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The sovereign spread in Asian emerging economies: The significance of external versus internal factors

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ABSTRACT

This paper investigates the dynamic relations between external factors, domestic macroeconomic factors with sovereign spreads, debt to GDP ratio, etc. in Asian emerging countries. First, we develop a theoretical model that determines the equilibrium debt level, probability of default and sovereign spread and draw empirical implications. We then employ a Structural Vector Autoregression (SVAR) model to investigate empirically how the spread of sovereign debt is influenced over time by both external and domestic factors. The empirical results show that variations in sovereign spreads are mainly driven by external shocks, with the term structure of US interest rate and the global risk aversion having the most important role. The findings also indicate that shocks from the US have a direct effect on sovereign spread and an indirect effect via domestic macroeconomic fundamentals. Finally, the evidence produced validates the presence of some response patterns of sovereign spread to the external shocks.

1. Introduction

With the rapid growth in the amount of outstanding debt,[1] sovereign bonds form an important class of portfolio for investors and a key source of funds for governments in emerging markets. There exists indeed a powerful view that understanding the factors behind the magnitude of the spread and its volatility and identifying how the spread is influenced over time is important not only for the purpose of inclusion in a well-diversified portfolio, but also for grasping its efficacy as a financial instrument of the governments in emerging economies. Typically, the sovereign spreads of the US Dollar denominated bond are defined as the difference in yield between the bond and a benchmark US Treasury bond of a similar maturity and are normally expressed in basis point. The return on emerging market issues of such bonds is in general expressed in terms of their spread rather than their absolute yield.

The role of sovereign bond spreads in emerging economies has generated a lot of interest among economists for the best part of the past century. Using Ordinary Least Squares (OLS) and panel regressions, extensive empirical evidence has been produced focusing on the relationship between sovereign spread, credit ratings and macroeconomic variables (e.g., Arora and Cerisola, 2001; Diaz and Gemmill, 2006; Edwards, 1984). Other studies have turned their attention to the endogeneity of sovereign spread (Uribe and Yue, 2006) and the role of risk aversion (Blanchard, 2005).

Using a panel VAR model, Uribe and Yue (2006) examine the interaction of sovereign spreads, the world interest rate, and business conditions in emerging markets. Their results show that sovereign spreads affect aggregate activity, while at the same time respond to domestic macroeconomic conditions. Their findings also highlight the issue of sovereign spreads and their dependence on domestic fundamentals while the world interest rate appears to be of great importance in understanding business cycles in emerging countries. A second strand of literature focuses explicitly on risk aversion and its impact on sovereign spread (Blanchard, 2005). Following this path, Dungey et al. (2003) consider the role of investors' risk aversion during financial crises, while Garcia-Herrero et al. (2006) investigate the underlying foreign determinants of Latin American sovereign spreads. In a more recent study, Fracasso (2007) advances the previous literature by considering both the endogeneity of the credit spreads and relate them to the degree of investors' risk aversion, as well as to domestic and international macroeconomic factors. Overall, although several studies have investigated sovereign spread in emerging markets, an emerging question in the midst of

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[1] Since the 1990s, there is a significant increase in the amount of outstanding debt and by 2010, the world had over 77 trillion dollars aggregate outstanding sovereign bond according to BIS.

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this debate is how foreign and domestic factors may determine the shapes of the spread over time.[2]

This paper constitutes the first attempt, to our knowledge, to explicitly assess the relative importance of both domestic and external factors in influencing the variations of spread of the sovereign bonds issued by the Asian emerging countries. In order to resolve endogeneity problems stemming from the dynamic interdependence between those variables, we employ a Structural Vector Autoregression (SVAR, hereafter) model. In addition, instead of following the traditional approach relying on exchange rate, we use the US Dollar index[3] as a proxy for the currency risk that affects the probability of default of sovereign bonds and their spread.

This paper advances the previous literature in the following directions: Firstly, we explicitly take into account currency risk by bringing the Dollar exchange rate into the analysis. The bulk of empirical evidence on capturing currency risk tends to use the exchange rate between domestic currency and the US Dollar (treated as a domestic factor). However, currency risk can be seen as a pure external factor, implying that the Dollar index can be considered as a more appropriate proxy. In other words, exchange rates can be affected by domestic factors, such as high debt level. Yet, previous studies on this issue have already included those variables in the model, which in turn implies that after controlling for domestic macroeconomic fundamentals, exchange risk can be seen as a pure external factor. Secondly, we investigate the dynamic role of the term structure of US interest rate on domestic economy of the emerging markets and sovereign spread; while the majority of the previous literature tends to focus on the spot US interest rate since their models are static. An increase in the expected future short term US interest rate might cause a higher cost of borrowing in emerging countries, but on the other hand it signals a recovery in a world economy.

