Macroeconomic fundamentals, price discovery, and volatility dynamics in emerging bond markets

Sylwia Nowak [a,*], Jochen Andritzky [b], Andreas Jobst [c], Natalia Tamirisa [d]

[a] Asia and Pacific Department, International Monetary Fund, 700 19th Street N.W., Washington, DC 20431, USA
[b] Fiscal Affairs Department, International Monetary Fund, 700 19th Street N.W., Washington, DC 20431, USA
[c] Monetary and Capital Markets Department, International Monetary Fund, 700 19th Street N.W., Washington, DC 20431, USA
[d] Research Department, International Monetary Fund, 700 19th Street N.W., Washington, DC 20431, USA

ARTICLE INFO

ABSTRACT

This study characterizes volatility dynamics in external emerging bond markets and examines how prices and volatility respond to macroeconomic news. As in mature bond markets, surprises about macroeconomic conditions in emerging markets are found to affect both conditional returns and volatility of external bonds, with the effects on volatility being more pronounced and longer lasting than those on prices. Yet the process of information absorption tends to be more drawn-out than in mature bond markets. Global and regional macroeconomic news is at least as important as local news for both price and volatility dynamics.

© 2011 Elsevier B.V. All rights reserved.

1. Introduction

Economic data releases form the basis of economic analysis and commentary by market participants. Analysts at brokerages and investment firms pay close attention to the daily flow of economic information, a significant part of it consisting of pre-scheduled releases of economic data and indicators. Comparing the new information against previous forecasts, and adjusting expectations for the future creates economically valuable information that investment houses and clients try to exploit in their trading decisions. Therefore, there should be a close link between the announcement of macroeconomic data and market prices fluctuations, most notably so in the minutes surrounding the scheduled data release. Thus, a better understanding of market reactions should allow market participants to fine tune their investment strategies and risk management. Besides market participants, policy makers are interested

in how markets respond to macroeconomic announcements in order to design more effective communication strategies.

Studies of macroeconomic data releases in mature markets already provide a nuanced view of the impact of news. Given that macroeconomic conditions are the main determinant of the benchmark curve, government bonds are the asset class that is most directly expected to react to macroeconomic announcements (Fleming and Remolona, 1999). Empirical studies across asset classes confirm that government bonds, next to foreign exchange markets, exhibit a reaction to macroeconomic announcements that is more pronounced than for other asset classes, such as equities (Andersen et al., 2007). The effect of data releases on bond prices is almost instantaneous (Fleming and Remolona, 1999; Balduzzi et al., 2001; Andersen et al., 2007), in line with theoretical models of market microstructure (see O'Hara, 1995, and the references therein). By contrast, price volatility is often found to remain elevated for a longer period in response to news (Fleming and Remolona, 1999).

Compared to mature bond markets, few studies have examined the role of macroeconomic surprises on financial markets in emerging countries. This is a notable gap in the literature, especially given the growing importance of emerging bond markets. To our knowledge, only one study has researched intraday moves

* Corresponding author. Tel.: +1 202 623 6429; fax: +1 202 623 4661.
E-mail addresses: snowak@imf.org (S. Nowak), jandritzky@imf.org (J. Andritzky), ajobst@imf.org (A. Jobst), ntamirisa@imf.org (N. Tamirisa).

of emerging bond markets, focusing on the effect of advanced country news on emerging market bond spreads.[1] Using hourly data, Robitaille and Roush (2006) find significant effects of US announcement of inflation and non-farm payroll surprises as well as interest rates on Brazilian external bond spreads for up to 2 h after their release. The magnitude of the impact on spreads is roughly comparable to the yield impact on mature markets. With regard to the volatility response, evidence from daily data on a sample of 12 emerging markets by Andritzky et al. (2007) shows that days of individual releases often exhibit lower bond price volatility, except for days with interest rate actions or rating changes.

In this paper, we analyze high-frequency price discovery and volatility dynamics in emerging bond markets and examine the role of local, regional, and global macroeconomic and monetary policy announcements. We model 10-min returns and volatility using intraday data on the most liquid external emerging market bonds (Brazilian, Mexican, Russian, and Turkish) for the period from October 2006 to February 2008. In addition, we compare intraday of emerging bond markets to those of a benchmark US bond.

When examining market reaction to news, we distinguish two types of adjustment: *repricing* (the price impact) and *repositioning* (the volatility impact). *Repricing* involves a shift in asset prices as traders discern the implications of public news for the fair value of a bond, in line with the theoretical model of Kim and Verrecchia (1991b). Within this framework, investors form their expectations before the release of news about macroeconomic fundamentals and trade accordingly. Following an announcement, traders revise their beliefs and trade only if there is a surprise component in the news, i.e., the released data differ from market expectations.

