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### **Words Matter: A Textual Analysis of SBP's Monetary Policy Reviews**

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**STATE BANK OF PAKISTAN**

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# Words Matter: A Textual Analysis of SBP's Monetary Policy Reviews

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## Abstract

In this paper we perform a textual analysis of monetary policy statements issued during the past ten years by State Bank of Pakistan and compare them with policy reviews of seven selected central banks from regional, emerging and advanced economies. Broadly, we divided our analysis into three parts. In the first part, we attempt to estimate the contribution of macroeconomic contents in the monetary policy analysis of selected central banks. The second part deals with the decomposition of macroeconomic contents in driving the policy decisions. In the last section, we attempt to measure the forward-looking content in the monetary policy reviews and also their predictive power. Key findings suggest that, across the sample, trends in inflation and developments in external sector play an important role in driving the monetary policy stance. Also, it is found that the inflation targeting central banks have more forward-looking content in their policy reviews than non-inflation targeters. On the basis of empirical estimations, the former central banks are also found to be more proactive in adjusting the policy stance to given macroeconomic conditions and their outlook.

**Keywords:** monetary policy, central bank, communication

**JEL Classification:** E52, E58

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## **Non-technical Summary**

Transparency and communication have become fundamental parts of best practices in the context of modern central banking around the world. There has been a significant increase, as well as improvement, in information disclosure of central banks of both advanced and emerging economies over the last fifteen years. State Bank of Pakistan (SBP) has also gradually improved in terms of transparency and communication, particularly in the last decade. Increased focus on economic outlook, regular and frequent assessment of economic conditions, press conferences and speeches are some of the key features of SBP's improved communication framework. The monetary policy framework and its communication have also undergone significant changes in the past decade.

In this context, we attempt to measure and compare on how different central banks tend to communicate and disclose information, particularly through monetary policy decisions. Today, more than 90 percent of the IMF member countries publish monetary policy statements accompanied by policy decisions. Typically, monetary policy decisions contain assessment about current and future economic conditions with role of monetary policy instruments in influencing these conditions. Discussions related to economic outlook and associated risks, particularly trend in inflation and its forecasts, are now considered as common features of these monetary policy statements/reviews.

Based on these observations, we put forward three important questions. First, what are the macroeconomic contents of monetary policy reviews in general? Second, how these contents contribute in the policy analysis and eventually to policy decision? And third, how much is the level of forward-looking contents in policy reviews of each central bank in our sample and can these contents predict future policy decisions? Using text analytic software and empirical estimations, we applied both the quantitative and qualitative approaches on policy reviews of eight central banks from regional, emerging and advanced economies. Our sample is based on monetary policy statements/decisions issued during January 2006 to September 2015.

Our results showed that the contents of monetary policy analysis are largely the reflection of particular regime adopted by the respective central bank. Also, across the sample, most of the monetary policy decisions are found to be driven by trends in inflation and developments in external sector. And, central banks which are following the inflation targeting regime have more forward-looking content in their policy reviews than non-inflation targeters. The former Banks are also found to have tendency to explain the future changes in policy rates and are more proactive to tame inflationary pressures. In case of SBP, the monetary policy analysis and its contents have shown gradual improvement. There is still room to improve SBP's monetary policy analysis and communication for better management of stakeholders' expectations.

## 1. Introduction

According to Svensson (2004), “monetary policy is to a large extent the management of expectations.” To manage expectations, however, transparency and effective communication are basic ingredients. In modern central banking, transparency and communication have become fundamental parts of best practices in monetary policy making. A vast amount of economic literature suggests that there has been a significant increase (as well as improvement) in information disclosure of central banks over the last fifteen years. The main channel through which central banks normally propagate their transparency and effective communication is the publication of monetary policy decisions at regular intervals.

According to Fermo (2012), 90 percent of the IMF member countries publish monetary policy statements accompanied by policy decisions. Typically, monetary policy decisions contain assessment about current and future economic conditions with role of monetary policy instruments in influencing these conditions. Discussions related to economic outlook and associated risks, particularly trend in inflation and its forecasts, are now considered common features of monetary policy reviews [Blinder et. al. (2008)]. Indeed, after the emergence of global financial crisis of 2007-08, some of the advanced economies’ central banks - with their already higher level of transparency - are also providing future guidance of monetary policy changes as an important addition to their toolkit. This feature is commonly identified as ‘forward guidance’ in the monetary policy literature.

The central banks in emerging economies, with their different economic structure, have also become more open and transparent in the last fifteen years than they were earlier. However, their level of transparency and communication varies depending upon the regime they follow. For instance, Geraats (2009) showed that the central banks under inflation targeting regime have experienced more transparency and effective communication relative to central banks with monetary and exchange rate targeting. These differences are also reflected through their monetary policy decisions at regular intervals [Filardo and Guinigundo (2008)].

State Bank of Pakistan (SBP) has also gradually improved in terms of transparency and communication, particularly in the last decade. Increased focus on economic outlook, regular and frequent assessment of economic trends, press conferences and speeches are some of the key features of SBP’s improved communication framework. The monetary policy framework and its communication have also undergone significant changes in the past decade while the importance of monetary policy process has also increased in the macroeconomic policy making. Being first stake holders, surely these developments have implications for financial market participants, particularly in the context of predicting future monetary policy stance.

Therefore, in light of this background, we attempt to measure the monetary policy communication of SBP - specifically through monetary policy reviews - and compare it with communication of seven selected central banks from regional, emerging and advanced economies. Our sample is based on monetary policy reviews issued during January 2006 to September 2015. Broadly, we put forward three important questions. First, what are the macroeconomic contents of monetary policy reviews in general? Second, how these contents contribute in the policy analysis and eventually to policy decision? Third, how much is the ‘level of forward-looking contents’ in policy reviews of each central bank in the sample and are they useful to predict future policy rate decisions?

Using text analytic software and empirical estimations, we applied both the quantitative and qualitative approaches on policy reviews of SBP and selected central banks. The key findings show

that overall (i) the contents of monetary policy analysis are largely the reflection of particular regime adopted by the respective central bank, (ii) across the sample, most of the monetary policy decisions are found to be driven by trends in inflation and developments in external sector, and (iii) central banks which are following the inflation targeting regime have more forward-looking content in their policy reviews and tendency to better guide the future changes in interest rates. Across the sample, however, SBP is found to be relatively more lagging in adjusting its policy stance to give economic situation.

The rest of the paper is organized as follows. Section 2 introduces textual analysis literature, particularly in the context of central bank communication. Section 3 briefly describes the evolution of monetary policy at SBP during the past decade. Section 4 presents the procedure for data collection while section 5 discusses the methodology. Section 6 reports the findings and discussion, and section 7 concludes.

## **2. Textual Analysis: An Introduction in the Context of Central Bank Communication**

According to American Heritage Dictionary, the textual analysis is described as “a systematic analysis of the content rather than the structure of a communication, including the study of thematic and symbolic elements to determine the objective or meaning of the communication.” While this kind of analysis is very common in many fields of social sciences, particularly in political science, it is still in a developing phase in field of economics [Bholat et. al. (2015)]. In fact, so far emerging interest in economics is also confined to the text of economic policy makers, such as of monetary policy makers at central banks of advanced economies.