Our results indicate that external factors cause variations of both domestic macroeconomic variables (trade balance to GDP ratio and debt to GDP ratio) and sovereign spreads. Moreover, there is evidence suggesting that external factors not only directly affect sovereign spread, but indirectly causes fluctuation of sovereign spread via its impact on the domestic macroeconomic fundamentals.

The remaining of the paper is organized as follows: Section 2 develops the theoretical model to show how sovereign spread and the level of debt are interdependent and they respond to the variations of external factors. Section 3 explains the empirical strategy. Section 4 discusses the empirical results for the variance decomposition and impulse response functions, and Section 5 concludes.

2. Theoretical model

We develop a model that combines a capital inflow model in the presence of the probability of default due to Blanchard (2005) with a framework of debt overhang, originally proposed by Krugman (1988) and illustrated in Obstfeld and Rogoff (1996), among many others. This framework establishes interdependence between sovereign debt, spreads of bonds with probability of default and show how do they respond to external shocks such US interest rates and global risk aversions. We then take these predictions of the model to data in the subsequent sections in order to analyze them empirically.

We consider a one period model with two different risk averse representative investors: 1) An emerging market investor whom we call the Malaysian investor and 2) international investor. There are three assets in the model: 1) A risk free one-period Malaysian bond denominated in domestic currency with rate of return r. 2) A one-period Malaysian government bond[4] denominated in US dollar with rate of return r^{MA} with a probability of default p. 3) A risk free one-period US government bond denominated in US dollar with rate of return r^{US}. There is capital flow control or restrictions on both types of investors that a representative government in emerging markets imposes on both domestic and international investors. All throughout, we assume that the Malaysian (i.e. emerging countries') investors can buy Malaysian risk free bond and Malaysian government's bond denominated in US dollar but are not allowed to buy bonds issued by foreign (US) governments. For simplicity, we also assume that the International investor buys only US government's bond and Malaysian government's sovereign bond expressed in US dollar.

Given the restricted pattern of capital inflow, the equilibrium no-arbitrage condition for the Malaysian investor would satisfy the following condition [5]:

$$(1-p)\frac{\varepsilon'}{\varepsilon}\left(1+r^{MA}\right)=(1+r)+\theta p \tag{1}$$

where, θ is the degree of absolute risk aversion of Malaysia investor and ε is the exchange rate expressed as Malaysian currency per US dollar and ε' is the expected exchange in the next period. The condition states that for Malaysian investor to hold the risky government bond, the expected return on the Malaysian government sovereign bond should equal to the rate of return of risk free domestic bond plus a premium measured by $\rho\theta$.

The next step is to look at the determination of international capital flow to emerging markets. Since international investors choose between Malaysian government US dollar denominated bond and US government bond, the capital flow will depend on the differences between relative return of the two bonds adjusted by risk premium of the international investor measured by $\rho\theta^*$.

Hence, capital flows to Malaysia are given by:

$$CF=C\left\{(1-p)\frac{\varepsilon'}{\varepsilon}\left(1+r^{MA}\right)-\frac{\varepsilon'}{\varepsilon}\left(1+r^{US}\right)-\theta^{*}p\right\}\qquad C'>0$$

Where, θ^* is the degree of risk aversion of international investor. The first two terms are the expected rate of tern on Malaysia US dollar bond and US government bond respectively, both expressed in terms of Malaysia currency.

By using Eq. (1), capital flow equation can be expressed as:

$$CF=C\left\{1+r-\frac{\varepsilon'}{\varepsilon}\left(1-r^{US}\right)+(\theta-\theta^{*})p\right\}$$

If the risk aversion between Malaysian investor and international investor is the same, then the increase in the probability of default p would not generate capital flow in either direction. However, if international investors have home bias and Malaysian investors have restricted participation in the international capital market, then probability of default will trigger capital outflows captured by the above equation. If we assume that the international investors are more risk averse than Malaysian investor with respect to inclusion of the Malaysian assets in their portfolio, then $\theta^*>\theta$. For the sake of simplicity, we further assume that:

$$\theta=\lambda\theta*,\quad \lambda\le 1$$

Then, the resulting expression for capital flow is given by:

$$CF=C\left\{1+r-\frac{\varepsilon'}{\varepsilon}\left(1+r^{US}\right)-(1-\lambda)\theta^{*}p\right\}$$

[2] Appendix C presents a summary of the previous studies on sovereign spread, along with their main findings.

[3] Dollar index is a trade-weighted average of six foreign currencies against the dollar. Currently, the index includes Euro (EUR), Japanese yen (JPY), British pound (GBP), Canadian dollar (CAD), Swedish krona (SEK) and Swiss franc (CHF).

[4] For convenience, we will be using the term 'Malaysian government bond' and 'emerging markets sovereign bond' synonymously.

[5] The Eq. is derived in Appendix A. See Blanchard (2005) for its application in a different context.