Abstracts / Résumés

Emerging Market Risk Premia Fluctuations: A micro founded decomposition

Paula Margaretic

This paper aims at deepening our understanding of emerging market (EM) sovereign bond spread fluctuations. I first build a noisy rational expectation model, with imperfect information, in which some informed investors receive a noisy private signal about the emerging country's ability and willingness to repay its sovereign debt. I show that, in equilibrium, sovereign bond prices and spreads depend on country characteristics, international capital flows and more surprisingly, on how dispersed information about the EM sovereign bond market is. I then empirically test the relevance of this equilibrium relation, using a monthly Panel data for 11 EMs over 2000-2012. Interestingly, the empirical investigation provides strong evidence in favor of the parsimonious representation of the EM sovereign bond spreads the theoretical model delivers. As theoretically predicted, country spreads increase with less liquidity available, with diminishing international reserves, with worsening governance and crucially, with more dispersed information about the EM sovereign bond market. The latter is a novel and salient result for EMs.

Cet article vise à approfondir notre compréhension des variations de spread d'obligations souveraines de marchés émergents (EM). Je construis un modèle d'anticipation rationnelle brouillée avec des informations incomplètes, dans lequel certains investisseurs informés reçoivent un signal privé brouillé sur la capacité et la volonté du pays émergent à rembourser sa dette souveraine. Je montre que l'équilibre des prix et des spreads dépendent des caractéristiques des pays, des flux internationaux de capitaux et de la dispersion dans les informations sur les obligations souveraines. Je teste ensuite empiriquement la pertinence de cette relation d'équilibre, en utilisant des données mensuelles d'un Panel de 11 marchés émergents sur la période 2000-2012. Comme anticipé, les spreads des pays augmentent avec moins

de liquidités disponibles, une diminution des réserves internationales, une instabilité politique et surtout, avec des informations plus dispersée. Ce dernier point est un résultat nouveau.

The asymmetrical behavior of hedge funds across the state of the business cycle: The *q*-factor model revisited

François-Éric Racicot, Raymond Théoret

We study the performance of the five-factor model recently proposed by Fama and French (2015) in the setting of hedge funds' strategies. Given the dynamic dimension of the strategies followed by hedge funds, we adopt a Markov regime switching setup where the factor loadings vary according to the regime, high or low. We find that the addition of the factors which drive returns in the q-model – i.e., the investment factor (CMA) and the profitability factor (RMW) – does not improve the global performance of the classical hedge fund return model. However, we find that CMA and RMW span risk dimensions which are not captured by the size factor (SMB) and the value factor (HML). In other respects, some strategies succeed in anticipating shocks and "time" the risk factors over the two regimes while other strategies are less successful in controlling risk during the low regime. All in all, consistent with other empirical studies, we find that risk factors are generally more at play in the low regime.

Nous examinons la performance du modèle à cinq facteurs proposé récemment par Fama et French (2015) dans le cadre des stratégies suivies par les fonds de couverture. Du fait des aspects dynamiques de ces stratégies, nous adoptons une procédure de changement de régime markovien dans laquelle les expositions aux facteurs de risque varient selon le régime – haussier ou baissier. Nous trouvons que l'ajout des facteurs qui commandent les rendements dans le modèle *q* – à savoir le facteur relié à l'investissement des entreprises (CMA) et celui rattaché à leur profitabilité (RMW) – n'améliore pas de façon significative la performance globale du modèle classique des rendements des fonds de couverture. Toutefois, nous trouvons que les facteurs CMA et RMW intègrent des dimensions de risque qui ne sont pas captées par le facteur associé à la taille de l'entreprise (SMB) ou le facteur relié à la valeur d'une action (HML). Par ailleurs, quelques stratégies réussissent à

prévoir les chocs économiques et pilotent les facteurs de risque sur les deux régimes alors que d'autres éprouvent des difficultés à contrôler le risque au cours du régime de crise. Somme toute, et conformément aux autres études empiriques, nous trouvons que les facteurs de risque sont généralement plus actifs en régime baissier.