Armesto et. al. (2009) attempted to measure the information content of Federal Reserve’s (Fed) Beige Book using mixed data sampling approach. Their results show that the Beige Book contents help in predicting GDP and aggregate employment. Stekler and Symington (2014) attempted to convert the qualitative forecasts of Fed’s Federal Open Market Committee (FOMC) using quantitative scale for period 2006-2010. Their key result indicates that the FOMC members saw the possibility of recession in US but they were unable to predict it. Recently, Hansen and McMahon (2015) measured the impact of FOMC statements on macroeconomic conditions. Their results indicate that financial markets are more reactive to shocks to forward guidance than the FOMC’s discussion on current economic conditions.<sup>1</sup>

In the context of European economies, Grimaldi (2010) attempted to identify the periods of financial stress from the European Central Bank’s (ECB) Monthly Bulletin by using quantitative approach of word-count for textual analysis. Apel and Grimaldi (2012) measured the tone of the minutes of the Riksbank using the automated approach for text analysis. The latter approach helped to convert the qualitative information in the text to quantitative measure. Their results show that the information in the central bank minutes is useful for predicting future policy rate decisions. Similar results are also found by Heinemann and Ulrich (2007), Jansen and De Haan (2010) and Sturm and De Haan (2011) in case of ECB’s monetary policy communication

Unlike advanced economies, research studies to measure the information content of monetary policy reviews of emerging market’s central banks are limited. Carvalho et. al. (2013) attempted to quantify the information content of Central Bank of Brazil’s interest-rate setting committee (COPOM). They tried to dissect the statements into hawkish and dovish language by using the Lucca and Trebbi (2011)

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<sup>1</sup> Amongst others, see Balke and Petersen (2002), Bligh and Hess (2010), Lucca and Trebbi (2011) and Cannon (2015) for more analysis related to contents of FOMC’s statements.

methodology. Their results indicated the predictive power of information content for short-term treasury yields. Similar results are found in the study by Demiralp et. al. (2011) while quantifying the information content of Central Bank of Turkey's policy statements.

It can be observed from the literature review that most of the studies highlighted above deals with both the quantitative and qualitative aspects of information content found in the monetary policy reviews. In this study - which is first of its kind in case of Pakistan - we also tried to extract both the quantitative and qualitative side of information embedded in the monetary policy reviews of countries in our sample.

### **3. Monetary Policy Evolution at SBP: A Brief Background**

During the past two decades, Pakistan's financial system has witnessed several reforms while SBP gradually achieved more autonomy in its operations. This helped the Bank to steadily adopt the market-based mechanism for its monetary policy implementation and transmission. Step-wise elimination of credit rationing system, abolition of ceiling on banks' lending rates and decrease in use of direct monetary policy instruments are some of the important reforms that took place in the late 1990s.<sup>2</sup> The pace of these reforms increased during the early 2000s as the role of private sector amplified in the economy.

While the objective of SBP's monetary policy has remained price stability and economic growth, its monetary policy framework has witnessed few changes in the past two decades.<sup>3</sup> Up till 2009, SBP was following monetary targeting regime with pre-determined monetary program.<sup>4</sup> Afterwards, the focus shifted towards anchoring of inflation expectations through inflation trends and near-term forecasts of inflation.

Certainly, regular publication of monetary policy reviews by SBP is the best document for reflection and substantiation of aforementioned evolutionary processes over time. It is to be noted that while SBP is regularly publishing annual (quarterly) assessments of Pakistan economy since 1949 (1999), there had been no dedicated monetary policy statement before mid 2005. Since the former reports essentially discuss 'state of the economy' (as required under the SBP Act 1956), for monetary policy implementation, forward-looking assessment of the economy is needed. This was also important for SBP in order to adopt best central bank practices.<sup>5</sup>

#### ***Structure and Frequency of Monetary Policy Reviews by SBP***

SBP issued its first monetary policy statement in July 2005 for H1-FY06. Up till April 2016, SBP has issued 51 monetary policy reviews. It is to note that, up till end 2008, SBP only issued bi-annual monetary policy statements, usually in July and January each year. From January 2009, the SBP started to disseminate the policy statements on quarterly basis. However, this pattern ended quickly in July 2009. From September 2009 onwards, SBP announced to have six monetary policy reviews on bi-monthly basis in each fiscal year; two comprehensive monetary policy statements in July and January followed by four brief monetary policy decisions in alternate months.

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<sup>2</sup> For details, see Financial Sector Assessment 1990-2000.

<sup>3</sup> According to SBP Act, 1956 (amended up to November 11, 2015), SBP is entrusted to "...regulate the monetary and credit system of Pakistan and to foster its growth in the best national interest with a view to securing monetary stability and fuller utilization of the country's productive resources."

<sup>4</sup> Since FY10, SBP stopped issuing M2 growth targets (See SBP Annual Reports for FY09, FY10).

<sup>5</sup> Based on IMF's Code of Good Practices in Transparency in Monetary Policy, the anecdotal evidence suggests that currently SBP follows around 90 percent of these codes (<https://www.imf.org/external/np/mae/mft/sup/part2.htm>).

While in general the structure of brief monetary policy decisions remains intact, over time, many changes could be observed in the structure of bi-annual comprehensive monetary policy statements. Nevertheless, the general theme of these statements remains the same. The first section presents the executive summary of current macroeconomic conditions and their outlook. This section has special importance since it is carved out from the general statement with important points to be highlighted by the governor SBP in press conferences. The second section normally deals with the assessment of global and domestic developments occurred in the previous half or quarter of the respective fiscal year. The third or usually the last section contains analysis about most recent economic developments in the country along with their outlook and projections; where required.<sup>6</sup>

#### 4. Data and Some Stylized Facts

Before discussing the methodology, as mentioned earlier, the monetary policy reviews of seven central banks - including Reserve Bank of Australia (RBA), Bank of Canada (BoC), Reserve Bank of India (RBI), Bank of Indonesia (BoI), Central Bank of the Republic of Turkey (CBRT), Central Bank of Sri Lanka (CBSL) and Bangladesh Bank (BB) - are also analyzed for cross-country comparison. Our analysis is based on monetary policy reviews issued during January 2006 to September 2015. Selected sample of central banks provides a good mix across the monetary policy framework of regional, emerging and advanced economies. Table 1 summarizes the key features of monetary policy frameworks of the selected central banks.

**Table 1: Selected Features of Monetary Policy Framework**

*as of September 2015 position*

	RBA	BB	BoI	CBRT	RBI	BoC	CBSL	SBP
Monetary policy regime	IT	MT	IT	IT	FIT	IT	MT	Other**
Key policy interest rate	Cash rate	Repo rate	BI rate	1-week repo rate	Repo rate	O/N target rate	SF rates	SBP target rate
Frequency of monetary policy meetings	11/year	4/year	12/year	12/year	6/year	8/year	12/year	6/year
Govt. officials in monetary policy meetings	1	3	NO	1*	2	NO	1	1
Monetary policy decision making body	RBA Board	BB Board	BoI Board	MPC	Central Board	Governing Council	Monetary Board	Central Board
Frequency of review/analysis accompanying monetary policy	4/year	2/year	6/year	12/year	6/year	4/year	11-12/year	6/year
Policy reviews issued during Jan'06 – Sep'15	39	20	76	116	59	39	69 <sup>#</sup>	48
Average # of words <sup>§</sup>	2,097	1,098	920	1,610	2,368	716	537	1,356
Average # of sentences <sup>§</sup>	84	37	41	71	90	30	17	54
Flesch-Kincaid (FK) grade level <sup>±</sup>	13.1	16.7	15.1	14.8	15.2	13.5	15.5	15.3

IT = Inflation Targeting; MT = Monetary Targeting; FIT = Flexible Inflation Targeting; O/N = Overnight; SF = Standing Facilities; MPC = Monetary Policy Committee; NO= no (government) official.

\* with no right to vote ; <sup>#</sup> during Jan'10 – Sep'15; <sup>§</sup> Average pertains to opening section of each central bank's monetary policy review published during the sample period; <sup>±</sup> FK grade level is a readability statistics that shows the number of years of education needed to sufficiently comprehend a text. In table, the figure pertains to monetary policy text; \*\* SBP uses trend and near-term forecasts of inflation as an implicit nominal anchor.

