.31e-05***		-1.05e-05*	
	(0.000)	(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)	
Share price volatility	0.007***	0.011***		0.009***		0.010***		0.011***		0.00972***		0.013***		0.009***	
	(0.001)	(0.000)		(0.000)		(0.000)		(0.000)		(0.001)		(0.001)		(0.000)	
Price-to-book ratio	-0.050***	-0.065***		-0.058***		-0.052***		-0.060***		-0.0512***		-0.0617***		-0.061***	
	(0.003)	(0.004)		(0.005)		(0.002)		(0.005)		(0.005)		(0.005)		(0.005)	
Block 3: Domestic variables:															
CPI inflation (yoy)	0.012	0.036*	0.054*												
	(0.009)	(0.015)	(0.025)												
Sovereign CDS (log)	0.115***			0.274**	0.386**										
	(0.029)			(0.087)	(0.110)										
Exchange rate change (yoy)	0.004**					0.009***	0.014***								
	(0.001)					(0.001)	(0.001)								
Block 4: Global variables:															
Commodity terms-of-trade index (log)	-1.726***							-5.381***	-8.075***						
	(0.407)							(0.413)	(2.048)						
Copper price (log)										-0.539***	-0.890***				
										(0.0561)	(0.109)				
Oil price (log)												-0.141*	-0.417**		
												(0.0671)	(0.116)		
VIX (log)	0.378***													0.501***	0.632***
	(0.051)													(0.0293)	(0.0302)
Dummy variables:															
dummy for period 2008Q1-2010Q4	0.881***	1.202***	1.292***	0.978***	1.004***	1.184***	1.248***	1.227***	1.344***	1.210***	1.289***	1.238***	1.375***	0.927***	0.938***
	(0.024)	(0.046)	(0.050)	(0.089)	(0.090)	(0.041)	(0.037)	(0.016)	(0.052)	(0.0365)	(0.0353)	(0.0301)	(0.0257)	(0.023)	(0.029)
dummy for period post-2011Q1	1.290***	1.461***	1.543***	1.264***	1.308***	1.397***	1.427***	1.559***	1.704***	1.573***	1.715***	1.563***	1.767***	1.423***	1.523***
	(0.043)	(0.050)	(0.064)	(0.096)	(0.110)	(0.046)	(0.046)	(0.042)	(0.085)	(0.0421)	(0.0604)	(0.0466)	(0.0833)	(0.039)	(0.062)
Constant	2.029***	3.298***	3.392***	2.354***	1.958**	3.480***	3.694***	3.436***	3.596***	3.455***	3.636***	3.407***	3.554***	2.208***	1.933***
	(0.066)	(0.087)	(0.101)	(0.374)	(0.535)	(0.055)	(0.031)	(0.029)	(0.055)	(0.0516)	(0.0311)	(0.0351)	(0.0424)	(0.086)	(0.060)
Observations	11,237	11,238	17,893	11,237	17,884	11,238	17,893	11,238	17,893	11,238	17,893	11,238	17,893	11,238	17,893
R-squared	0.819	0.769	0.637	0.787	0.678	0.785	0.677	0.779	0.651	0.781	0.680	0.760	0.636	0.792	0.669
Number of Code2	515	515	654	515	654	515	654	515	654	515	654	515	654	515	654

Note: Robust standard errors in parentheses - *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Source: IMF staff calculations.

Note: these estimation results are for the sample of Latin American firms.

Table 10: Impact of *Additional* Domestic and Global Macroeconomic Factors - Estimation Results

