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# Effects of Monetary Policy Communication in Emerging Market Economies: Evidence from Malaysia

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## CAMA Working Paper 67/2021
## July 2021

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## Abstract

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**Keywords**

**JEL Classification**

J31, J64

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**ISSN 2206-0332**

# Effects of Monetary Policy Communication in Emerging Market Economies: Evidence from Malaysia*

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**Abstract**

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*The views expressed here are the views of the authors and do not necessarily represent the views of the Bank Negara Malaysia (BNM), the South East Asian Central Banks Research and Training (SEACEN) Centre, and its member central banks or monetary authorities. We thank Ahmad Othman Amrul Aaz, Sabrina Bashir, Hans Genberg, Refet Gürkaynak, Shahredza Minhat, Athanasios Orphanides, Ole Rummel and Mohamad Hasni Sha'ari for comments in various stages of this paper. We also thank the seminar participants at BNM for their comments and suggestions. Correspondence: Sui-Jade Ho – jade@bnm.gov.my, Özer Karagedikli – ozer@seacen.org.

# 1 Introduction

On 8 May 2014, Bank Negara Malaysia (BNM), Malaysia's central bank, kept its key monetary policy instrument, the Overnight Policy Rate (OPR), unchanged at three percent. This decision was widely anticipated by the financial markets; the short-term interest rates such as the 1-week and 1-month interbank rates, as well as the 1-month Kuala Lumpur Interbank Offered Rates (KLIBOR) remained unchanged following the announcement. In other words, the unanticipated or the surprise component of the change in the policy rate itself was negligible if not zero. Following BNM's interest rate announcement and the accompanying policy statement however, the two- and three-year Malaysian Government Securities (MGS) increased by 18 and 16 basis points respectively. The reaction of longer-term interest rates therefore, was not primarily due to what the central bank did or did not do with the OPR itself, but rather about what it said in its Monetary Policy Statement (MPS) that was released with the decision:

> "*.. the current monetary and financial conditions could lead to a broader build up in economic and financial imbalances. Going forward, the degree of monetary accommodation may need to be adjusted to ensure that the risks arising from the accumulation of these imbalances would not undermine the growth prospects of the Malaysian economy.*"

The reaction of the financial markets after this particular announcement illustrates how prospective future monetary policy changes can influence markets expectations. Therefore, any analysis of the central bank's policy for the 8 May 2014 decision based purely on the zero monetary policy surprise would miss a very important component of policy. The role of communications in the MPS in influencing the yield curve would be missing in such analysis.

In this paper, we test whether the observation on 8 May 2014 is a systematic response by financial markets to the monetary policy statements. In the literature, forward guidance is defined as situations in which the monetary authorities provide direct statements about the future path of their policy tools (Bassetto 2019). In this paper, we adopt a broader definition that goes back to the literature on central bank communication and transparency, more generally. These would include more indirect signals, including specific phrasing especially in terms of policy bias, assessments of balance of risks, etc (Blinder et al. 2008). In this same vein, we view that some form of forward guidance is evident whenever the market is able to extract some signal about the future likely path of interest rates from the broader discussion of the MPC's view on the underlying conditions of the economy even if the statements do not provide an explicit description of the future interest rate path. More recently, Lunsford (2020) makes the distinction between two forms of forward guidance language. The first, which was employed by the Federal Open Market Committee (FOMC) between February 2000 and May 2006, refers to language about economic outlook risks and without any explicit guidance about future policy inclinations. The second form (which was employed from August 2003 to May 2006) refers to more explicit language about future policy inclinations.

In an influential paper, Gürkaynak et al. (2005) show that the responses of the yield curve to monetary policy decisions of the Federal Open Market Committee (FOMC) may be inadequately captured by the widely used single factor approach (for example, Kuttner (2001)), whereby the single factor captures the surprise element of the current policy decision. Instead, Gürkaynak et al. (2005) show that monetary policy is better characterised or understood by two factors. While the first factor is indeed the Kuttner (2001) type surprise on the decision itself, the second factor is associated with the content of the FOMC statements, and had significant effects on longer-term asset prices. In other words, market participants find that FOMC statements contain important signals about the future direction of monetary policy.[1]

The second factor, also known as the path factor is found to have a much larger influence on longer-term interest rates. Furthermore, it explains around 75 percent of the total explainable variation in longer-term asset prices on days of monetary policy decisions.

[1] In Gürkaynak et al. (2005), the first factor is (almost) identical to the Kuttner (2001) measure and is calculated as the unexpected component of monetary policy announcements by using Fed Funds Futures on announcement days. This factor, known as monetary policy surprise, was shown to have a significant influence on asset prices on the days of monetary policy announcements (Kuttner (2001); Bernanke and Kuttner (2005)). Moreover, Gertler and Karadi (2015) use the changes in a particular contract of the Feds Funds Futures as an external instrument in identifying monetary policy shocks in a Proxy VAR.

Similar results have been shown in other countries, such as in studies by Brand et al. (2010) for the euro-area, Brubakk et al. (2017) for Norway and Sweden, and Detmers et al. (2018) for New Zealand. Detmers et al. (2018) and Natvik et al. (2019) also find that the results are robust and do not depend on whether the central bank communicates by means of press releases or numerical forecasts for the central bank's instrument.

In this paper, we take the empirical questions of the above literature to the data from an emerging market economy, i.e., Malaysia. Our results extend the results of the literature that has mostly focused on advanced economies or inflation targeting countries. While newer studies on central bank communications in emerging markets have been undertaken in recent years (e.g. Pescatori (2018) and Garcia-Herrero et al. (2017)), to our knowledge, this paper is one of the first to consider the presence of the path factor from monetary policy statements in a non-inflation targeting emerging market economy. More specifically, we investigate the extent to which the responses of the interest rates on 8 May 2014 could be generalised.

We have three major findings. First, formal tests show that a single factor cannot adequately capture the total effects of monetary policy on asset prices on days of policy announcements. A second factor is indeed needed to fully characterise the effects of the monetary policy on asset prices. By following Gürkaynak et al. (2005)'s rotation, a structural interpretation can be assigned to these factors. The first, is a "current OPR target" factor, which corresponds to the surprise element in the current policy decision. The second factor, on the other hand, is about the "future path of policy", where the latter is independent of the surprise changes in the current OPR.

Second, the path factor is indeed related to significant changes in the wording of the statements by the Bank. On days when the estimated path factor is larger, we find some correspondence between the factor and the MPS.

Third, similar to the findings in some advanced economies, our results show that the path factor affects the longer maturity yields much more than the first factor alone. The path factor explains between 53 and 74 percent of the total explainable variation in yields between five to ten-year maturity. In addition, we find that the path factor influences corporate bond yields and spreads. The effects of changes in the path factor on long-term government bond yields persist for about 25 working days.