Source: Bank for International Settlements, Central banks' websites

Table 1 show that all the central banks in our sample use short-term interest rate for implementing the monetary policy decision. Also, except CBRT, the highest governing body is responsible for

<sup>6</sup> The last section is further sub-divided into different macroeconomic themes such as financial markets, monetary sector, fiscal sector, external sector, economic growth and inflation.

monetary policy decision in all other central banks.<sup>7</sup> Furthermore, Table 1 also report key statistics related to readability of policy reviews across sample. It appears that RBI is having the longest policy reviews in the sample with an average 90 sentences per review. In contrast, each CBSL's policy review only contains 17 sentences on average. On scale of readability statistics, it is found that the policy statements of RBA and BoC require on average 13 years of education to comprehend the text, which is 2.5 years lesser than other banks in the sample.<sup>8</sup>

Since it is quite a stretch to analyze the full monetary policy reviews of selected sample, for the objectives of this study, we only focused on the opening section of policy reviews which generally summarizes the overall macroeconomic conditions systematically. The motivation behind this selection is that the opening section receives the most media attention due to its brevity along with policy decision and rationale [Fracasso et. al. (2003)]. Importantly, this section also includes the outlook and forecasts of important macroeconomic policy indicators (such as of inflation and GDP growth) up to the horizon of one year ahead.

## 5. Methodology

Regarding the methodology to conduct the analysis of contents of monetary policy reviews, we followed the spirit of methodology used by Romer and Romer (1994) and Fernandez (2007). For this purpose, we employed the text analysis software Qualitative Data Analysis (QDA) 4.0.<sup>9</sup> QDA creates 'characteristic' classes of topics on their patterns of distribution throughout the text; commonly termed as corpus in text mining context. The software basically analyzed the 'active' topics in the text and avoids the preposition and other auxiliary words.<sup>10</sup> The active words - normally referred as bag-of-words in text mining literature - are actually the researchers' coded characteristic categories of interest.

Specifically, we categorized our coded characteristics into five main macroeconomic themes usually found in monetary policy reviews (or even in any other central bank's report on economic analysis). These themes include trends in inflation and commodity prices, developments in real sector, impact of external sector and changes in global economy, and trend in fiscal and monetary variables. Moreover, to refine the search pattern, since real sector is a broad term, we club together the growth-describing words such as manufacturing, GDP growth, and production using wildcard methods for in-depth text analysis. Similar procedure is applied in case of other four macroeconomic themes as well.<sup>11</sup>

To extract the information related to forward-looking contents in monetary policy reviews, however, we designed and applied different sets of characteristics which are usually found in monetary policy literature for analyzing futuristic content in the central banking text (see Lucca and Trebbi (2011) and Campbell et. al. (2012) for details). Basically we attempted to estimate the proportion of discussion in

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<sup>7</sup> It is to be noted that our sample is up to September 2015 position where as the changes in SBP's framework (such as the establishment of MPC) were enacted in November 2015.

<sup>8</sup> For this purpose, we used Flesch-Kincaid grade level statistics that shows the number of years of education needed to sufficiently comprehend a text. It is calculated as  $0.39 * (\# \text{ words} / \# \text{ sentences}) + 11.8 * (\# \text{ syllables} / \# \text{ words}) - 15.59$ . The intuition is that many words per sentence or many syllables per word decrease text readability. It is embedded in new version of Microsoft Word.

<sup>9</sup> QDA is developed by a research firm *Provalis*. Unlike other text analysis softwares, QDA does not depend on the researcher prejudices concerning the content. In fact, QDA recognizes the characteristic topics and the researcher then imposes categorical, semantic meaning on them.

<sup>10</sup> It is pertinent to mention here that despite the software support, we still spent a substantial amount of time reading selected monetary policy reviews of central banks in the sample.

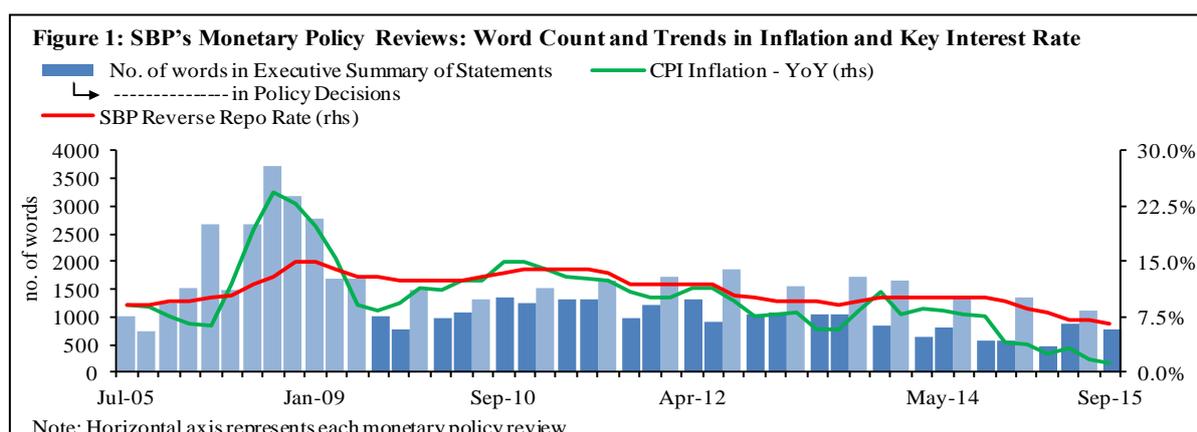
<sup>11</sup> See Table A.1 and Figure A.1 in appendix for complete list of topics and their respective word clouds across sample.

opening section of monetary policy reviews that contain futuristic characteristic topics.<sup>12</sup> After identifying these characteristics, we group them into three broad categories; namely economic outlook (in narration form), projections and forecasts (in figures), and risks associated to economic outlook.

It is pertinent to mention here that despite the degree of subjectivity in our analysis, the coding is generally in line with the anecdotal evidences about the macroeconomic conditions in all the selected countries during the sample period. However, in case of extracting forward-looking content, surely the subjective approach is not perfect and comes with caveats and biasness. But, unlike algorithm based coding in linguistic softwares, the hand coding also provides between the line information to a reader/researcher.

## 6. Findings and Discussion

Before we dwell into findings and discussion about the objectives of this study, Figure 1 depicts the trend of wordcount in SBP’s monetary policy reviews and policy variables. It can be observed that, amid balance of payments crisis in 2008, an obvious effort from SBP could be seen to enhance communication for calming down the then emerging speculative sentiments in the foreign exchange market.<sup>13</sup> Interestingly, over the period, the trend in word count largely coincides with the underlying trend in headline CPI inflation (correlation of 0.70) and changes in SBP reverse repo rate. Not necessarily, but it seems that it’s easy for SBP to communicate when economic conditions and outlook allows for an ease in monetary policy stance.