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Country's real GDP growth			G7 real GDP growth			S&P-500		
Block 1: Firm-specific fundamentals:									
Profitability, principal component	-0.0802***	-0.0576***		-0.0805***	-0.0610***		-0.0813***	-0.0788***	
	(0.00604)	(0.00970)		(0.00626)	(0.0106)		(0.00541)	(0.00828)	
Capitalization, principal component	-0.367***	-0.370***		-0.364***	-0.422***		-0.367***	-0.422***	
	(0.0226)	(0.0396)		(0.0214)	(0.0448)		(0.0231)	(0.0457)	
Leverage, principal component	0.0758***	0.0775***		0.0757***	0.0773***		0.0763***	0.0786***	
	(0.0119)	(0.0114)		(0.0117)	(0.0140)		(0.0121)	(0.0153)	
Liquidity, principal component	-0.0305**	-0.0339*		-0.0311**	-0.0271		-0.0305**	-0.0322**	
	(0.0123)	(0.0157)		(0.0125)	(0.0138)		(0.0120)	(0.0122)	
Size (percent of country's GDP)	0.00487	0.00962		0.00474	0.00752		0.00609	0.0101	
	(0.00542)	(0.00663)		(0.00540)	(0.00746)		(0.00508)	(0.00625)	
Block 2: Firm-specific market variables:									
Share price	-4.93e-06	-1.03e-05***		-4.92e-06	-1.14e-05***		-4.66e-06	-1.43e-05***	
	(3.62e-06)	(1.79e-06)		(3.40e-06)	(1.36e-06)		(3.41e-06)	(2.27e-06)	
Share price volatility	0.00691***	0.0105***		0.00694***	0.0103***		0.00702***	0.0113***	
	(0.000546)	(0.000489)		(0.000531)	(0.000305)		(0.000562)	(0.000301)	
Price-to-book ratio	-0.0506***	-0.0558***		-0.0503***	-0.0613***		-0.0500***	-0.0641***	
	(0.00346)	(0.00377)		(0.00331)	(0.00404)		(0.00341)	(0.00591)	
Block 3: Domestic variables:									
CPI inflation (yoy)	0.0116			0.0107			0.0152		
	(0.00854)			(0.00908)			(0.0114)		
Sovereign CDS (log)	0.118**			0.117***			0.113***		
	(0.0353)			(0.0271)			(0.0265)		
Exchange rate change (yoy)	0.00465**			0.00465**			0.00457***		
	(0.00129)			(0.00128)			(0.00110)		
Block 4: Global variables:									
Commodity terms-of-trade index (log)	-1.764***			-1.853***			-1.771***		
	(0.420)			(0.469)			(0.339)		
VIX (log)	0.376***			0.387***			0.313**		
	(0.0569)			(0.0503)			(0.0907)		
Block 5: Additional Domestic and Global variables:									
Real GDP growth (yoy)	0.00206	-0.0285***	-0.0508***						
	(0.00686)	(0.00510)	(0.00798)						
G7 real GDP growth (yoy)				0.00580	-0.0479***	-0.0822***			
				(0.00358)	(0.00192)	(0.00300)			
S&P-500 (log)							-0.165	-0.401***	-0.386*
							(0.129)	(0.0860)	(0.173)
Dummy variables:									
dummy for period 2008Q1-2010Q4	0.883***	1.173***	1.224***	0.889***	1.099***	1.105***	0.880***	1.121***	1.233***
	(0.0246)	(0.0312)	(0.0245)	(0.0273)	(0.0316)	(0.0324)	(0.0230)	(0.0254)	(0.0360)
dummy for period post-2011Q1	1.290***	1.440***	1.476***	1.292***	1.464***	1.547***	1.318***	1.557***	1.671***
	(0.0420)	(0.0456)	(0.0411)	(0.0426)	(0.0382)	(0.0573)	(0.0486)	(0.0414)	(0.0429)
Constant	2.014***	3.588***	3.914***	1.988***	3.587***	3.825***	2.196***	3.466***	3.635***
	(0.0952)	(0.0536)	(0.0351)	(0.0564)	(0.0340)	(0.0358)	(0.137)	(0.0273)	(0.0332)
Number of Observations	11,237	11,237	17,832	11,237	11,238	17,893	11,237	11,238	17,893
R-squared	0.819	0.772	0.658	0.819	0.771	0.652	0.820	0.767	0.623
Number of Firms	515	515	654	515	515	654	515	515	654

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Source: IMF staff calculations.

Note: these estimation results are for the sample of Latin American firms.