These results suggest that there is at least a 'perceived' forward guidance element on days of monetary policy announcements. Regardless of whether the central bank intended to give any guidance on the future monetary policy stance, the markets have extracted some form of information about the likely path of the future policy from the statements and have incorporated them in their pricing of yields. In other words, the information extracted by the markets about the future policy path (even if it was not explicitly pursued by the central bank) has helped the transmission of monetary policy in Malaysia. We would like to, however, state that the forward guidance or the type of communication we discuss here is different from the one used by some advanced economy central banks following the Global Financial Crisis of 2008-9.

We believe that our findings also point towards some evidence of monetary policy independence and effectiveness in an emerging market economy. This is in contrast to some emerging market studies that have found some evidence of the existence of a "monetary policy dilemm" (Rey (2015)), where the effectiveness of monetary policy on long-term rates in emerging market economies diminishes amid sizeable capital flows, which are in turn, largely influenced by the global financial cycle. Instead, our results suggest that domestic monetary policy still has sizable influence on longer-term interest rates.

This paper also contributes to the growing literature on central bank communication by examining the role of communications in a non-inflation targeting emerging market economy central bank.[2] Woodford (2005) in his well-cited speech at the 2005 Federal Reserve Bank of Kansas City Symposium in Jackson Hole, described central banking as "management of expectations". Specifically, the successful conduct of monetary policy would involve shaping market expectations on how key macroeconomic variables would evolve in the future, beyond the control of the policy rates itself. While it has been true that central banks have been communicating about the likely future path of their policy instruments as part of their communication of the underlying economic assessment and outlook, the greater use of a more explicit form of announcement coupled with some intention to pre-commit future policy (typically with some conditionality) has been more evident since the Global Financial Crisis. This occurred as central banks in the advanced economies encountered the effective lower bound in their conventional

[2] See Blinder et al. (2008) and Moessner et al. (2017) for broad surveys of central bank communication.

monetary policy tool. Given the prevailing environment of low global interest rates, this issue is therefore of relevance to all central banks and is not confined to advanced economies alone.

The remainder of this paper is structured as follows. Section 2 explains the methodology and the data used, as well as the factor estimation. Section 3 reports the estimated factors, and discusses the identification. Section 4 estimates the effect of the factors on government bond yields, corporate yields, and corporate spreads. Section 5 examines the persistence of the effects of the path factor. Finally, Section 6 concludes.

# 2 Methodology

Where does the power of forward guidance or communication come from? Let us briefly discuss the theoretical underpinnings of the influence of forward guidance.[3] As discussed in the introduction, we adopt a broader view of the concept of forward guidance to include both direct and indirect signals that the central bank could convey in its communication.[4] We can illustrate this in a simple New Keynesian model similar to the one used in Gertler (2017), which includes trend inflation. The model equations are:

$$y_t = E_t y_{t+1} - \sigma(i_t - E_t \pi_{t+1} - r_t^*) \tag{1}$$

$$\pi_t = \lambda y_t +_t \pi_{t+1} + (1 - \beta)\bar{\pi}_t \tag{2}$$

$$i_t = max\{r_t^* + \bar{\pi}_t + \phi_\pi(\pi_t - \bar{\pi}_t) + \phi_y y_t, 0\} \tag{3}$$

The IS equation (4) links the current level of output gap $y_t$ to the future expected level of output gap as well as the real interest rate gap $(i_t - E_{\pi_{t+1}})$, the deviations of the level of real interest rate from the natural rate of interest, $r_t^*$. The second equation (equation 2) is the New Keynesian Phillips Curve with trend inflation, in which the current level inflation is related to the output gap in the next period as well as to the trend inflation. The third equation, equation 3 is the policy reaction function of the central bank. It is adjusted in response to output gap and inflation deviations from the

[3]The discussion of the theory here is for illustrative purposes to show how communication can influence the economy and make policy more effective.

[4]Moreover, even if the central bank does not intend to 'forward guide' the markets, the markets might still infer some information from the statements.

trend inflation. Solving this model under rational expectations results in the following equations:

$$y_t = E_t \sum_{j=0}^{\infty} -\sigma(i_{t+j} - \pi_{t+1+j} - r^*_{t+j}) \tag{4}$$

$$\pi_t = E_t \sum_{j=0}^{\infty} \beta^j \lambda y_{t+j} + \bar{\pi}_t \tag{5}$$

Eggertsson and Woodford (2003) show that current economic activity, the output gap, is influenced not only by the current interest rate but also by the entire path of future expected interest rates. A lower expected path for example leads to an expansion in output today. There are two effects coming from forward guidance: direct and indirect effects. The direct effect is the influence exerted by the expected interest rates ($E_t i_{t+j}$) on the output that is identical at every $j$. It should be noted that there is no discount factor in the IS equation, which is an outcome of general equilibrium effects in conjunction with rational expectations (Angeletos and Lian (2018)).[5] The powerful and important indirect effect comes from the effect of changes in output gap, $y_t$ on expected inflation, which magnifies the overall effect. The increase in $E_t i_{t+j}$ reduces expected output gap from $k = 1$ to $j$. In turn, the changes to the path of output affects the path of inflation over the entire period, thus raising the real interest rates in the IS curve, equation (4). The effect on output is amplified by the magnified increase in the interest rate path over the entire horizon. Because the indirect effect is increasing in the horizon $j$, so too is the overall impact of an increase in expected interest rates on output gap.[6]

Given the above theoretical framework, let us now turn to the empirical methodology that we adopt. We apply the Gürkaynak et al. (2005) approach to data from

[5]As discussed in Gertler (2017), individuals do indeed discount the effects of changes in future interest rates in partial equilibrium. Given the assumption of rational expectations, the effect of future interest rate change on future aggregate activity are, nevertheless taken into account. In this simple framework, however, the general equilibrium effect exactly offsets the discounting of future interest rate changes.

[6]In these models the forward guidance has been found to be 'too powerful' so that the economy could be fully stabilised with more communications. This is also known as the forward guidance puzzle and is beyond the scope of our work.

Malaysia, and test for the number of factors that are needed to correctly and adequately understand the responses of asset prices to monetary policy on announcement days.[7]

We consider BNM's monetary policy statement announcements from August 2005 to March 2020 ($T$=97). Specifically, let $X$ be the a $T \times n$ matrix of daily changes in interest rates on the days of the monetary policy announcements by the BNM. Let $F$ be the unobserved factor(s) that characterise the changes in yields, which are collected in matrix $X$, where the first column of $X$ is a proxy for monetary policy surprises, similar to Kuttner (2001). In our estimation we use daily changes in the one-month KLIBOR yield as monetary policy surprises.

We use two sets of yields to estimate the factors. For our benchmark estimation, the $X$ matrix, in addition to the changes in one-month KLIBOR yield includes the changes in the three-, six-months KLIBOR yields, and three-, five- and ten-year Malaysian Government Securities (MGS) yields. The second set of $X$ matrix include the changes in yields of one- and three-month KLIBOR yields, one-year interest rate swaps (IRS) yield, and three-, five- and ten- year MGS yields. All variable series in the principal component analysis are standardised to have zero mean and unit variance.