### Contents of Monetary Policy Analysis and Macroeconomic Conditions

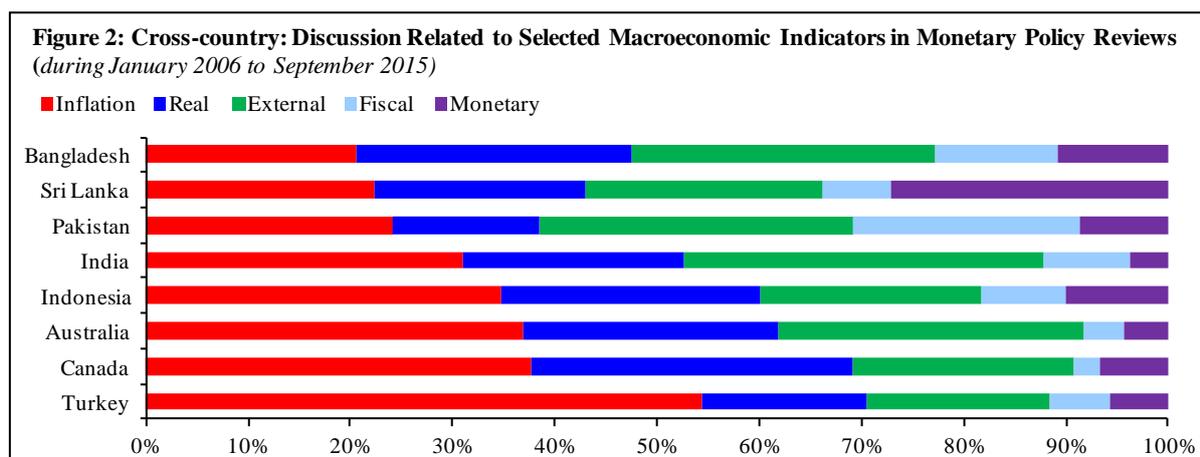
Figure 2 presents the average distribution of selected macroeconomic sectoral contents in the monetary policy reviews of each central bank in our sample. It appears from the figure that SBP gives one-fourth of the weight to analysis related to developments in external sector which is followed by inflation, fiscal, growth and monetary. Being a small open economy, this pattern is anticipated.<sup>14</sup> Also, unlike other central banks in the sample, SBP’s monetary policy reviews stand out in giving more space to fiscal analysis. Deterioration in fiscal sector (and its skewed reliance on domestic financing)

<sup>12</sup> See Table A.2 in appendix for randomly selected statements highlighting the forward-looking contents in monetary policy reviews.

<sup>13</sup> Due to increase in import bill, particularly of oil, pressures in the foreign exchange market increased. SBP lost around 76 percent of its foreign reserves (around \$11.0 billion) in 12 months before signing the IMF program in November 2008.

<sup>14</sup> In the context of emerging economies, emphasis on external sector developments are quite explicable, particularly in the perspective of ‘fear of floating’ and ‘original sin’ phenomenon [Calvo and Reinhart (2002) and Eichengreen *et. al.* (2003)]

after 2008 balance of payments crisis perhaps partially explains SBP’s increased focus on fiscal analysis.



In cross-country comparison, it could be observed that in terms of contents of the monetary policy reviews, the policy analysis are broadly in line with a specific regime of respective central bank. Specifically, the inflation targeting central banks gives more attention to inflation (and trend in prices) than other central banks. Similarly, monetary targeting central banks devote significant space to analysis related to monetary sector. Interestingly, irrespective of regime (and income classification), however, the discussion on external sector found to have a significant weight in all the selected central banks’ monetary policy reviews.

The estimated weights in each sector are also a good reflection of overall macroeconomic conditions in the sample period.<sup>15</sup> For instance, increased focus of monetary policy analysis on external developments was natural after global commodity prices shock of 2008, particularly the oil price shock. On the other hand, due to liquidation of Lehman Brothers and the collapse in global housing markets in late 2008, recessionary tendencies and increase in unemployment led the central banks to focus more on real sector developments. In recent years, the latter trend is more visible in case of emerging economies.

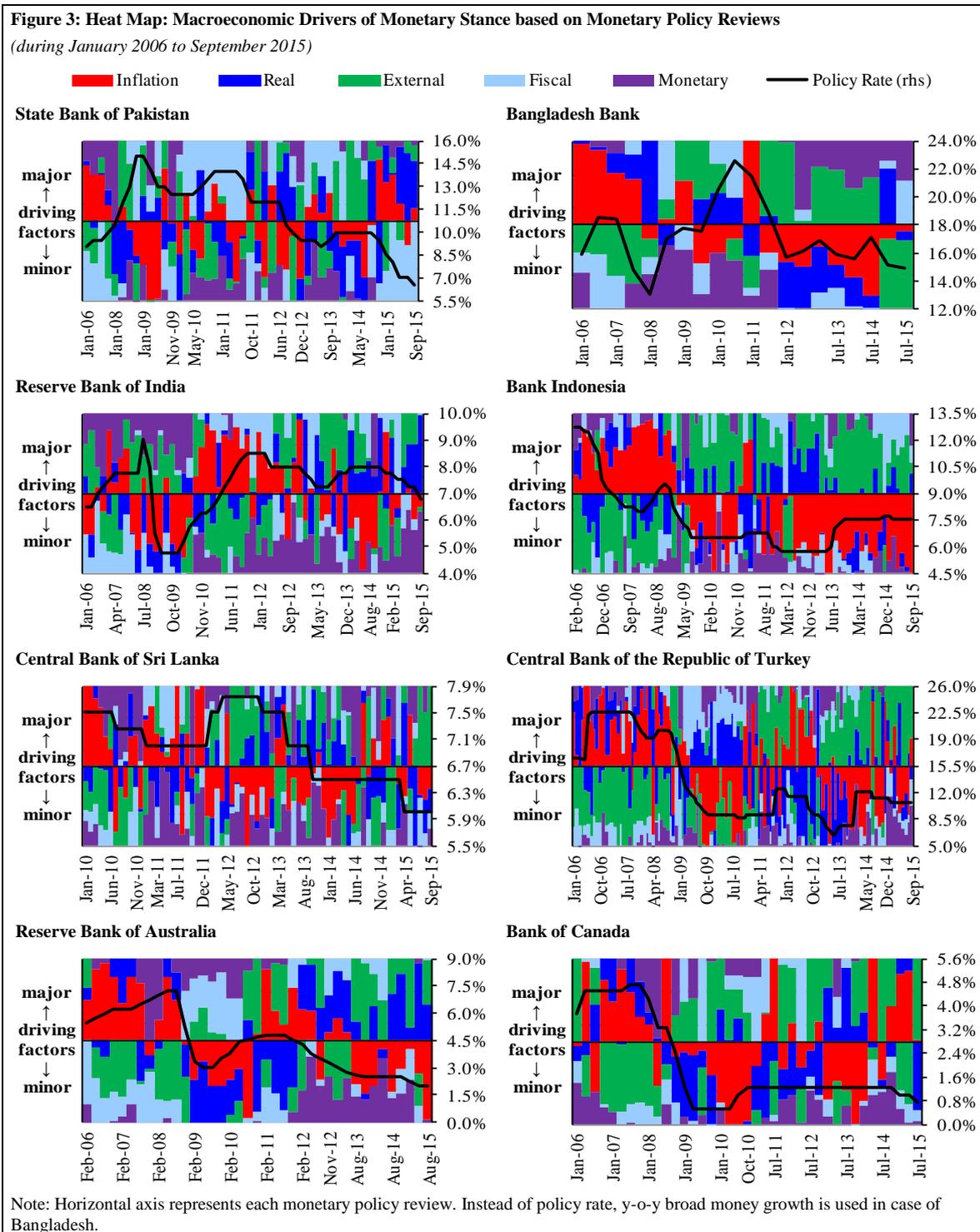
### ***Role of Macroeconomic Contents in Driving the Monetary Policy Decisions***

While it is interesting to identify the pattern and behavior of macroeconomic textual analysis in monetary policy reviews, however, the key question from the policy perspective is that which conditions played an important role in influencing the central bank’s interest rate decision. To answer this question, we attempted to decompose the information extracted from the previous section into major and minor driving factors. The intuition behind this dissection is simple, i.e., the more the emphasis of central bank analysis on particular sector, the greater will be its influence in driving the policy decision. Based on this reasoning, Figure 3 presents the heat map of selected sample depicting the major and minor driving factors along with trend in main policy interest rate.