The recommencement of trading following an announcement is further reflected in an increase in trading activity, as investors rebalance their portfolios in light of new information to fit their risk preferences. The market microstructure literature suggests that this *repositioning* effect stems from information asymmetry between informed and liquidity traders (Admati and Pfleiderer, 1988) and investors' heterogeneity in interpreting public information (Kim and Verrecchia, 1997). In the Admati and Pfleiderer (1988) model, informed traders concentrate their trades during periods of high market activity, such as around public announcement times, to ensure that their informed trading has little effect on prices and that they can benefit from the liquidity externalities generated by other traders. This, in turn, promotes concentration of liquidity trades and generates even greater trade volume and more volatility. Similarly, Kim and Verrecchia (1997) argue that public announcements increase information asymmetry because investors have varying degrees of skill in interpreting news. Therefore, the news impact on volatility dominates the effect on prices, with volatility remaining at elevated levels long after prices have adjusted.

Our findings are consistent with theoretical predictions, while highlighting similarities and differences in responses of emerging and advanced market bonds to news. First, as in studies of mature bond markets (Fleming and Remolona, 1999; Balduzzi et al., 2001 and Andersen et al., 2007), we find that the initial price adjustment upon the arrival of new information is small and dissipates within minutes of the announcement. The direction and magnitude of the

response are broadly similar for emerging and US bonds at very high frequencies (1-min intervals).

Second, the volatility response is much more pronounced than the price response. Volatility remains at elevated levels, at up to six times the preannouncement level, for up to 3 h after the announcement—about two times longer than in mature bond markets. This result suggests that the absorption of new information is occurring much more slowly in emerging markets than in mature markets. One possible explanation is the lower trading liquidity which leads to a stronger desire of dealers to concentrate trades (along the lines of Admati and Pfleiderer, 1988). Another explanation of the larger and more prolonged volatility response to news is the greater heterogeneity of views on macroeconomic fundamentals (Kim and Verrecchia, 1991a) in rapidly developing economies.

Third, although responses to news vary to some extent across countries and types of indicators, international news is generally at least as important as domestic news for both asset valuations and volatility dynamics in emerging markets. While the role of US news is obvious for the dollar-denominated bonds, the impact of German news on the volatility of Russian and Turkish bonds points to significant spillovers from regionally important economies. Moreover, we find evidence of asymmetric effects (stronger responses to negative news than to positive news) and observe a disproportionately large impact of news releases that contain large surprises.

The rest of the paper is organized as follows. Section 2 describes the high-frequency data on bond prices and macroeconomic announcements and explains how the surprise content of news was measured. The intraday patterns of return volatility are discussed in Section 3, along with implications for the modeling framework in Section 4. The empirical findings are presented in Section 5. Section 6 concludes.

2. Intraday price data and announcements

The core of our dataset consists of intraday price data for the benchmark external bonds issued by Brazil, Mexico, Russia, and Turkey. Together with Argentina and Venezuela (which we exclude because of data problems), these four countries represent the top six sovereign issuers among emerging economies. Their benchmark bonds are among the most liquid and actively traded instruments in the asset class. In the last quarter of 2008, sovereign eurobonds with a daily trading volume of US$2.3 billion accounted for 18% of trading in emerging market debt instruments (Trade Association for the Emerging Markets, 2009).[2]

We compare the data for these four countries with similar, high-frequency data on a US treasury note to quantify differences between reaction of mature and emerging bond markets to news. Data on expectations and announcements of local macroeconomic data and interest rate decisions are used as a proxy for public information about macroeconomic fundamentals. For global macroeconomic data, we use announcements for the United States; for Russian and Turkish bonds we also use regional data, those for Germany. The sample period is from October 1, 2006, to February 20, 2008 (297–340 trading days during 17 months, depending on the bond), split into two subperiods: before and during global financial turmoil triggered by the US subprime market crisis, whose onset is identified as June 5, 2007 (see below). The main data source is Bloomberg.

---

[1] For other asset classes, a few studies provide evidence on the role of domestic versus global news in emerging markets, with mixed results for the impact on volatility. For instance, Wongswan (2006) examines high-frequency data for the Korean and Thai equity markets and finds that both global (US and Japanese) and local releases affect intraday volatility. In contrast, the results by Cai et al. (2009) suggest that US macroeconomic news have a strong impact on the returns and volatilities of exchange rates in a number of emerging economies while domestic announcements often do not.

[2] Emerging market debt trading was about US$13 billion a day at end-2008. The average daily trading volume of US treasuries alone was about US$10 billion at end-2008, according to primary dealer estimates (Trade Association for the Emerging Markets, 2009).