

Responsiveness of the Malaysian Government Securities Yield Curve to Movements of Sovereign Bond Yields Abroad

Introduction

The greater financial integration over the past decade has led to more synchronised movements of financial markets across the globe. As the domestic bond market, particularly the Malaysian Government Securities (MGS) market, deepens, the movements of the domestic yield curve are increasingly influenced by movements in foreign bond yields as both domestic and foreign investors respond to global developments and sentiments. Such inter-linkages may have resulted in stronger correlations between MGS yields and sovereign yields in other economies. In effect, at any given point in time, the shape of the MGS yield curve could be influenced by a change in foreign yields that are responding to shocks that may not have any influence on macroeconomic factors in Malaysia. As the yield curve provides important information on expectations of the economic conditions, it is therefore important to understand the extent of the co-movement between the domestic and foreign yield curves. Given this motivation, this study attempts to assess the importance of foreign yields in influencing the domestic yield curve. The study also evaluates whether there are any important differences in the response of the MGS yield curve to shocks originating from the advanced economies compared to those emanating from the regional bond markets.

Information content of the yield curve

The study of the yield curve is developed based on the term structure of interest rates, which is built upon the expectations hypothesis (EH)¹. EH essentially equalises the long-term interest rates with short-term interest rates and market expectations of future interest rates² and a risk premium, reflecting the opportunity costs of holding bonds. The yield curve is a plot of yields on securities of different maturities at a particular point in time. These maturities range from the shortest period of one month, up to ten, or even thirty years for the more advanced markets. Accordingly, the shapes of the yield curve provide an indication of market expectations of the future path of short-term interest rates. A normal yield curve is upward sloping as longer-maturity bonds would carry higher yields due to an increase in risk associated with time. A steepening yield curve reflects market expectations of higher short-term rates in the future underpinned by anticipation of a higher policy rate following expectations of rising inflation. The reverse is true in the case of a flattening of the yield curve. The yield curve could also shift in a parallel manner, in which both short-term and long-term yields move in the same direction following a change in risk premia across all maturities. The risk premia for government bonds refers to the added compensation needed for investors to hold domestic bonds given the overall risk profile of a country, including its default risk, credit risk and liquidity risk. A country with weak fiscal discipline and rising credit risk, for instance, would have to offer a higher yield to draw investors into holding its bonds.

Estimating the response of the MGS yield curve to shocks from foreign government bond markets

One of the approaches in modeling the yield curve is the Nelson-Siegel (NS) exponential framework³. The model estimates three measures of the yield curve, which represent the level, slope and curvature components of the yield curve. These components refer to how the shape of the yield curve would change following a shock. The level component refers to the effect of the shock on long-term yields and such an effect is normally reflected in parallel shifts in yields of all maturities. A shift in the level component reflects structural influences such as a change in the market perceptions on a country's long-term inflation outlook, or a change in the assessment of credit worthiness of a country. The slope component reflects the effect of the shocks to short-term yields that will result in a change in the degree of steepness of the yield curve. The key factor that often alters the slope of the yield curve is a change in market expectations about domestic monetary policy decisions. As central banks

¹ Apart from EH, there are other theories used to explain the term structure of interest rates, and these include liquidity premium theory, market segmentation theory, pure expectations theory and preferred habitat theory.

² $(1 + i_t)^n = \rho + (1 + i_{st})^1(1 + i_{st})^2 \dots (1 + i_{st})^n$ where the subscripts *lt*, *st* are abbreviations for long-term and short-term respectively. ρ is the risk premium and the superscripts 1, 2, ..., *n* indicate the time periods.

³ The model is developed by Nelson and Siegel (1987) and extended by Diebold and Li (2006).

generally target a very short-term interest rate, a shift in the market's expectations towards a lower future policy rate for example, will cause the yield curve to flatten, reflecting lower short-term interest rates in the future. The curvature component refers to the effect of the shock on medium-term yields compared to other maturities, which would cause the yield curve to become more 'hump-shaped'. All these components are unobservable but the NS framework would allow the estimation for these underlying components. Through the estimation of these components, a time varying yield curve could be established and its dynamics could be tested against the relevant factors that drive the movements of short-term and long-term bond yields. In this study, the NS methodology is employed to distinguish the responses of the MGS yield curve to shocks that originate from either the advanced or regional markets. Using monthly data from four advanced economies and seven regional economies⁴, the slope and level components of the yield curves are extracted for each of the eleven countries.

After obtaining the different components of the yield curves, the study adopts a two-step approach to test for co-movements. In the first step, a variance decomposition study is undertaken to assess the extent of co-movement of MGS yields vis-à-vis movements of the foreign sovereign bond yields. Next, the respective bond yield components from the regional and advanced markets are analysed along with the MGS yield components using the VAR model, in which the re-aggregated generalised impulse response function is generated to synthesise the dynamic responses of the MGS yield curve to shocks coming from the regional and advanced economies. This exercise would be useful in determining whether there are important differences in the responses of MGS yields to shocks from the regional and advanced economies.