As highlighted earlier, Figure 3 further reinforce the fact that unlike other central banks, trend in fiscal variables on average play an important role in decision making process of SBP. Broadly, across the sample, developments in inflation and external sector play a leading role in driving the monetary policy stance. However, a close inspection also suggest that after the financial crisis of 2008, there is

<sup>15</sup> See Figure A.2 in appendix for over time changes in discussion on macroeconomic sectoral contents in policy reviews.

an apparent shift in increased policy analysis of inflation targeting central banks towards real sector. In fact, with lower levels of inflation worldwide and sluggish recovery in domestic demand, this pattern seems to be found in most of the central banks' analysis around the world.



Furthermore, Table 2 reports that the findings highlighted above are also found to be significant by performing simple regression analysis for each central bank in the sample.<sup>16</sup> For instance, in case of SBP, it is found that on average 1 percentage point increase in inflation analysis (from its sample average) is associated with an increase in SBP policy rate by 50 basis points. In case of inflation targeting central bank such as CBRT, however, this relationship is relatively strong.

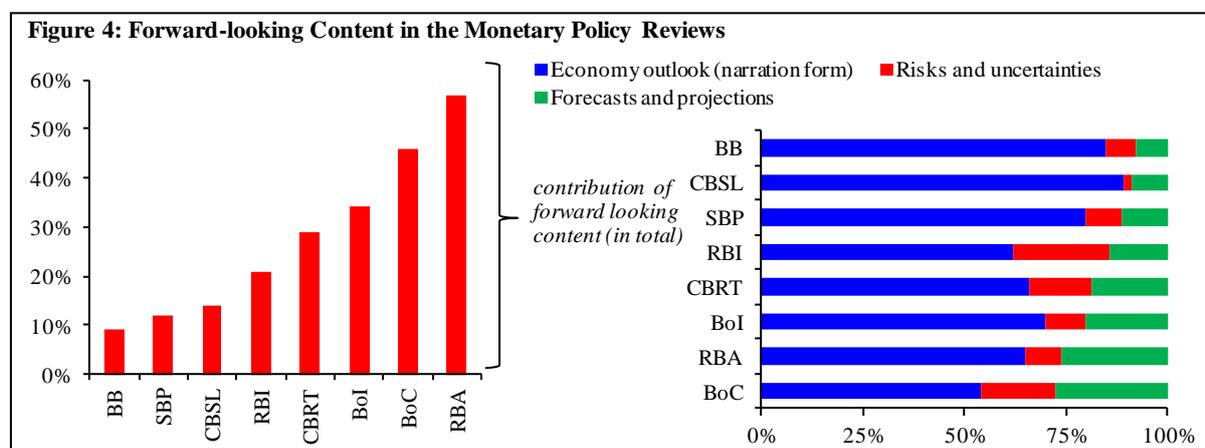
**Table 2: Regression Analysis: Macroeconomic Contents as driver of Monetary Policy Decisions**  
(dependent variable is first difference of each central bank's key policy interest rate, during 2006-2014)

	Constant	Inflation	Real	External	Fiscal	Monetary	Obs.	Adj. R <sup>2</sup>
<b>Regional/Emerging Economies</b>								
<b>SBP</b>	-0.011 *	0.052 *	0.046 **	0.057 *	0.056 **	0.015 *	48	0.43
<b>RBI</b>	0.004 *	0.051 **	0.053 **	0.055 *	0.038 *	0.032 *	59	0.37
<b>BoI</b>	-0.021 **	0.032 *	0.018	0.048 ***	0.014 *	0.019 **	76	0.58
<b>CBRT</b>	0.057 **	0.076 ***	0.048 **	0.060 *	0.021 *	-0.002	116	0.52
<b>CBSL</b>	0.022 *	0.026 **	0.019 *	0.037 **	0.028 *	0.039 **	69	0.61
<b>Advanced Economies</b>								
<b>RBA</b>	0.008 **	0.061 **	0.003	0.038 ***	0.021 **	0.009 *	39	0.43
<b>BoC</b>	0.016 *	0.054 *	0.023 **	0.032 **	0.013 ***	0.011 **	39	0.33

Note: \*, \*\* and \*\*\* denote statistical significance at 10, 5 and 1 percent (level of significance) respectively. Also, each coefficient value represents an average deviation from mean weighted discussion due to increase (decrease) in policy rate by central bank during the sample period.

### Forward-looking Contents in the Monetary Policy Reviews

Figure 4 shows that, in case of SBP, on average forward-looking content represent only 10 percent of discussion in monetary policy reviews. In other words, 90 percent of discussions contain backward-looking analysis. Also, it appears that the forward-looking contents tend to discuss economic outlook



more in a descriptive manner (i.e. explaining the 80 percent of total forward-looking contents). The proportion of providing numerical projections or forecasts along with risks and uncertainties is very low. This pattern of analyzing economic outlook is understandable given the fact that Pakistan is having a developing financial system that leads to distortions in monetary transmission mechanism and cause weak relationship between the central bank's policy tools and objectives.<sup>17</sup>

<sup>16</sup> Since Bangladesh Bank is not using interest rate as an instrument of monetary policy, it is excluded from regression analysis.

<sup>17</sup> See Choudhri *et al.* (2015) for recent empirical results about the effectiveness of monetary policy in Pakistan.

Under the cross-country analysis, it is found that the non-inflation targeting central banks - which includes South Asian economies in the sample - generally rely on back-ward looking analysis as the forward-looking information makes only 10 percent of total discussion in their policy reviews. Also, similar to SBP, its other South Asian counterparts tend to focus more on economic outlook in a descriptive way instead of sharing quantitative forecasts about policy variables. This lack of transparency partially explains the lower ranking of the central banks of South Asian economies according to Dincer and Eichengreen (2014) transparency index.

In contrast, it is found that forward-looking content makes on average three times more in case of monetary policy analysis of inflation targeting central banks. These central banks are also found to be more transparent in providing the numerical projections or forecasts about important macro-indicators in their policy reviews. For instance, RBA is found to have more than half of its monetary policy analysis discussing the futuristic contents; of which, one-third is in the form of projections/forecasts along with risks and uncertainties.

### ***How Predictive are these Forward-looking Contents?***

How well these extracted forward-looking contents are useful to explain the future changes in central bank's interest rate decisions? To measure this aspect in our sample, we construct the communication indices (CIs) for each central bank based on statements related to price stability and inflation. We only focused on arguments related to price stability and inflation due to the fact that most of the central banks – whether targeting inflation or not – gives significant weight to price stability or trends in inflation while making policy decisions.<sup>18</sup> Specifically, we are dissecting the forward-looking statements about inflation and price stability into hawkish, neutral and dovish categories with +1, 0 and -1 codes, respectively. Based on this coding scheme, Figure 5 plots the cross-correlations between estimated/resultant communication indices (CIs) and main policy rates of central banks in our sample.

Figure 5 shows that despite the slight variations among the trends, broadly the CI is found to have leading indicator qualities and could explain the future changes in policy rate in each case. This outcome is bit intuitive as the CIs contain mainly forward-looking information. It could be observed from Figure 5 that based on frequency of monetary policy reviews, the highest cross-correlation between CI and policy rate mostly seen at 3 to 9 month horizon in each case. For instance, in case of SBP, the highest correlation stands at 0.40 after two scheduled monetary policy reviews (which is equal to 4 months).