The $X$ matrix, which collects different yields can be summarised as a factor structure:

$$\underbrace{X}_{T\times n} = \underbrace{F}_{T\times k}\underbrace{\Lambda}_{k\times n} + \underbrace{\varepsilon}_{T\times n} \tag{6}$$

where $F$ is a $T \times k$ matrix of latent factors (with $k < n$), $\Lambda$ is a $k \times n$ matrix of factor loadings, and $\varepsilon$ is a $T \times n$ matrix of white noise disturbance. We first test for the number of latent factors, $k_0$, that can adequately describe the variation in asset price responses on announcement days. For this, we follow Gürkaynak et al. (2005) and use the Cragg and Donald (1997) rank test, where the null hypothesis is that $X$ is described by $k_0$ common principal components and the alternative is that $X$ is described by $k > k_0$ principal components. We report the results of the Cragg and Donald (1997) rank test in Table 1.

[7] There is another way of decomposing the changes in yields into their "target" and "path" components a la Gürkaynak (2005). This is the approach taken in Lunsford (2020).

The top panel of the table presents the results for the benchmark factor model while the bottom panel presents the results with the alternative group of data we described above.[8] The tests reject null hypotheses that there is no factor structure (white noise). The tests also reject that a single factor is enough to characterise the responses of asset prices to monetary policy announcements. This implies that the traditional way of characterising monetary policy by surprise changes in short-term interest rates is not adequate to explain the responses of the yield curve to monetary policy decisions. This result is consistent with results from a number of countries.

**Table 1**

Cragg and Donald Rank Tests for Number of Factors

Panel A: Series used are KLIBOR 1m, 3m, 6m and MGS 3y,5y,10y

| H0: No of factors equal | Wald statistic | Chi-sq degrees of freedom | p-value | No. of obs |
|---|---|---|---|---|
| 0 | 36.6368 | 15 | 0.00143 | 97 |
| 1 | 17.3334 | 9 | 0.04374 | 97 |
| 2 | 4.6853 | 4 | 0.32114 | 97 |

Panel B: Series used are KLIBOR 1m, 3m, IRS1y and MGS 3y,5y,10y

| H0: No of factors equal | Wald statistic | Chi-sq degrees of freedom | p-value | No. of obs |
|---|---|---|---|---|
| 0 | 43.9498 | 15 | 0.00011 | 97 |
| 1 | 17.8332 | 9 | 0.03716 | 97 |
| 2 | 6.0037 | 4 | 0.19887 | 97 |

## 2.1 Factor Rotation - A Structural Interpretation of the Factors

We estimate the latent factors, $F$ by using the standard principal components method.[9] The two principal components we estimated above, $F = [F_1, F_2]$, however, are only statistical transformations and do not possess an economically meaningful interpretation. For example, the first principal component may or may not correspond to the surprise change in the OPR or path factor. Instead, the first principal component is likely to be some combination of both the target and the path factors contained in the announcements. In technical terms, if $F$ and $\Lambda$ are good characterisation of the

[8]We also conduct the same tests with different types of market interest rates. The results are consistent with the benchmark estimation.

[9]This section borrows heavily from Gürkaynak et al. (2005).

data $X$ and $U$ is any $2 \times 2$ orthogonal matrix, then the matrix $\tilde{F} = FU$ and loadings $\tilde{\Lambda} = U'\Lambda$ represent an alternative factor model that fits data, $X$, exactly as well as $F$ and $\Lambda$, producing exactly identical residuals $\epsilon$. Furthermore, the scale of $F$ and $\Lambda$ are also indeterminate: if $\alpha$ is any scalar, then  and $\Lambda/\alpha$ also fit the data $X$ exactly as well as $F$ and $\Lambda$. For this reason, we will follow the standard practice of normalising each column of $F$ to have unit variance (Swanson (2017)).

We use the approach proposed by Gürkaynak et al. (2005) to identify "structural" factors so that we can interpret what the factors are. This involves a rotation of the two principal components $F_1$ and $F_2$ that results in two new factors $Z_1$ and $Z_2$. The new factors $Z_1$ and $Z_2$ are orthogonal to each other and explain the data $X$ in the same way as $F_1$ and $F_2$. The main identifying assumption is that the monetary policy surprise should be correlated with the target factor but not with the path factor, so that the second factor $Z_2$ has no effect on the current interest rate surprise.

Define

$$Z = FU$$

where the second column of $Z$ is a vector that is associated on average with no change in the current interest rate decision, $U$ is an orthogonal matrix,

$$U = \begin{bmatrix} \alpha_1 & \beta_1 \\ \alpha_2 & \beta_2 \end{bmatrix}$$

where the columns of $U$ are normalised to have unit length ($Z_1$ and $Z_2$ have unit variances). The rotated factors are orthogonal to each other,

$$E(Z_1 Z_2) = \alpha_1\beta_1 + \alpha_2\beta_2 = 0$$

$Z_2$ does not influence the current policy surprise. Let $\gamma_1$ and $\gamma_2$ be the loadings of the monetary policy surprise on $F_1$ and $F_2$, respectively. Then,

$$F_1 = \frac{1}{\alpha_1\beta_2 - \alpha_2\beta_1}\left[\beta_2 Z_1 - \alpha_2 Z_2\right]$$

$$F_2 = \frac{1}{\alpha_1\beta_2 - \alpha_2\beta_1}\left[\alpha_1 Z_2 - \beta_1 Z_1\right]$$

and

$$\gamma_1\alpha_1 - \gamma_1\alpha_2 = 0$$

$Z_1$ and $Z_2$ are re-scaled so that $Z_1$ moves with the current monetary policy surprise one-for-one, $Z_2$ has the same effect on the one-year ahead yield as $Z_1$ has on that rate. These conditions are enough for unique identification. These identification assumptions are consistent with the view that the first factor corresponds to the target factor while the second factor is about the path factor.

As Gürkaynak et al. (2005) state, the estimated target factor should be similar to — but not exactly equal to — the monetary policy surprises derived by the Kuttner (2001) methodology. This is largely due to the fact that the principal component approach strips out the white noise potentially present in the data.

# 3 Empirical Results

For the rest of our discussion, we consider the factors extracted from our benchmark model as described above. Figure 1 plots the histogram of the normalised factors, and Figure 2 shows the two factors over time.