Table 11: Impact of Commodity Prices and Interaction with Economic Sectors

Variables	Core Model	Commodity Terms of Trade				Oil Prices				Copper Prices			
		No-interactions		Sectoral-interactions		No-interactions		Sectoral-interactions		No-interactions		Sectoral-interactions	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Block 1: Firm-specific fundamentals:													
Profitability, principal component	-0.080***	-0.063***		-0.064***		-0.066***		-0.066***		-0.057***		-0.056***	
	(0.006)	(0.010)		(0.010)		(0.009)		(0.009)		(0.012)		(0.011)	
Capitalization, principal component	-0.367***	-0.410***		-0.411***		-0.380***		-0.379***		-0.363***		-0.362***	
	(0.023)	(0.046)		(0.045)		(0.045)		(0.044)		(0.047)		(0.045)	
Leverage, principal component	0.076***	0.076***		0.075***		0.078***		0.078***		0.077***		0.077***	
	(0.012)	(0.014)		(0.014)		(0.013)		(0.013)		(0.012)		(0.012)	
Liquidity, principal component	-0.030**	-0.029*		-0.029*		-0.036**		-0.035**		-0.035*		-0.036**	
	(0.012)	(0.012)		(0.013)		(0.013)		(0.013)		(0.015)		(0.014)	
Size (percent of country's GDP)	0.005	-0.001		-0.001		0.007		0.007		0.005		0.005	
	(0.006)	(0.007)		(0.007)		(0.007)		(0.007)		(0.007)		(0.008)	
Block 2: Firm-specific market variables:													
Share price	-0.000	-0.000		-0.000		-0.000***		-0.000***		-0.000***		-0.000***	
	(0.000)	(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)	
Share price volatility	0.007***	0.011***		0.011***		0.011***		0.011***		0.010***		0.010***	
	(0.001)	(0.000)		(0.000)		(0.001)		(0.001)		(0.001)		(0.001)	
Price-to-book ratio	-0.050***	-0.059***		-0.060***		-0.062***		-0.062***		-0.051***		-0.052***	
	(0.003)	(0.005)		(0.005)		(0.005)		(0.005)		(0.005)		(0.005)	
Block 3: Domestic variables:													
CPI inflation (year over year)	0.012												
	(0.009)												
Sovereign CDS (log)	0.115***												
	(0.029)												
Exchange rate change (year over year)	0.004**												
	(0.001)												
Block 4: Global variables:													
VIX (log)	0.378***												
	(0.051)												
Commodity-related variable (log)	-1.725***	-5.381***	-8.075***			-0.141*	-0.417**			-0.539***	-0.890***		
	(0.407)	(0.413)	(2.048)			(0.067)	(0.116)			(0.056)	(0.109)		
Interaction of sector and commodity-related variable:													
Consumer discretionary				-5.303***	-8.733***			-0.133*	-0.327**			-0.573***	-0.894***
				(0.233)	(2.016)			(0.058)	(0.118)			(0.056)	(0.098)
Consumer staples				-5.174***	-8.094***			-0.062	-0.376**			-0.461***	-0.779***
				(0.287)	(1.815)			(0.084)	(0.151)			(0.060)	(0.114)
Energy				-4.965**	-10.861*			-0.159	-0.560**			-0.590***	-1.178***
				(1.660)	(3.940)			(0.127)	(0.197)			(0.115)	(0.180)
Health				-5.718***	-7.110***			-0.240	-0.443***			-0.639***	-0.913***
				(0.717)	(1.082)			(0.144)	(0.077)			(0.109)	(0.108)
Industrials				-5.513***	-8.040**			-0.158	-0.458**			-0.562***	-0.913***
				(0.844)	(2.576)			(0.132)	(0.167)			(0.103)	(0.143)
Information Technology (IT)				-4.117	-6.498***			0.121	-0.373***			-0.166	-1.006***
				(2.562)	(1.443)			(0.096)	(0.092)			(0.200)	(0.151)
Materials				-5.148***	-8.557***			-0.144**	-0.481***			-0.526***	-0.995***
				(0.540)	(2.119)			(0.055)	(0.091)			(0.060)	(0.089)
Telecommunications				-4.573***	-7.672**			-0.190***	-0.490***			-0.467***	-0.855***
				(0.649)	(2.163)			(0.025)	(0.095)			(0.012)	(0.062)
Utilities				-5.824***	-7.225***			-0.226***	-0.428***			-0.598***	-0.812***
				(0.555)	(2.100)			(0.036)	(0.103)			(0.033)	(0.109)
Dummy variables:													
dummy for period 2008Q1-2010Q4	0.881***	1.227***	1.344***	1.228***	1.345***	1.238***	1.375***	1.239***	1.376***	1.210***	1.289***	1.210***	1.289***
	(0.024)	(0.016)	(0.052)	(0.016)	(0.052)	(0.030)	(0.026)	(0.030)	(0.026)	(0.036)	(0.035)	(0.037)	(0.035)
dummy for period post-2011Q1	1.290***	1.559***	1.704***	1.559***	1.704***	1.563***	1.767***	1.563***	1.768***	1.573***	1.715***	1.571***	1.714***
	(0.043)	(0.042)	(0.085)	(0.042)	(0.086)	(0.047)	(0.083)	(0.047)	(0.084)	(0.042)	(0.060)	(0.042)	(0.061)
Constant	2.029***	3.436***	3.596***	3.437***	3.596***	3.407***	3.554***	3.408***	3.553***	3.455***	3.636***	3.456***	3.636***
	(0.066)	(0.028)	(0.055)	(0.028)	(0.055)	(0.035)	(0.042)	(0.035)	(0.043)	(0.052)	(0.031)	(0.051)	(0.031)
Number of Observations	11,236	11,237	17,893	11,237	17,893	11,237	17,893	11,237	17,893	11,237	17,893	11,237	17,893
R-squared	0.819	0.779	0.651	0.778	0.650	0.760	0.636	0.761	0.637	0.780	0.680	0.780	0.681
Number of Firms	515	515	654	515	654	515	654	515	654	515	654	515	654