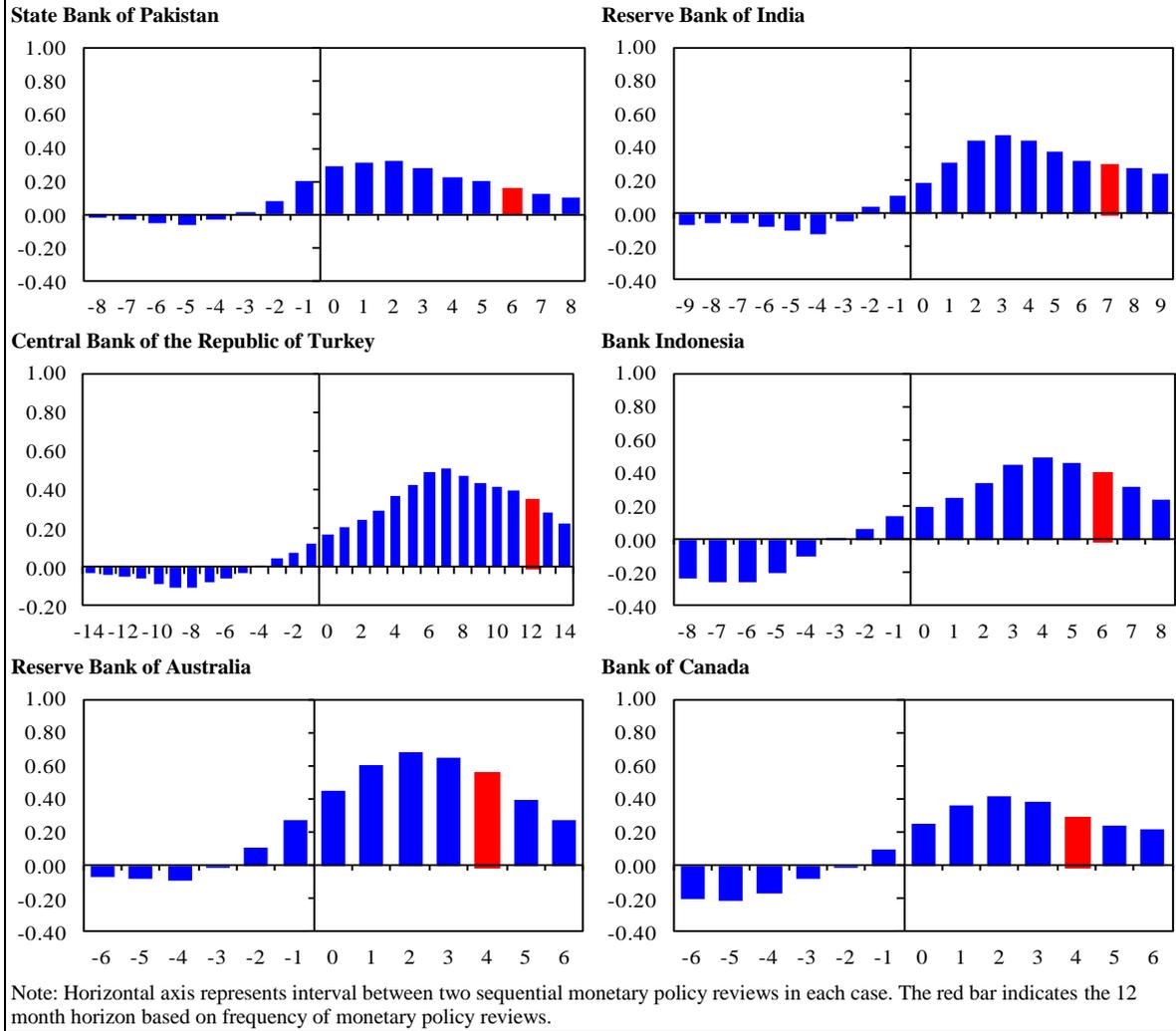
Compared to other central banks in the sample, however, on average SBP is found to have lesser predictive powers to guide future changes in policy rate. For example, in case of RBI, correlation peak to 0.55 when the CI precedes the policy rate by 2 quarters. Similar results are found for inflation targeting central banks, but with significant higher correlation at longer horizons. To further empirically investigate the leading properties of constructed CIs and their role in central bank's communication; we applied the Structural Vector Autoregression (SVAR) model for period from January 2006 to September 2015.

The SVAR model consists of three variables; year-on-year change in headline inflation (measured by consumer price index), central bank's main policy interest rate and CI for each central bank in the

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<sup>18</sup> See useful survey by Jeanneau (2009) for further details.

**Figure 5: Cross-correlations between Communication Indices (CI) and Policy Rates**  
(during January 2006 to September 2015)



sample.<sup>19</sup> The recursive structure of the VAR assumes that (i) inflation responds with a lag to innovations in policy rate, and (ii) policy rate does not respond to change in CI in the same period. Specifically;

$$CPI_t = E_{t-1}CPI_t + \varepsilon_t^{CPI}$$

$$PR_t = E_{t-1}PR_t + \alpha_{21}\varepsilon_t^{CPI} + \varepsilon_t^{PR}$$

$$CI_t = E_{t-1}CI_t + \alpha_{31}\varepsilon_t^{CPI} + \alpha_{32}\varepsilon_t^{PR} + \varepsilon_t^{CI}$$

Where CPI is the headline inflation, PR is the main policy interest rate of central bank, CI is the constructed communication index for each central bank,  $E_{t-1}$  is the conditional expectations operator and  $\alpha$  is the impulse response coefficients. Choice of the lag is based on the Akaike information criterion (AIC). Equation (1) presents the structural form of the VAR model as follows;

<sup>19</sup> Due to data limitations, we excluded Bangladesh Bank and CBSL from estimations. For RBI model, we used wholesale price index (WPI) instead of consumer price index (CPI).

$$Y_t = AY_{t-1} + B\varepsilon_t \quad (1)$$

Where  $Y = [\text{headline inflation, policy interest rate, CI}]$ ,

$\varepsilon = (\varepsilon^{CPI}, \varepsilon^{PR}, \varepsilon^{CI})$ , and

$$B = \begin{bmatrix} 1 & 0 & 0 \\ \alpha_{21}^{\varepsilon^{CPI}} & 1 & 0 \\ \alpha_{31}^{\varepsilon^{CPI}} & \alpha_{32}^{\varepsilon^{PR}} & 1 \end{bmatrix}$$