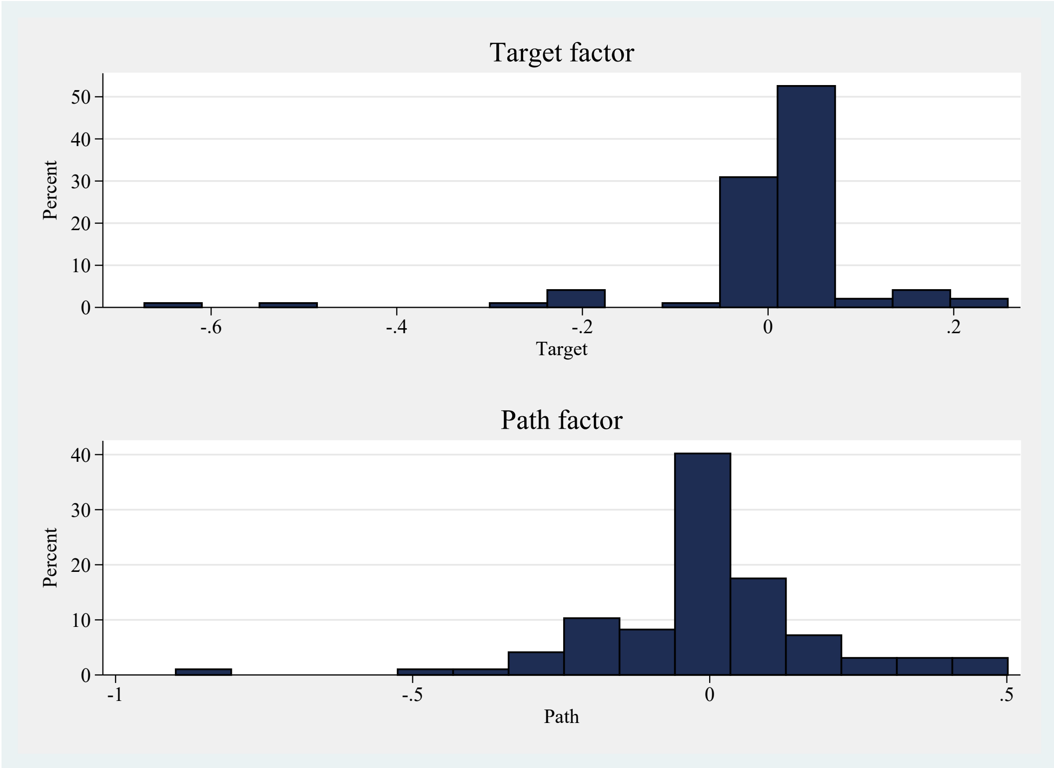


**Figure 1**
Distribution of factors - normalised

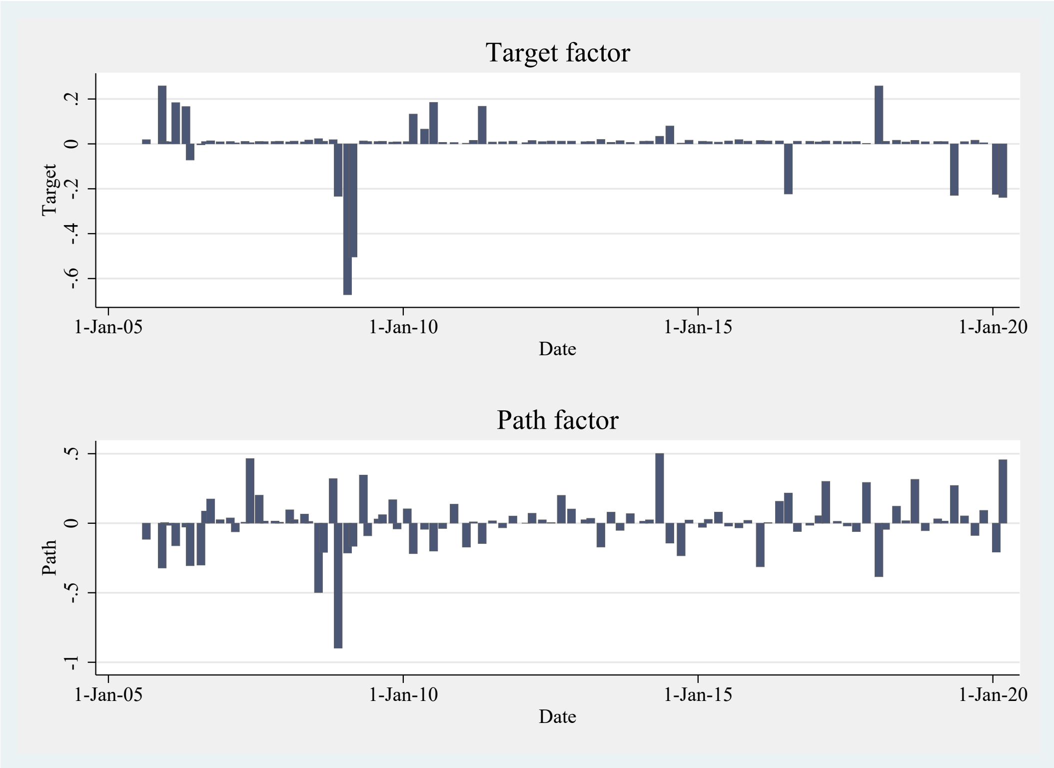


**Figure 2**
Target and Path Surprises

### 3.1 Path Factor and Monetary Policy Statements

We compare the factors as shown in Figures 1 and 2 with the actual observed features of the monetary policy statements on the announcement dates.[10] During the period of the Global Financial Crisis, we find that there were several dates whereby the path factor was large in absolute terms. Starting from the announcement on 25 July 2008, while the OPR was left unchanged, our estimates show that the path factor was large and negative. There was a discernible shift in the language used in describing the balance of risks between growth and inflation since the preceding meeting on 26 May 2008. Notably, while risks were assessed to be balanced in May 2008, the tone shifted towards greater downside concerns on growth in July 2008. This change would

[10] In our robustness exercise, we find that the correspondence between the factors obtained from in our baseline case is in line with the second set of series that we showed in Table 1.

have led markets to start adjusting their expectations of future policy rates over the medium-term.

> *In the next twelve months, while both the risks to higher inflation and the risks to slower growth have increased, the immediate concern is to avoid a fundamental economic slowdown that would involve higher unemployment. Slowing growth itself will contribute to containing the potential for second round effects on inflation, thereby containing further increases in prices in the second-half of 2009.*
>
> - Excerpts from the Monetary Policy Statement on 25 July 2008

> *...going forward, the risks to inflation are on the upside, while the risks to growth are on the downside. Should the balance of risks shift towards higher inflation, the Bank will undertake the appropriate monetary policy measures. At this stage the risks are assessed to be about balanced.*
>
> - Excerpts from the Monetary Policy Statement on 26 May 2008

Later in the year, our estimate shows that the sharpest change in the path factor in our sample occurred with the announcement on 24 November 2008, which marked the beginning of the Malaysian easing cycle at the height of the Global Financial Crisis. While the target factor also changed quite substantially on that announcement date, the large negative path factor indicates that market participants' expectations on future policy path shifted significantly after that meeting. In particular, the specific phrasing of the forward-looking element of the statement provided strong indications of an easing stance.