Note: Robust standard errors in parentheses - *** p<0.01, ** p<0.05, * p<0.1

Source: IMF staff calculations. Note: these estimation results are for the sample of Latin American firms.

Table 12: Actual Vs. Implied CDS Spreads - Impact of Firm-Specific Market-Based Variables

	Implied CDS Spreads Bloc #2, incl. Dummy Variables			*Actual CDS Spreads* Bloc #2, incl. Dummy Variables			*Implied CDS Spreads* Bloc #2, excl. Dummy Variables			*Actual CDS Spreads* Bloc #2, excl. Dummy Variables		
	LAC + CAN	LAC	LA5	LAC + CAN	LAC	LA5	LAC + CAN	LAC	LA5	LAC + CAN	LAC	LA5
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Block 2: Firm-specific market variables:												
Share price	-3.11e-07***	-3.05e-07***	-3.01e-07***	-0.00322**	-0.00264*	-0.00264*	-2.02e-07***	-1.87e-07***	-1.81e-07***	-0.000978	-0.000526	-0.000526
	(2.03e-08)	(1.93e-08)	(1.93e-08)	(0.000743)	(0.000849)	(0.000849)	(1.68e-08)	(1.38e-08)	(1.20e-08)	(0.00118)	(0.00171)	(0.00171)
Share price volatility	0.0111***	0.0122***	0.0122***	0.0115***	0.00884**	0.00884**	0.0111***	0.0112***	0.0101***	0.0133***	0.00896*	0.00896*
	(0.000205)	(0.000477)	(0.000543)	(0.000647)	(0.00187)	(0.00187)	(0.000207)	(0.00148)	(0.00100)	(0.00126)	(0.00322)	(0.00322)
Price-to-book ratio	-0.0343***	-0.0573***	-0.0618***	-0.0373*	-0.0904**	-0.0904**	-0.0534***	-0.0958***	-0.12***	-0.0824**	-0.177***	-0.177***
	(0.00452)	(0.00514)	(0.00212)	(0.0151)	(0.0265)	(0.0265)	(0.00910)	(0.0228)	(0.0147)	(0.0275)	(0.0175)	(0.0175)
Dummy variables:												
Dummy "crisis" (LAC)	1.270***	1.258***	1.262***	1.062***	1.076***	1.076***						
	(0.0224)	(0.0221)	(0.0247)	(0.164)	(0.139)	(0.139)						
Dummy "crisis" (CAN)	0.457***			0.858***								
	(0.00791)			(0.00805)								
Dummy "recent" (LAC)	1.593***	1.587***	1.578***	1.311***	1.239***	1.239***						
	(0.0369)	(0.0357)	(0.0413)	(0.121)	(0.128)	(0.128)						
Dummy "recent" (CAN)	0.604***			0.937***								
	(0.00632)			(0.00884)								
Constant	3.766***	3.274***	3.288***	3.720***	3.872***	3.872***	4.529***	4.609***	4.688***	4.436***	4.959***	4.959***
	(0.00817)	(0.0277)	(0.0310)	(0.0754)	(0.188)	(0.188)	(0.0298)	(0.103)	(0.0643)	(0.129)	(0.199)	(0.199)
Number of Observations	37,544	12,957	11,590	1,076	329	329	37,544	12,957	11,590	1,076	329	329
R-squared	0.509	0.721	0.718	0.583	0.611	0.611	0.218	0.108	0.112	0.208	0.173	0.173
Number of Firms	1,613	552	486	39	11	11	1,613	552	486	39	11	11