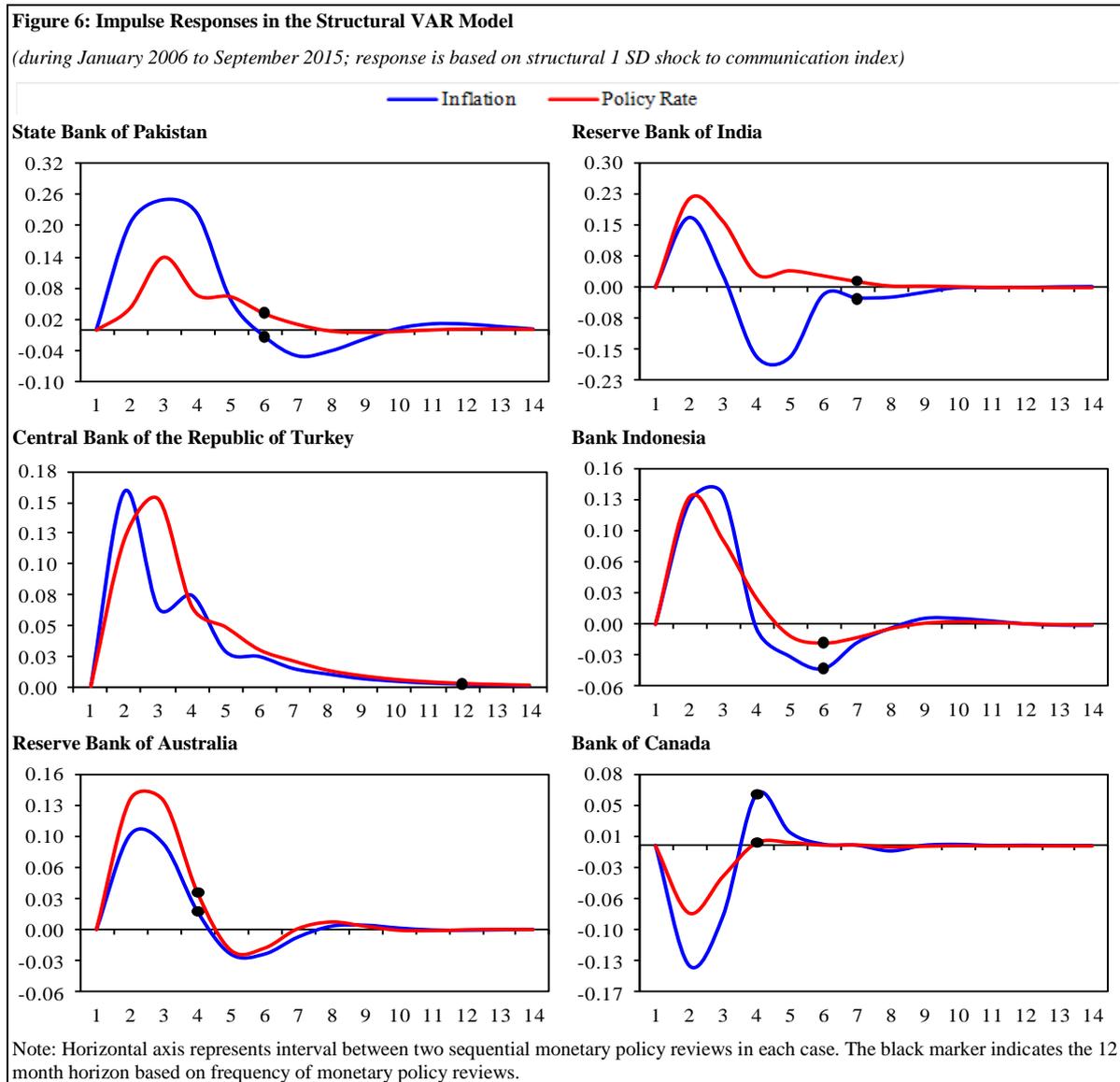


Figure 6 presents the impulse responses of headline inflation and policy rate across the sample to one standard deviation (SD) shock in innovation of communication index variable. Positive innovation in index reflects the hawkish or tightening effect of monetary stance on variables of our interest. Both headline inflation and policy rate responses show a percentage point deviations from the baseline. The results show that, broadly across the sample, a unit SD shock to communication index explains the developments in headline inflation and policy rate up to one year horizon.

Specifically, the results in Figure 6 indicates that in case of SBP, a positive 1 SD shock to CI first leads to an increase in CPI inflation by 0.25 percentage points up to 6 months before it starts to fall; a phenomenon generally known as prize puzzle.<sup>20</sup> The response of SBP policy rate appears to be bit lagging as it is showing an increase after two months with a peak of 14 basis points (or 0.14 percentage points) and remain positive up to 14 months. Furthermore, the results for RBI also suggests the presence of prize puzzle as WPI inflation shows an increase up to two quarters after monetary tightening. However, unlike SBP, the RBI appears to be more preemptive in case of adjusting its policy stance to control any increase in inflationary pressures.<sup>21</sup>

Except for BoC, the above results are also found in case of other Banks in the sample, particularly those following the inflation targeting regime. Amongst the latter group, RBA appears to be more belligerent in controlling the inflation than CBRT and BoI. On the other hand, different behavior of BoC might suggest to the fact that in response to emergence of financial crisis, BoC sharply reduced its policy rate from 4.75 percent to 0.50 percent in late 2008. At that time, Canadian government had also announced the fiscal stimulus package to avoid economic recession. Although these measures were supposed to boost the aggregate demand, the economy however faced brief episodes of deflation after the crisis which forced the BoC to still hold its policy rate at 0.50 percent.

## 7. Conclusion

This paper presented a textual analysis of SBP's monetary policy reviews conducted during the past decade and compared them with the policy reviews of RBI, CBSL, BB, BoI, CBRT, BoC and RBA. Our sample provided a good mix of regional, emerging and developed economies with different policy regimes as well. Using text analytics softwares and empirical estimations, we applied both the quantitative and qualitative approaches for the content analysis of monetary policy reviews.

Our results show that the contents of monetary policy analysis are largely a reflection of particular regime adopted by the respective central bank. Also, across the sample, most of the monetary policy decisions are found to be driven by trends in inflation and developments in external sector. And, central banks which are following the inflation targeting regime have more forward-looking content in their policy reviews than non-inflation targeters. The former banks are also found to have better tendency to explain the future changes in policy rates and more proactive in tackling the rise in inflationary pressures.

Particularly in case of SBP, although the monetary policy analysis and its contents have shown gradual improvement, but compared to central banks of regional and emerging economies, empirical results suggest that there is still a much room for improvement in SBP's monetary policy analysis and its communication. It is also necessary for better management of expectations of stakeholders and to enhance the effectiveness of monetary policy transmission.

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<sup>20</sup> For more details on prize puzzle, see Eichenbaum (1992). Also, this result is in line with Javid and Munir (2010) findings for monetary policy transmission mechanism in Pakistan.

<sup>21</sup> Though it requires proper empirical testing, but this lagging behavior of SBP could potentially imparting the confusion among the financial market participants about the bank's monetary policy strategy. In fact, this behavior is reflected in Bloomberg survey which is normally conducted before each monetary policy review. Figure A.3 in appendix shows that, across the selected sample, on average the number of surprises are found to be highest in case of SBP when financial market participants try to predict the interest rate decision.

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## Appendix

**Table A1: Word Lists Across Monetary Policy Reviews in Sample for Textual Analysis**

<b>Inflation related</b>	<b>Growth related</b>	<b>External related</b>	<b>Fiscal related</b>	<b>Monetary related</b>
inflation*	manufacture*	global*	fiscal*	credit*
price*	product*	external*	budget*	broad money
price stability	investment*	current account	government borro*	money supply
CPI* (or WPI in case of India)	GDP growth	capital flows	tax*	monetar*
	economic growth	capital inflows	expenditur*	
	domestic demand	foreign inflows		
		foreign flows		
		financial account		
		trade		
		export*		
		import*		
		reserves		
		exchange rate		
		appreciat*		
		depreciat*		

Note: \* denotes a wildcard allowing for stemming words such as ‘inflationary pressure’