> *"Given the heightened downside risks to growth and the diminishing inflationary pressures, the reduction in the OPR is a pre-emptive measure aimed at providing a more accommodative monetary environment... Bank Negara Malaysia will monitor closely the evolving developments and will undertake the appropriate policy response to avoid a severe economic downturn."*
>
> - Excerpts from the Monetary Policy Statement on 24 November 2008

While in the next two subsequent monetary policy meetings in January 2009 and February 2009, the policy rate was cut by 75 and 50 basis points respectively, the changes in the path factor at those two meetings were smaller (and still negative). This suggests that market expectations had already priced in the changes in the future path of monetary policy, that it would remain very accommodative over the medium-term.

Another key period when the path factor was large occurred after the announcement on 8 May 2014. As described in the introduction of this paper, the last sentence of the statement, i.e., *“..the degree of monetary accommodation may need to be adjusted...*" provided strong indications for an imminent (upward) adjustment in the policy rate that subsequently led markets to reprice assets. In addition to the forward-looking element in the statement, it also provided an assessment of the central bank’s view of the economic outlook.

> *In Malaysia, latest indicators suggest that the domestic economy continued to register favourable performance in the first quarter. Going forward, growth will remain anchored by domestic demand with additional support from the improved external environment... Inflation is...expected to remain above its long-run average due to higher domestic cost factors.*
>
> - Excerpts from the Monetary Policy Statement on 8 May 2014

To a large extent, the change in wording in describing the economic outlook compared to the previous statement on 6 March 2014 could also have contributed to a change in expectations on the policy path.

> *“Latest indicators point to further improvement in exports and continued expansion in private sector investment spending... Domestic demand is, however, expected to moderate, reflecting the ongoing public sector consolidation and as private consumption growth trends towards its long-term average.*"
>
> - Excerpts from the Monetary Policy Statement on 6 March 2014

The expectation for a hike in policy rate materialised in the subsequent policy meeting on 10 July 2014 when the OPR was raised by 25 basis points.

# 4 Responses of Asset Prices

## 4.1 Government Bond Yields and Stock Prices

In the previous section, we established that two factors are needed to adequately capture the responses of yields to monetary policy. Having then estimated those factors, in this section we will examine the effects of these two factors on asset prices including longer term interest rates and stock prices. More specifically, we run the regressions 7 and 8 for every maturity $j$ of government bond yields, and the stock price index:

$$\Delta y_t^j = \alpha + \beta_1 Z_{1,t} + \varepsilon_{t,1} \tag{7}$$

$$\Delta y_t^j = \alpha + \beta_1 Z_{1,t} + \beta_2 Z_{2,t} + \varepsilon_{t,2} \tag{8}$$

where $\Delta y_t^j$ is the daily change in the government bond yields with a maturities of $j = 1, 3, 5, 7, 10$ years on the days of monetary policy announcements.

This high-frequency event study methodology is widely used in the literature (see Gürkaynak et al. (2005), Kuttner (2001)) since lower frequency data i.e., at monthly or quarterly, would be inappropriate with the role of confounding factors making the estimation harder. For example, in a quarterly window, new domestic or foreign data releases or external capital flows from global factors would confound the estimate of our variables of interest. For our exercise, we employ daily (24-hour window) data for Government yields and stock prices, and weekly data for corporate bond yields and spreads.

Table 2 reports the responses of the MGS yields to the estimated factors, $Z_1$ and $Z_2$. Columns (1) to (5) of Panel A report the estimates from equation (7) and columns (1) to (5) of Panel B report the results from equation (8).

The first factor on its own explains a very large fraction of one-year yield, whereby about 71 percent of the variation in one-year yield is explained by the first factor

**Table 2**
Responses of Malaysian Government Securities (MGS) yields and stock prices

Panel A

| | (1)<br>MGS (1y) | (2)<br>MGS (3y) | (3)<br>MGS (5y) | (4)<br>MGS (7y) | (5)<br>MGS (10y) | (6)<br>FBMKLCI Index |
|---|---|---|---|---|---|---|
| Target | 0.519*** | 0.398*** | 0.289*** | 0.276*** | 0.213*** | -0.00667* |
| | (0.101) | (0.073) | (0.052) | (0.054) | (0.054) | (0.003) |
| Observations | 97 | 97 | 97 | 97 | 97 | 97 |
| R-squared | 0.705 | 0.562 | 0.442 | 0.393 | 0.231 | 0.011 |

Panel B

| | (1)<br>MGS (1y) | (2)<br>MGS (3y) | (3)<br>MGS (5y) | (4)<br>MGS (7y) | (5)<br>MGS (10y) | (6)<br>FBMKLCI Index |
|---|---|---|---|---|---|---|
| Target | 0.519*** | 0.398*** | 0.289*** | 0.276*** | 0.213*** | -0.00667* |
| | (0.093) | (0.042) | (0.008) | (0.018) | (0.029) | (0.003) |
| Path | 0.118*** | 0.184*** | 0.182*** | 0.194*** | 0.213*** | -0.003 |
| | (0.020) | (0.016) | (0.009) | (0.007) | (0.014) | (0.004) |
| Observations | 97 | 97 | 97 | 97 | 97 | 97 |
| R-squared | 0.810 | 0.907 | 0.943 | 0.952 | 0.898 | 0.020 |

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

(target surprise factor). However, the variation explained by this factor declines sharply as one moves along the yield curve and bottoms up at about 23 percent for the ten-year yield.

The bottom panel of Table 2 presents the estimation results for equation (8) which includes the path factor, $Z_2$ as an additional regressor. Since the factors are orthogonal, the marginal increase in the explained variation ($R^2$) is solely due to the effect of the path factor ($Z_2$). As the maturity increases, the relative contribution of this factor, measured by the increase in $R^2$ increases. This factor explains around an additional 35 percent of the variation in the movements of the three-year yield. For the yields at longer maturities than three years, the path factor dominates and explains more than 50 percent of the total explainable variation in government bond yields on monetary policy days. The explained variation attributable to this factor reaches about 74 percent of the total explainable variation for ten-year yields.[11] The fact that the effects of the path factor tend to be more sizeable at the longer end of the yield curve is consistent with the domination of that part of the curve by local investors. In the Malaysian fixed income market, historically, non-residents tend to be at the shorter-end of the curve due to preference for more liquid segments for arbitraging purposes although this has been changing in recent years.