Paulson Plan Credits

Eric de Bodt, Frederic Lobez et Armin Schwienbacher

The Capital Purchase Plan (CPP) is one of the main ingredients of the Paulson Plan. In accordance with the CPP, U.S. federal agencies invested more than $200 billion in approximately 700 financial institutions in 2008 and 2009. This article examines whether the CPP as a major public intervention helped to decrease financial institutions' systemic risk contribution. We use $\Delta CoVaR$ (Adrian and Brunnermeier, 2016) as measure of systemic risk contribution, as well as a difference-in-difference test. Size, business model and CPP timing all matters when it comes to identify the effects of the CPP. In particular, October 2008 recipients, a limited sample of major industry players, underwent an increase in their systemic risk contribution after CPP funding. This result suggests either a moral hazard issue and/or an indirect effect of the financial industry restructuring in the wake of the Lehman Brothers collapse.

Le « Capital Purchase Plan » (CPP) est un des ingrédients principaux du Plan Paulson. En lien avec le CPP, les agences fédérales américaines ont investi plus de $200 milliards dans environ 700 institutions financières en 2008 et 2009. Cet article examine si le CPP en tant qu'intervention publique majeure a aidé à réduire la contribution des institutions financières au risque systémique. Nous utilisons $\Delta CoVaR$ (Adrian and Brunnermeier, 2016) comme mesure de contribution au risque systémique, ainsi qu'un test en différence-de-différence. L'impact du CPP dépend de la taille et du modèle économique de la banque, tout comme du moment précis de la recapitalisation. En particulier, les bénéficiaires d'octobre 2008, qui représentent un groupe limité d'acteurs majeurs de l'industrie, ont subi une augmentation de leur contribution au risque systémique après le financement public. Ce résultat suggère la présence d'un problème d'aléa moral et/ou un effet indirect de la restructuration de l'industrie financière suite à la faillite de Lehman Brothers.

Emerging Market Risk Premia Fluctuations: A micro founded decomposition[1]

Paula Margaretic[2]

Abstract

This paper aims at deepening our understanding of emerging market (EM) sovereign bond spread fluctuations. I first build a noisy rational expectation model, with imperfect information, in which some informed investors receive a noisy private signal about the emerging country's ability and willingness to repay its sovereign debt. I show that, in equilibrium, sovereign bond prices and spreads depend on country characteristics, international capital flows and more surprisingly, on how dispersed information about the EM sovereign bond market is. I then empirically test the relevance of this equilibrium relation, using a monthly Panel data for 11 EMs over 2000-2012. Interestingly, the empirical investigation provides strong evidence in favor of the parsimonious representation of the EM sovereign bond spreads the theoretical model delivers. As theoretically predicted, country spreads increase with less liquidity available, with diminishing international reserves, with worsening governance and crucially, with more dispersed information about the EM sovereign bond market. The latter is a novel and salient result for EMs.

1. Introduction

Emerging markets (EMs) tend to have volatile business cycles and experience economic crisis more often than developed economies. Also, the cost of borrowing that these economies face in international markets is volatile and negatively correlated with their business cycles: Periods of low EM risk

1. I would like to thank two anonymous referees, for very helpful comments and suggestions, which helped to improve the paper considerably. I also wish to gratefully acknowledge Javier Barroso, for excellent research assistance; my PhD thesis advisor Sophie Moinas; Marco Batarce, Christophe Godlewski, Maria de las Mercedes Haga, Henry Pages, Guillaume Plantin, Sebastien Pouget, Laurent Vilanova; Elias Albagli, Rodrigo Alfaro, Manuel Arellano, Carola Moreno and Juan Francisco Martinez for very interesting discussions and the participants of seminars at Central Bank of Argentina, Central Bank of Hungary, Toulouse School of Economics, Central Bank of Chile, University Diego Portales and University of Santiago de Chile for their very useful comments. Remaining errors are naturally mine.

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premia, as measured by EM sovereign bond spreads, are typically associated with strong country fundamentals and low world interest rates.

The counter-cyclical relation between EM risk premia and business cycles has spurred researchers to investigate, mostly empirically, the link between EM sovereign bond spreads, world interest rates and output.[3] However, how and why interest rates and output might impact sovereign spreads or whether and why these spreads respond more to country-specific or global factors are still controversial. A better theoretical understanding of the mechanisms behind EM risk premia fluctuations is still desirable.