**Table A2: Selected Statements Showing Forward-looking Elements in Monetary Policy Reviews in Sample**

Central Bank	Example 1	Example 2
State Bank of Pakistan	“In March 2012 the year-on-year CPI inflation was 10.8 percent and, given the current economic conditions, <i>is projected to remain in double digits during FY13.</i> ” [Apr 2009]	“Thus, there is no change in SBP’s <i>forecast of average CPI inflation for FY16 with its range of 4.5-5.5 percent remaining below the annual plan target of 6 percent.</i> ” [Sep 2015]
Bangladesh Bank	“Following some government measures, growth in agriculture <i>is expected to be higher than the previous year.</i> ” [Jul 2007]	“.....inflationary pressures over the past few months with the <i>risks ahead</i> related to the inflation <i>outlook</i> imply that achieving the FY15 inflation target will be challenging.” [Jul 2014]
Reserve Bank of India	“Essentially, inflation rates have reached a plateau, but are <i>likely to remain at unacceptably high levels for some months.</i> ” [Oct 2011]	“The <i>outlook for food inflation</i> could improve if the increase in sown area translates into higher production.” [Sep 2015]
Bank Indonesia	“This measure <i>is expected to</i> deliver a boost to the domestic economy that will prevent steeper decline.” [Feb 2009]	“In 2015, stronger economic growth is <i>forecasted</i> , namely in the 5.4-5.8% range.” [Jan 2015]
Central Bank of Sri Lanka	“As a result, inflation <i>is projected to moderate</i> from March 2013 and reach mid-single digit levels thereafter.” [Jan 2013]	“..... <i>will continue to be vigilant</i> on the overall trends in the growth of credit as well as monetary aggregates and take preemptive measures in the case of emerging risks threatening the maintenance of price stability on a sustainable basis.” [Sep 2015]
Central Bank of the Republic of Turkey	“Short-term <i>forecasts</i> made in the light of these evaluations indicate that annual inflation will slightly increase in the first quarter of 2006, but decline again starting from the second quarter onwards.” [Jan 2006]	“This development in the exchange rates is assessed to contribute favorably to the inflation <i>outlook.</i> ” [May 2014]
Reserve Bank of Australia	“On this basis, while inflation <i>is likely to remain high</i> in the short term, it is <i>forecast to start to decline</i> towards the end of 2008, reaching a rate of around 2¾ per cent at the end of the forecast period.” [May 2008]	“.....inflation <i>is projected to be consistent</i> with the target over the <i>forecast period.</i> ” [Aug 2014]
Bank of Canada	“.....strength of the Canadian dollar, Canada’s poor relative productivity performance, and the low absolute level of U.S. demand <i>will continue to act as significant drags</i> on economic activity in Canada.” [Apr 2010]	“Prices are currently lower but our belief is that prices over the medium term <i>are likely to be higher.</i> ” [Jan 2015]

Source: Central banks’ websites

Figure a1: Word Clouds of Macroeconomic Topics in Monetary Policy Reviews across Sample

(based on word list in Table A.1)

State Bank of Pakistan



Bangladesh Bank



Reserve Bank of India



Bank Indonesia



Central Bank of Sri Lanka



Central Bank of the Republic of Turkey



Reserve Bank of Australia



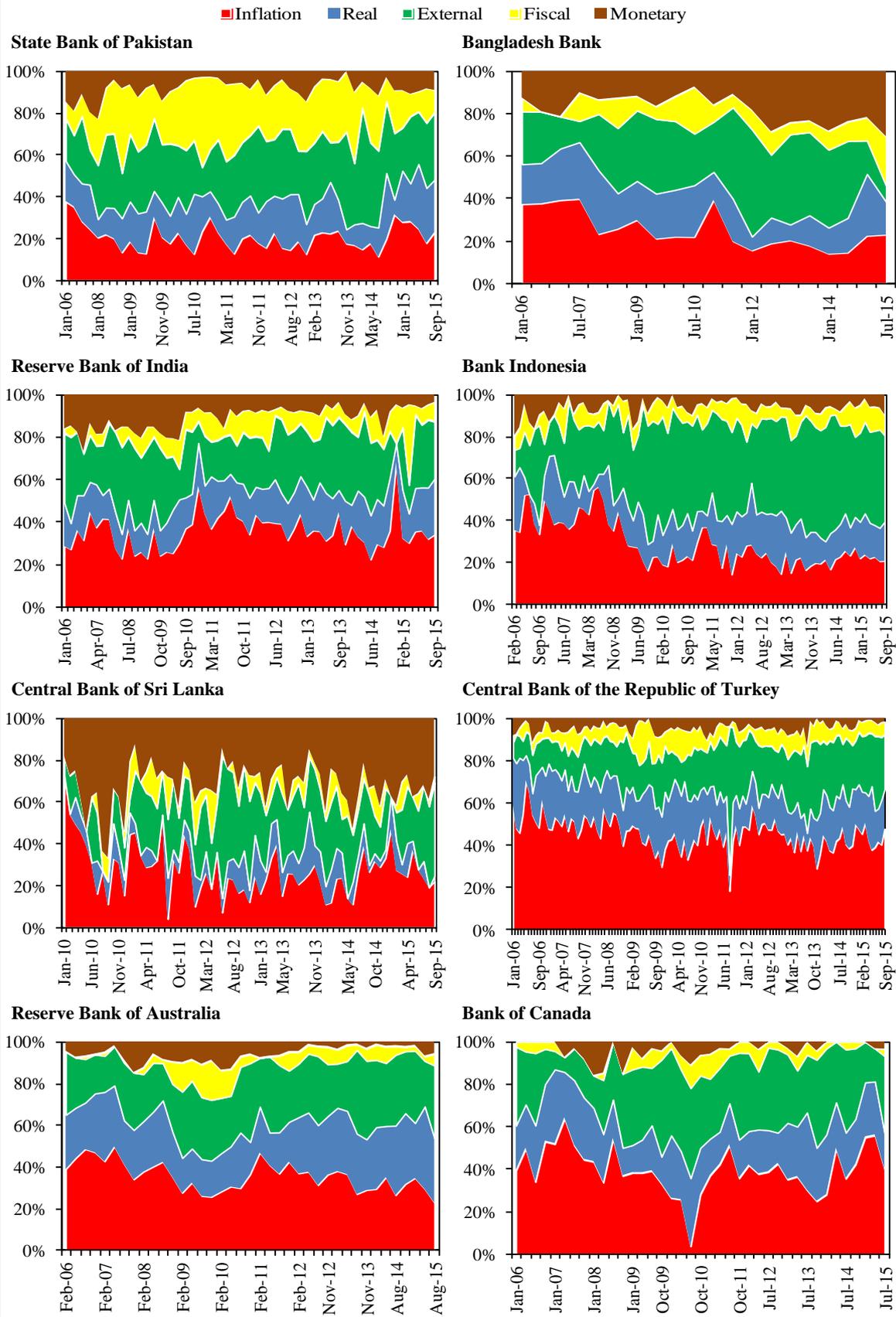
Bank of Canada



Note: Size of words reflects their respective weighted frequency in Monetary Policy Reviews across the sample.

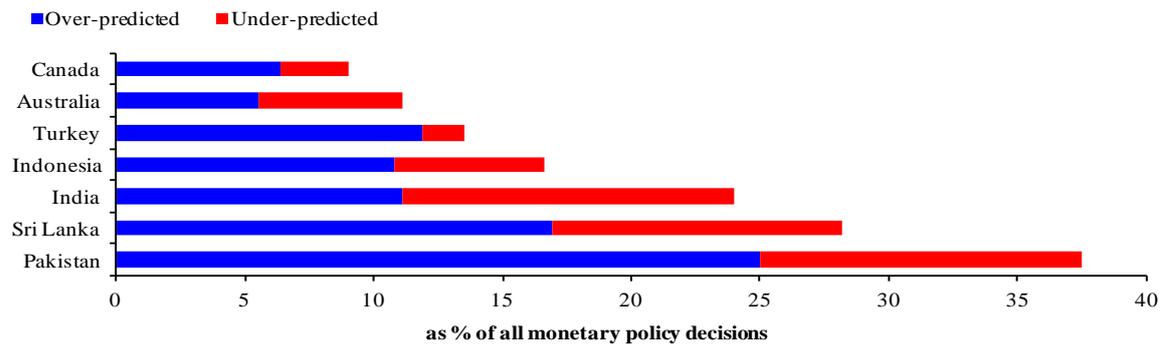
**Figure a2: Overtime Contribution of Sectoral-discussion in Monetary Policy Reviews**

(during January 2006 to September 2015)



Note: Horizontal axis represents each monetary policy review.

**Figure a3: Policy Surprises for Financial Market Participants**  
(based on Bloomberg survey for changes in policy rate, during January 2006 to September 2015)



Source: Bloomberg, authors' calculations