Table 2 also includes the responses of the stock market index to the two types of monetary policy factors (see Columns (6) of Panels (A) and (B)). Interestingly, the stock prices measured by the FTSE Bursa Malaysia KLCI (FBMKLCI) Index only responds (negatively) to the target surprise but not to the path surprise. This result is consistent with the findings from Gürkaynak et al. (2005). However, the result in Gürkaynak et al. (2005) on stock prices is overturned in Swanson (2017). Recently, by examining individual stock level responses, Gürkaynak et al. (2019) show that the liability structure and associated cash flow for a firm matters for the response of stock price to monetary policy, especially to the forward guidance. They show that firms that have more cash flow exposure see their stock prices affected more. They also find that stock price reaction depends on the maturity and type of debt issued by the firm, and the forward guidance provided by the Fed. While an analysis of the stock specific

[11] We find the same results if we estimate the same regressions for IRS yields.

responses is beyond the scope of this paper, however, we believe that understanding the role of balance sheets in the transmission of the path factor surprise is important.

We also investigate the differential responses of Government yields whether the OPR announcements involved an actual policy rate change or otherwise. For this, we estimate the following regression:

$$\begin{aligned}\Delta y_i^j = \; & \alpha + \beta_1 Z_{1,i} + \beta_2 Z_{2,i} + \beta_3 \mathbf{1}(\Delta OPR \neq 0) + \\ & \beta_4 Z_{1,i} \times \mathbf{1}(\Delta OPR \neq 0) + \beta_5 Z_{2,i} \times \mathbf{1}(\Delta OPR \neq 0) + \varepsilon_{i,2} \end{aligned} \quad (9)$$

where the indicator variable, $\mathbf{1}(\Delta OPR \neq 0)$ is 1 if the date corresponds to an actual OPR increase or decrease, and 0 if the OPR is left unchanged.

**Table 3**
Responses of Malaysian Government Securities (MGS) yields interacted with OPR change

| | (1)<br>MGS (1y) | (2)<br>MGS (3y) | (3)<br>MGS (5y) | (4)<br>MGS (7y) | (5)<br>MGS (10y) |
|---|---|---|---|---|---|
| Target | 0.222 | 0.975** | 0.842*** | 0.229* | -0.625** |
| | (0.311) | (0.389) | (0.088) | (0.124) | (0.280) |
| Path | 0.084*** | 0.158*** | 0.167*** | 0.190*** | 0.241*** |
| | (0.021) | (0.016) | (0.013) | (0.011) | (0.014) |
| OPR change (dummy) | 0.005 | 0.001 | 0.004 | -0.007* | -0.004 |
| | (0.012) | (0.008) | (0.003) | (0.004) | (0.006) |
| OPR change (dummy) X Target | 0.308 | -0.582 | -0.556*** | 0.042 | 0.844*** |
| | (0.325) | (0.391) | (0.089) | (0.125) | (0.282) |
| OPR change (dummy) X Path | 0.093** | 0.038 | 0.018 | 0.000 | -0.039 |
| | (0.042) | (0.040) | (0.016) | (0.016) | (0.032) |
| Observations | 97 | 97 | 97 | 97 | 97 |
| R-squared | 0.827 | 0.918 | 0.954 | 0.955 | 0.924 |

In Table 3, we find that the coefficients on the indicator variable are generally statistically insignificant across all maturities of the MGS yields (with the exception of MGS 7y). Likewise, for the interaction term between the path factor and the indicator variable, we find that aside from the 1-year MGS yields, the coefficient is also insignificant across the longer-term maturities. This suggests that the path factor does not move differently on dates that correspond to OPR changes. In other words, the information content of the monetary policy statement appears to influence the path factor in the same way regardless of whether the actual decision involves a change in OPR or not.

These results strongly suggest that the path factor is influential in explaining the movements in longer-term interest rates in Malaysia. Although these estimates come from a sample where the monetary policy was not restricted by the effective lower bound, they still suggest that the path factor can affect longer maturity interest rates.

## 4.2 Corporate Bond Yields and Spreads

We also investigate the impact of the factors on private sector borrowing costs; i.e., on corporate bond yields and spreads similar to Swanson (2017) and Lunsford (2020). As in the US data, noted by Gilchrist et al. (2015), corporate bonds often have the option to be "called" prior to maturity of the bond. Because the monetary policy changes may indeed influence the value of the call option, we would ideally strip out this effect by using yields that are option-a djusted.[12] However, we do not have access to this type of data for Malaysia. Unlike the previous analysis using daily government bond yields, corporate bond yields data are available only at weekly frequency. Therefore, our results are probably not as clear cut as Lunsford (2020).

Specifically, we consider the responses of corporate bond yields of AAA, AA, A, BBB and BB and lower rated bonds with maturities of 3, 5, 7 and 10 years.[13] Table 4 shows the estimates of the target and path factors for corporate yields for AAA-rated corporate bonds. The results for the other lower-rated bonds are shown in Appendix I. We find that the responses of corporate bond yields to be generally more muted compared to those of government bond yields. Our findings are similar to those obtained by Swanson (2017) in his analysis of US corporate bond yields, where he also finds a relatively more muted impact of corporate yields compared to government yields. This

[12] Lunsford (2020) uses the Bloomberg Fair Value model for option-adjusted corporate bond yields.

[13] In Malaysia, rated bonds are disproportionately skewed towards AAA-, AA- and A-rated bonds, which together make up about half of the total issuance, while another 30 percent comprise government guaranteed bonds which rank above or close to AAA-rated bonds. The rest are mostly unrated bonds, a segment which has grown upon the easing of mandatory rating requirements in January 2015. Bonds that are rated BBB- and lower account for only about 1 percent of total issuance.

is unlike the results obtained by Lunsford (2020) in which the yields of corporate bonds and mortgage backed securities (MBS) have been found to be generally as or more responsive compared to government yields.

**Table 4**
Responses of corporate yields (AAA-rated)

Panel A

| | (1)<br>AAA (3y) | (2)<br>AAA (5y) | (3)<br>AAA (7y) | (4)<br>AAA (10y) |
|---|---|---|---|---|
| Target | 0.170*** | 0.155*** | 0.141*** | 0.134*** |
| | (0.037) | (0.042) | (0.041) | (0.042) |
| Observations | 97 | 97 | 97 | 97 |
| R-squared | 0.309 | 0.231 | 0.234 | 0.199 |

Panel B

| | (1)<br>AAA (3y) | (2)<br>AAA (5y) | (3)<br>AAA (7y) | (4)<br>AAA (10y) |
|---|---|---|---|---|
| Target | 0.170*** | 0.155*** | 0.141*** | 0.134*** |
| | (0.033) | (0.040) | (0.040) | (0.042) |
| Path | 0.054*** | 0.049*** | 0.051*** | 0.050*** |
| | (0.016) | (0.013) | (0.015) | (0.015) |
| Observations | 97 | 97 | 97 | 97 |
| R-squared | 0.401 | 0.300 | 0.323 | 0.280 |

Given the combined results from government and corporate bond yields, the implied effect of the path factor on corporate bond spreads (measured as the difference between corporate bond yields and the government bond yields for each corresponding maturity) is negative and significant (Table 5).[14] As discussed by Swanson (2017), it is worth reiterating that while a decrease in the path factor has caused an increase in

[14]Similar results are found for corporate spreads measured by AA less MGS and A less MGS yields of corresponding maturities.

corporate bond spreads, it does not mean that the policy is contractionary. As shown in Table 4, corporate bond yields did respond positively to a positive change in the path factor, and so, corporate financing costs would have been lower whenever the path factor decreases.