Strong co-movement between MGS and foreign government bond yields

The results from the variance decomposition approach show the significant co-movements between foreign government bond yields and the MGS yields. In terms of the long-term yields, it appears that both regional and advanced markets collectively contribute by about 80% of the total variations in the long-term MGS yields with the advanced markets alone accounting for about 45% of the total variations. For the short-term MGS yields, the regional and advanced markets together contribute over two-third to the total variations in MGS yields. These results generally conform to empirical findings for financially open capital markets in which variations in yield curves globally could account for the majority of the variations in the slope and level factors⁵. In particular, the strong co-movement of yields reflects the importance of the advanced markets in influencing global asset prices (including sovereign yields). This is supported by the IMF Spillover Report for the US, which highlights that the US market represents close to two-thirds of the total equity and government bond market turnover of the five large and systemically-important economies⁶. Such a global dominance of the US financial markets has often contributed to large spillover effects of asset prices in the US on other markets⁷.

MGS yield curve respond differently to shocks from advanced markets compared to shocks from regional markets

The results of the second part of the study are broadly summarised in Chart 1, which shows the impulse responses of the MGS level and slope components following shocks to the corresponding yield components of the advanced and regional markets. The impulse response is calculated over the 1-month, 3-month, 6-month and 12-month horizons. A notable pattern is observed in which the MGS yield curve responds differently to shocks from advanced markets vis-à-vis shocks from regional markets.

⁴ The advanced economies comprise of the euro area, the UK, the US, and Japan while regional markets include PR China, Hong Kong SAR, Indonesia, the Philippines, Singapore and Thailand. Data length varies for each country, from the earliest 1992 up to 2011.

⁵ Diebold, Li and Yue (2008) shows that global level factors account for 60% to 80% of total variations in the US, Japan, Germany and the UK, while global slope factor accounts for almost entire variations for economies with common business cycle.

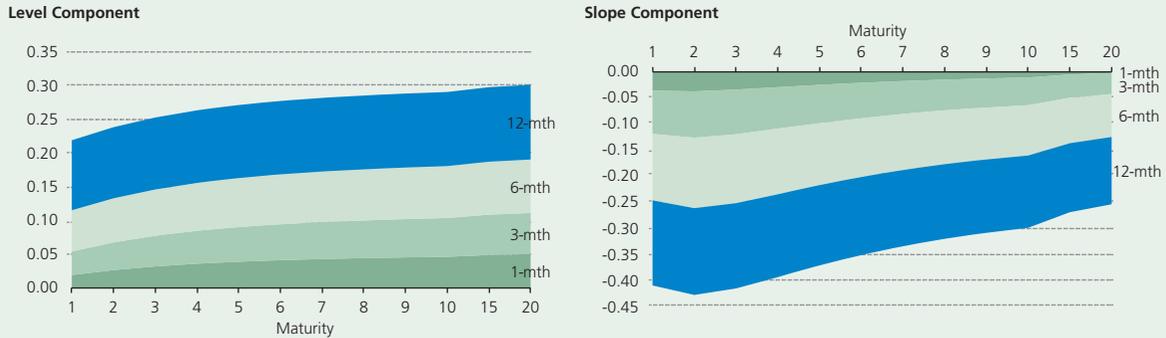
⁶ The five 'systemic' economies are PR China, the euro area, Japan, the UK and the US. Sourced from The United States Spillover report by IMF, July 2011.

⁷ The report indicated that the US interest rates and global risk measures explain over half of the variation in Emerging Market Economies (EME) spreads.

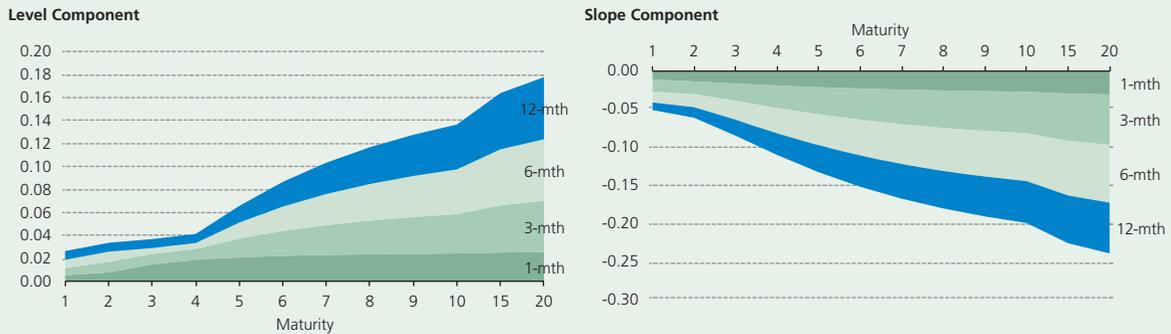
Chart 1

Re-aggregated Generalised Impulse Response Functions

Panel A: Dynamic Responses of the MGS Yield Curve to Shocks to Yields in the Advanced Markets



Panel B: Dynamic Responses of the MGS Yield Curve to Shocks to Yields in the Regional Markets



Note: The R-GIRFs show the effect of yields compared to its baseline; a negative response of the R-GIRF means the yields fall below the baseline rather than implying a negative yield.