This paper aims at deepening our understanding of EM sovereign bond spread fluctuations. It first presents a noisy rational expectation model, with imperfect information, in which some informed investors receive a noisy private signal about the unobserved country's ability and willingness to repay its sovereign debt. It then shows that in equilibrium, sovereign bond prices depend on the country's characteristics, capital flows and more interestingly, on how dispersed EM sovereign bond market information is[4]. It finally empirically investigates the relevance of this equilibrium relation, using a monthly Panel data for 11 EMs, over 2000-2012.

In the model, there is a one-period bond, that is, the sovereign issued by an emerging economy. The bond's repayment value at the end of each period depends on the country's underlying fundamentals. Fundamentals aggregate the country's ability and willingness to repay its sovereign debt: While I model the country's ability to pay as an exogenous, time-varying random variable, the willingness to pay is an idiosyncratic, country-specific characteristic, which does not change through time.

Importantly, the EM sovereign bond can default on its end-of-period repayment value. Default is non-strategic and occurs if fundamentals fall below an exogenous threshold. If default, the EM sovereign bond is liquidated; in expected values, the bond's liquidation value is lower than the repayment value if no default. Without loss of generality, the market shuts down if default.

There are two types of agents in this economy: Informed investors and liquidity traders. The crucial assumption is that investors imperfectly observe the underlying fundamental state variable (aggregating the country's

3. As for example, Neumeyer and Perri (2005) and Uribe and Yue (2006).
4. Bachellerie and Couillault (2005), among others, point out that reliable information is more difficult to collect in EMs.

time-varying ability and the country-specific, non time-varying, willingness to repay its debt), when deciding whether to purchase the sovereign bond or not. Each period, informed agents receive a noisy private signal about this realized, but unobserved fundamental. Using their private signal, together with the history of past prices and fundamentals (observable *ex-post*), they rely on Bayesian updating to form their beliefs and decide whether to trade.

From the model, we learn that sovereign bond prices not only fluctuate due to changes in the country's characteristics and the liquidity demand, but also due to variations in the dispersion of the error of investors' private signal, which is time-varying but perfectly observed. Three theoretical mechanisms explain why EM sovereign bond prices fluctuate. First, prices fluctuate, because investors imperfectly observe the country's underlying fundamental. Because they are uncertain about the latter, when they receive bad news (through private and/or public signals), relative to the previous period, they downside their expectations about the end-of-period bond repayment value, which in turn leads to a lower demand, decreasing bond prices and growing spreads.

Second, how EM sovereign bond prices respond to changes in the liquidity demand depends on the time-varying dispersion of investors' private signal. Moreover, the latter dispersion amplifies the effect that the former exert on equilibrium prices. Intuitively, between two markets that only differ in the dispersion of investors' private signals, the model predicts that, all else equal, the effect of liquidity traders on prices will be higher in the market with more dispersed information, due to the amplification mechanism.

Third, the time-varying dispersion of investors' private signal also affects how much weight informed investors put to the history of past public signals. This is because the lower is this dispersion, the more informative is the public history of past realizations of fundamentals about the current unobserved fundamental state.[5] While Vives already in 2008 stresses the interplay between dispersion and liquidity demand, the combined effect of unobserved underlying fundamentals and the double role of the time-varying dispersion of investors' private signal, offers a novel explanation of why EM sovereign bond prices and spreads fluctuate in equilibrium.

5. Agents cannot separate the time-varying ability from the country-specific, non time-varying, willingness to repay, when they observe the history of past fundamentals or a private signal about the unobserved, current fundamentals. Nevertheless, because the willingness to repay is constant, agents can make, to some extent, better inferences about this decomposition through time. The limit to their capacity to infer the unobserved underlying fundamentals is the time-varying dispersion of the error of investors' private signal.

The model delivers the following implications. First, sovereign bond spreads decrease with better fundamentals and/or a growing liquidity demand, relative to the previous period. Second, the impact of the dispersion of the error of investors' private signal on country spreads is ambiguous. Numerical simulations reveal that it can either be negative or positive, depending on the economy parameter values.