**Table 5**

Responses of corporate spreads (AAA-MGS)

Panel A

| | (1)<br>AAA less MGS (3y) | (2)<br>AAA less MGS (5y) | (3)<br>AAA less MGS (7y) | (4)<br>AAA less MGS (10y) |
|---|---|---|---|---|
| Target | -0.140 | -0.00277 | -0.0358 | -0.0453 |
| | (0.136) | (0.0589) | (0.0615) | (0.0580) |
| Observations | 97 | 97 | 97 | 97 |
| R-squared | 0.046 | 0.000 | 0.003 | 0.005 |

Panel B

| | (1)<br>AAA less MGS (3y) | (2)<br>AAA less MGS (5y) | (3)<br>AAA less MGS (7y) | (4)<br>AAA less MGS (10y) |
|---|---|---|---|---|
| Target | -0.140 | -0.00277 | -0.0358 | -0.0453 |
| | (0.137) | (0.0697) | (0.0805) | (0.0711) |
| Path | -0.126*** | -0.202*** | -0.214*** | -0.197*** |
| | (0.0423) | (0.0455) | (0.0481) | (0.0456) |
| Observations | 97 | 97 | 97 | 97 |
| R-squared | 0.155 | 0.256 | 0.291 | 0.293 |

Nevertheless, the remaining question is why would the magnitude of the impact on corporate bond yields be less than that observed for government yields. We conjecture that this might be due to the nature of the forward guidance itself. Given that the central bank has not, in the past, explicitly committed itself to an unconditional future policy path (Odyssean-form of forward guidance in the language of Campbell et al. (2012)) but instead, relied more on a Delphic-form of forward guidance, we conjecture that whenever the forward guidance path is reduced, it has often been associated with periods of weaker economic growth and inflation outlook. During those times, the credit risks of firms would also have been higher. As such, even as the forward guidance factor falls, the corporate bond yields would also fall but not by as much because it could have been offset by rising credit risks at the same time. The converse is true as well. When the forward guidance factor increases, it is often associated with more optimistic economic outlook and therefore, declines in credit risks.[15]

## 5 The Persistence of the Path Factor

In this section, we investigate how persistent the effects of the path factor have been on asset prices.[16] To answer this question we estimate impulse response functions of different asset prices to path factors by using local projections ( Jordà (2005)). Local projections are essentially a series of regressions at different horizons, $h$:

$$y_{t-1+h} = \alpha_h + \beta_h y_{t-1} + \gamma_h Z_{2_t} + \varepsilon_{h,t} \tag{10}$$

where $y_t$ is a yield at the close of day $t$, $Z_{2_t}$ is the path factor on announcement day $t$ that we estimated earlier. The time subscripts $t$ corresponds to the monetary policy announcement dates, *t-1* denotes the previous business day before the policy announcement. Each forecast horizon $h$ corresponds to a working day. The parameter of interest $\gamma_h$, which is the impulse response itself, is a vector of parameters that may vary across horizons (regressions) $h$. The main advantage of estimating impulse responses in local projections a la Jordà (2005) as opposed to a VAR is the robustness to model mis-specification.[17]

[15]In addition, we also consider the responses of professional forecasters to the two policy factors. These results are available upon request. Similar to Campbell et al. (2012) and Lunsford (2020), we do not find clear-cut statistically significant results for this analysis. This could be due to a number of reasons. First, the discrepancy between the timing of the survey for forecasts and the monetary policy announcements could mean that other information flows could have contaminated the estimates. Second, related to the first point is that the "central bank information effect" may not be as important (Bauer and Swanson 2020). Third, our methodology could not rule out reverse causality.

[16]In several studies conducted on FOMC's unconventional monetary policy measures, there have been generally the sense that the effects of large-scale asset purchases (LSAP) have not been very persistent (Wright (2012), Rogers et al. (2014)) although Swanson (2017) finds some evidence to the contrary.

[17]Plagborg-Møller and Wolf (forthcoming) show that the impulse responses from the VARs and the local projections are the same asymptotically. For a more recent treatment of the simplicity and robustness of local projections we refer the readers to Olea and Plagborg-Møller (forthcoming).

Similar to Swanson (2017), we find that the coefficients $\alpha_h$ and $\beta_h$ are always close to zero and one, respectively. We then follow Swanson (2017) and impose these coefficients to be zero and one. As a result of these restrictions on $\alpha_h$ and $\beta_h$, equation (10) becomes a regression of the $h$-day changes in yields, $y_{t-1+h}$ - $y_{t-1}$, on the factors $Z_{2_t}$. The impulse responses which are essentially the coefficient estimates of $\gamma_h$ across forecast horizons $h$. We would like to observe if they tend to fall as the number of days past the announcement ($h$) increases.[18]

Needless to say that as $h$ increases, in other words as we move away from the announcement day there will be other news that may affect the asset prices and therefore we expect the standard errors for $\hat{\gamma}_h$ to increase. For example, in a small open economy like Malaysia, the influences of global factors (e.g., global term premium or risk aversion) could play a significant role. These would imply that the error term, $\epsilon_t^h$ and standard errors surrounding $\hat{\gamma}_h$ would grow as *h* increases.

Figure 3 shows the results for MGS yields of maturities 1-, 3-, 5-, 7- and 10-years. The solid black lines show the point estimates of the parameter $\gamma_h$ across different horizons, *h* while the broken thin lines are the corresponding 95$\%$ confidence band for each point estimate. The estimated effects of a one percentage point increase in the path factor on the 1-year MGS yields is significantly different from zero for up to around 18 business days. For MGS yields of 3- and 5-year maturities, the effects remain significant for around 23 business days while for MGS yields of 7- and 10-year maturities, they remain significant for around 26 business days. In comparison to the FOMC forward guidance path, Swanson (2017) finds that for the 2-year and 10-year Treasury yields, the effects are statistically significant out to horizons of about 35 days and 40 days respectively.

[18] If the shock is observed then the impulse responses can be estimated simply by estimating same equation (equation 10) without other control variables, including the $y_{t-1}$. We refer the reader to Jordà (2005) for a more detailed discussion.


**Figure 3**
Effects of Path Factor on 1-,3-,5-,7- and 10-year Malaysian Government Securities yields

It is important to note that in our sample period, BNM has not engaged in unconventional monetary policies in the same form as those undertaken by central banks in the advanced economies. Therefore, any persistence in the path factor would purely be the consequence of market participants' perceptions and reactions to BNM's monetary policy statements in its current monetary policy framework.