Note: Robust standard errors in parentheses - *** p<0.01, ** p<0.05, * p<0.1.

Source: IMF staff calculations.

Notes: CAN = Canada. LAC includes Argentina, Brazil, Chile, Colombia, Mexico, Panama, and Peru. LA5 includes Brazil, Chile, Colombia, Mexico, and Peru.

References

Avramov, D., Jostova, G., and Philipov, A., 2007, "Understanding Changes in Corporate Credit Spreads," *Financial Analysts Journal*, Vol. 63, No. 2, pp. 90-105.

Aymanns, C., Caceres, C., Daniel, C., and Schumacher, L., 2016, "Bank Solvency and Funding Cost," IMF Working Paper WP/16/64, (Washington: International Monetary Fund).

Cavallo, E., and Valenzuela, P., 2007, "The Determinants of Corporate Risk in Emerging Markets: An Option-Adjusted Spread Analysis," IMF Working Paper WP/07/228, (Washington: International Monetary Fund).

Das, S.R., Hanouna, P., and Sarin, A., 2009, "Accounting-based versus market-based cross-sectional models of CDS spreads," *Journal of Banking and Finance*, No. 33, pp. 719-730.

Doshi, H., Jacobs, K., Ericsson, J., and Turnbull, S.M., 2013, "Pricing Credit Default Swaps with Observable Covariates," *Review of Financial Studies*, doi:10.1093/rfs/hht015.

Duffie, D., and Singleton, K., 1999, "Modeling Term Structures of Defaultable Bonds," *Review of Financial Studies*, Vol. 12, No. 4, pp. 687-720.

Elton, E.J., Gruber, M.J., Agarwal, D., and Mann, C., 2001, "Explaining the Rate Spread on Corporate Bonds," *Journal of Finance*, Vol. 56, No. 1, pp. 247-277.

Fama, E., and French, K., 1993, "Common Risk Factors in the Returns on Stocks and Bonds," *Journal of Financial Economics*, Vol. 33, No.1, pp. 3-57.

Gruss, B., 2014, "After the Boom–Commodity Prices and Economic Growth in Latin America and the Caribbean," IMF Working Paper WP/14/154, (Washington: International Monetary Fund).

Longstaff, F.A, and Schwartz, E.S., 1995, "A Simple Approach to Valuing Risky Fixed and Floating Rate Debt," *Journal of Finance*, Vol. 50, No. 3, pp. 789-819.

Merton, R., 1974, "On the Pricing of Corporate Debt: The Risk Structure of Interest Rates," *Journal of Finance*, Vol. 29, No. 2, pp. 449-470.

Nelson, R., and Siegel, F., 1987, "Parsimonious Modeling of Yield Curves," *Journal of Business*, Vol. 60, No. 4, pp. 473-489.

Tang, D.Y, and Yan, H., 2013, "What Moves CDS Spreads?" Mimeo (June 21, 2013).

Warga, A., 1998, Fixed income database, University of Houston, Houston, Texas.