Two economic forces are behind this ambiguous result. On the one hand, all else equal, when the dispersion of the error of the private signal decreases (relative to the previous period), the signal threshold below which investors prefer not to purchase the bond reduces, the sovereign bond demand thus expands, which leads to higher prices and lower spreads. On the other hand, the lower is this dispersion, the lower is the amplification effect of the liquidity demand on prices and the greater is the weight that investors put to past public information. The net effect will then depend on the combination of economy parameters. In line with previous studies' conclusion, this ambiguous relation is an empirical question, which needs to be resolved with an econometric investigation.[6]

I then estimate a structural model, based on the theoretically derived decomposition of country spreads in equilibrium. I use the following proxies. First, the proxy for the EM sovereign bond spreads is the JP Morgan's EMBI+ country specific indices. Second, I measure the time-varying ability to pay with the international reserves-to-external debt ratio, by country. Third, I rely on the World Bank's World Governance Indicators to proxy willingness to pay. Fourth, I measure the liquidity demand with data on net capital inflows to the EMs considered here, over GDP. Finally, I proxy the dispersion of the error of the private signal with the dispersion of analysts' GDP forecast.

The empirical investigation provides strong evidence in favour of the parsimonious representation of the EM sovereign bond spreads the theoretical model delivers. As theoretically predicted or numerically derived, country spreads increase with decreasing international reserves, with worsening governance, with less liquidity available and crucially, with more dispersed information about the EM sovereign bond market. To my best

6. Diether *et al.* (2002) point out that because some of the theoretical papers that incorporate belief heterogeneity and dispersed information produce conflicting cross-sectional implications, the debate can only be resolved with a careful empirical investigation.

knowledge, the latter is a novel determinant to explain observed EM risk premia fluctuations.

In total, changes in the previously defined control variables contribute to explain more than 60% of the EM sovereign risk premia fluctuations over the period. Importantly, the predictive ability of our micro-founded decomposition of country sovereign spreads is also very satisfactory: The model predictions come close to the observed EM sovereign bond spread evolution, with a mean absolute prediction error of less than 5% in all cases.

Summing up, the theoretical model aims at structuring the empirical analysis and deriving a micro-founded decomposition of EM sovereign bond spreads in equilibrium. The estimation model, in turn, aims at implementing this micro-founded decomposition and testing the empirical predictions and testable hypothesis the theoretical model delivers. Importantly, the EM data considered here does confirm the empirical predictions and testable hypothesis the theoretical model delivers.

More generally, by achieving a close match between the theoretical and the estimation model, this paper contributes to enhance our understanding of the economic forces driving EM risk premia fluctuations. In addition, it highlights the importance of dispersed information to explain EM sovereign bond spread fluctuations. The latter is a novel result, relative to the existing empirical literature on EM sovereign bond markets.

The remainder of the paper is organized in 6 sections. Section 2 reviews the related literature. Section 3 displays the set up. Section 4 solves for the noisy rational expectation equilibrium. Second 5 presents the structural model, the data, the model's empirical predictions and testable hypothesis, the methodology and the estimation results. Section 6 concludes. The appendix contains all derivations, proofs, additional descriptive statistics and robustness checks, absent in the main text.

2. Literature review

This paper is related to three strands of literature.

First, there is the abundant literature on the empirical determinants of EM sovereign bond spreads. This strand varies widely in the choice of variables: On one hand, several studies examine the importance of global and liquidity factors, such as, capital flows, international interest rates

and risk appetite, real exchange rates, international terms of trades and external shocks. To cite only some, Calvo *et al.* (1993), Calvo (2002), Grandes (2003), Neumeyer and Perri (2005), Uribe and Yue (2006), Gónzalez-Rosada and Levy Yeyati (2008) and Longstaff *et al.* (2010). On the other hand, many studies use a large set of country-specific macroeconomic variables, like real GDP growth, international reserves, external debt, export growth, fiscal and current account balance, public investment, debt service burden and inflation. Edwards (1984), Hilscher and Nosbusch (2010), Baldacci *et al.* (2011), Cosset and Jeanneret (2014) and Benzoni *et al.* (2015) are some references using these variables.[7] While the list of variables in this empirical literature is very extensive, the aim of this paper is not to use the previously mentioned comprehensive set of variables, but to propose (among this comprehensive set) a parsimonious representation of the determinants of EM sovereign bond spreads, guided by a theoretical model.