# 6 Conclusions

In this paper, we examine the role of monetary policy communication in an emerging market economy, Malaysia. Malaysia is an interesting case study as it is a non-inflation targeting emerging market economy while the extant literature on monetary policy communication has hitherto, been focused primarily on either advanced economies or inflation targeting economies.

Our paper has a number of important findings. First, there is indeed a path factor embedded in the markets responses on days of monetary policy announcement by BNM. Second, the variation in the path factor appears to be related to the wording of the policy statements. Third, the path factor has a strong influence on long-term government and corporate bond yields, as well as spreads. The impact of longer-term Government yields persists for up to around 25 working days.

Our results show that even without deviating from the current monetary policy framework, it may be possible for the current communication strategy of the Bank to potentially strengthen the persistence of the effects of the path factor. Given that market participants have inferred the future policy stance from policy statements, there may be room for policy-makers to make greater use of this tool. This has provided an environment of policy predictability that has helped to shape market expectations accordingly.

There are some remaining challenges for broad monetary policy conduct arising from our findings. There are several issues that may inhibit the power of forward guidance by the central bank from achieving its intended outcome. Based on a survey by Moessner et al. (2017), they find that in practice, forward guidance is mostly conditional, that is central banks generally do not provide commitment in their communication. The practical concern is how to ensure that the conditionality can be best communicated without being misinterpreted by the market. In addition, there are further challenges associated with communication during periods of great uncertainty. While there is a greater need for guidance during periods of uncertainty, it would be more challenging to prescribe guidance in these times. Notably, the recent paper by Campbell et al. (2019) highlights some of the effects should the central bank fail to communicate clearly and credibly. Specifically, they find that miscommunication could lead to sizable macroeconomic volatility. This concern could explain why central banks can be reticent when uncertainties are high. This does not, however, mean that central banks should eliminate forward guidance altogether. Rather, the lesson is that there are clear benefits for central banks to invest in developing effective communication. While there is no fixed prescription for every central bank or scenario, experiences from other countries have shown that features of a successful communication strategy would include elements such as clarity in objectives and trade-offs, as well as leveraging on broader communication platforms (e.g., minutes of decision meetings and press conferences following decisions).

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# A Appendix I

**Table 6**
Responses of corporate yields (AA-rated)

Panel A

| | (1)<br>AA (3y) | (2)<br>AA (5y) | (3)<br>AA (7y) | (4)<br>AA (10y) |
|---|---|---|---|---|
| Target | 0.167*** | 0.162*** | 0.154*** | 0.125*** |
| | (0.0235) | (0.0358) | (0.0337) | (0.0324) |
| Observations | 97 | 97 | 97 | 97 |
| R-squared | 0.390 | 0.322 | 0.274 | 0.169 |

Panel B

| | (1)<br>AA (3y) | (2)<br>AA (5y) | (3)<br>AA (7y) | (4)<br>AA (10y) |
|---|---|---|---|---|
| Target | 0.167*** | 0.162*** | 0.154*** | 0.125*** |
| | (0.0217) | (0.0340) | (0.0334) | (0.0336) |
| Path | 0.0374*** | 0.0544*** | 0.0548*** | 0.0531*** |
| | (0.0101) | (0.0103) | (0.0115) | (0.0144) |
| Observations | 97 | 97 | 97 | 97 |
| R-squared | 0.446 | 0.426 | 0.374 | 0.257 |

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

**Table 7**
Responses of corporate yields (A-rated)

Panel A

| | (1)<br>A (3y) | (2)<br>A (5y) | (3)<br>A (7y) | (4)<br>A (10y) |
|---|---|---|---|---|
| Target | 0.164*** | 0.0485 | -0.0309 | -0.0179 |
| | (0.0382) | (0.0487) | (0.0987) | (0.0849) |
| Observations | 97 | 97 | 97 | 97 |
| R-squared | 0.138 | 0.007 | 0.001 | 0.000 |

Panel B

| | (1)<br>A (3y) | (2)<br>A (5y) | (3)<br>A (7y) | (4)<br>A (10y) |
|---|---|---|---|---|
| Target | 0.164*** | 0.0485 | -0.0309 | -0.0179 |
| | (0.0398) | (0.0426) | (0.0845) | (0.0717) |
| Path | 0.0501* | 0.0722** | 0.109** | 0.120** |
| | (0.0296) | (0.0351) | (0.0508) | (0.0554) |
| Observations | 97 | 97 | 97 | 97 |
| R-squared | 0.175 | 0.050 | 0.054 | 0.025 |

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

**Table 8**
Responses of corporate yields (BBB-rated)

Panel A

| | (1)<br>BBB (3y) | (2)<br>BBB (5y) | (3)<br>BBB (7y) | (4)<br>BBB (10y) |
|---|---|---|---|---|
| Target | 0.055 | 0.003 | 0.041 | -0.006 |
| | (0.060) | (0.107) | (0.122) | (0.167) |
| Observations | 97 | 97 | 97 | 97 |
| R-squared | 0.003 | 0.000 | 0.001 | 0.000 |

Panel B

| | (1)<br>BBB (3y) | (2)<br>BBB (5y) | (3)<br>BBB (7y) | (4)<br>BBB (10y) |
|---|---|---|---|---|
| Target | 0.055 | 0.003 | 0.041 | -0.006 |
| | (0.050) | (0.088) | (0.096) | (0.141) |
| Path | 0.083* | 0.153** | 0.183** | 0.225** |
| | (0.050) | (0.069) | (0.079) | (0.106) |
| Observations | 97 | 97 | 97 | 97 |
| R-squared | 0.025 | 0.032 | 0.032 | 0.030 |

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

**Table 9**
Responses of corporate yields (BB and lower)

Panel A

| | (1)<br>BB and lower (3y) | (2)<br>BB and lower (5y) | (3)<br>BB and lower (7y) | (4)<br>BB and lower (10y) |
|---|---|---|---|---|
| Target | -0.017 | 0.025 | 0.009 | 0.062 |
| | (0.096) | (0.108) | (0.137) | (0.158) |
| Observations | 97 | 97 | 97 | 97 |
| R-squared | 0.000 | 0.000 | 0.000 | 0.000 |

Panel B

| | (1)<br>BB and lower (3y) | (2)<br>BB and lower (5y) | (3)<br>BB and lower (7y) | (4)<br>BB and lower (10y) |
|---|---|---|---|---|
| Target | -0.017 | 0.025 | 0.009 | 0.062 |
| | (0.0872) | (0.0947) | (0.121) | (0.139) |
| Path | 0.110 | 0.131 | 0.193 | 0.210 |
| | (0.073) | (0.103) | (0.141) | (0.168) |
| Observations | 97 | 97 | 97 | 97 |
| R-squared | 0.010 | 0.007 | 0.005 | 0.008 |

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