Source: Bank Negara Malaysia, Bloomberg

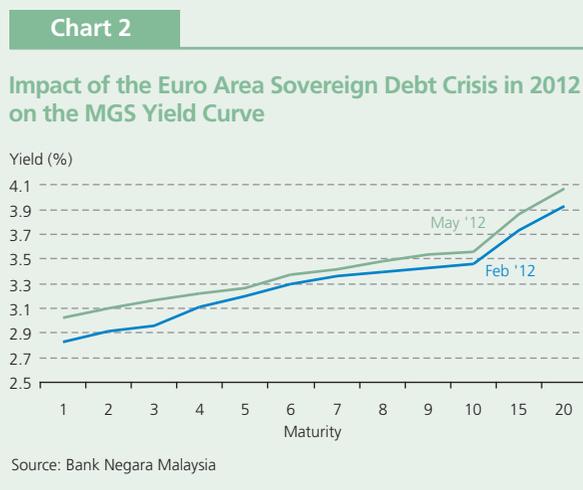
Shocks from advanced markets influenced the MGS yield curve through risk premium adjustments

A shock⁸ in the slope and level components of the yield curves in the advanced economies leads to a parallel shift in the MGS yield curve (Panel A). The parallel shift in the yield curve suggests that the shock from the government bond markets in the advanced economies is transmitted to MGS yields through risk premium adjustments. For example, a negative shock to investors' balance sheets or increased uncertainty in the advanced markets would cause domestic and foreign investors to liquidate their assets in emerging markets in favour of more liquid assets in other markets⁹. This means that, for a given level of expected future growth and inflation in the domestic economy, investors would require a higher compensation for holding domestic bonds. The investor behavior in disengaging from the emerging markets could result in a tightening of liquidity conditions in the domestic market, which will be reflected as an increase in the risk premium, resulting in an upward shift in the yield curve. Such adjustments could take place even without substantial changes in the fundamentals of the domestic economy, hence causing a temporary disconnection between information retrieved from the yield curve and economic fundamentals.

⁸ This study is not meant to assess how different type of shocks could affect bond yields in advanced or regional markets. Nevertheless, for illustration purposes, a factor that could result in a parallel shift of the yield curve in advanced economies could be driven by heightened sovereign risks, which would result in a sharp rise in the bond yields across all maturities.

⁹ See Krishnamurthy (2009) and Frankel and Schmukler (1998).

Chart 2 exemplifies the movement of the MGS yield curve following a heightening of risk aversion in the euro area in the second quarter of 2012. The MGS yield curve shifted up in parallel during this period despite an unchanged domestic monetary policy and macroeconomic conditions.



Shocks from regional markets influenced the MGS yield curve through growth and inflation expectations

A shock to the slope and level components of regional bond yields result in a tilting (flattening or steepening) of the MGS yield curve (Panel B) rather than a shift in yields of all maturities as observed in the case of the advanced markets. While economic fundamentals in the region varies, the tilting movement of the MGS yield curve broadly reflects the similarity in growth and inflation expectations in the regional markets, given the strong synchronisation of business cycles within the region, which is primarily driven by greater trade and financial integration¹⁰. Also, given the extensive production network within the region and its central role in the global supply chain, the region is likely to be exposed to common global shocks. For example, an adverse shock on global demand would be manifested into slower growth and more subdued inflation for regional economies and this will be translated into expectations of a policy rate cut. Such expectations in regional economies would be reflected in a flattening of the yield curve in the region. Investors, therefore, tend to assess the regional economies as a group and hence may fail to distinguish key differences between these economies. This leaves the regional markets exposed to more synchronised surges and reversals of capital flows.

Conclusion

The study indicates that there are important differences in the response of the MGS yield curve to shocks from the government bond markets in the advanced and regional economies. Shocks from the advanced markets would induce risk premia adjustments while shocks from the regional markets are reflected in changes in growth and inflation expectations. Such findings point towards the increasing influence of global sentiments in affecting the domestic government bond market. While the growing financial integration helps to deepen the domestic bond markets, it also brings many challenges. In particular, this article highlights that changes in global sentiments and regional economic outlook could alter the shape of the MGS yield curve, even in the absence of changes in the domestic economic conditions.

¹⁰ Studies by Sato and Zhang (2006) and Rana (2007) provide support to the synchronisation of business cycles in the East Asian region.

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