Second, and related, there is the literature investigating the impact of legal and political institutions on a country's creditworthiness or willingness to pay.[8] Interestingly, already in 1989, Nunnenkamp and Pitch suggest that the willingness of debtor countries to undertake policy reforms and the country's political (and legal) environment may be good proxies of the willingness to pay. However, because of lack of data availability at the time, early studies test the notion of willful default in *ä more direct way"* (Nunnenkamp and Pitch (1989)).[9] Among the more recent contributions to this strand, Ciocchini *et al.* (2003) and Depken *et al.* (2011) focus on Corruption; Moser (2007), Baldacci *et al.* (2011) and Bekaert *et al.* (2014) concentrate on Political Risk factors and finally, Cosset and Jeanneret (2014) and Benzoni *et al.* (2015) examine the impact of Government Effectiveness and Political Stability, respectively.[10] I share with this strand the conclusion that debtor countries' political (and legal) environment are good proxies of

7. The majority of them also include global factors in their empirical specifications.

8. Eaton and Gersovitz (1981) have been the first to stress that sovereign debt depends not only on the country's ability to pay, but also on its willingness to pay the debt, due to limited international enforceability in case of payment arrears. Following this idea, Nunnenkamp and Pitch (1989) and Bohemmer and Megginson (1990) are early studies controlling both for the country's ability and willingness to service its debt in their empirical investigations.

9. For instance, Nunnenkamp and Pitch (1989) use variables like the share of outstanding debt on total GDP, the ratio of borrowers imports on total GDP, the volatility of GDP per capita; whereas Bohemmer and Megginson (1990) proxy the willingness to pay with the level of payment arrears.

10. Ciocchini *et al.* (2003) and Depken *et al.* (2011) rely on the Transparency International Corruption Perception Index; Baldacci *et al.* (2011) use the International Country Risk Guide Political Risk Indicator and Bekaert *et al.* (2014) elaborate their own index, based on the World Bank governance Indicators. Finally, Cosset and Jeanneret (2014) and Benzoni *et al.* (2015) rely on the World Bank Governance Indicators.

the willingness to pay. I contribute to this group, by proposing a theoretical model that decomposes the ability and willingness to pay.

Finally, this paper relates to the literature, both theoretical and empirical, that investigates the effect of noisy information and beliefs' heterogeneity on credit spreads. Within them, Duffie *et al.* (2001), Güntay and Hackbarth (2010), Buraschi *et al.* (2013) and Albagli *et al.* (2014).[11] Mainly focused on corporate bonds or stocks, this strand concludes that beliefs' disagreement matters and some of them agree that greater beliefs' dispersion leads to higher credit risk. I share with this literature the conclusion that beliefs' heterogeneity matters. I depart from them, because instead of focusing on corporate bonds or stocks, I concentrate on EM sovereign bonds.

The paper closest to mine is Benzoni *et al.* (2015). They propose an equilibrium model for defaultable bonds that are subject to contagion risk. They then test their predictions, relying on sovereign European Credit Default Swap data. While we both assume that there is an underlying fundamental economic state variable, which is unknown to investors, they focus on fragile beliefs (investors are uncertain about their ability to accurately estimate the underlying state variable and its probability) to explain credit spreads. Instead, I focus on how imperfect and dispersed information affect investors' beliefs and this way, sovereign bond spreads.

3. The economy

This section presents a competitive rational expectation model with imperfect information, in discrete time, which is designed to fit EM risk premia fluctuations.

Consider an economy with a finite number of periods $T \geq 2$, $t = 0,1,2,\ldots$, populated by a continuum of risk neutral agents, indexed by $i \in [0,1]$ with total measure 1 and liquidity traders.

3.1. Assets: The emerging market sovereign bond

Each period t, one risky asset is traded for a riskless asset, which return rate is r.

11. Güntay and Hackbarth (2010) and Buraschi *et al.* (2013) proxy beliefs disagreement with dispersion in analysts' earnings forecasts.