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6 September 2024

Online at <https://mpra.ub.uni-muenchen.de/121952/>  
MPRA Paper No. 121952, posted 09 Sep 2024 08:30 UTC

# A Measure of Financial Conditions for Pakistan

Asif Mahmood\* and Ringchan Ali†

## Abstract

Emerging literature after the global financial crisis of 2007-08 have highlighted the important role of financial conditions as they provide a comprehensive snapshot of the overall economic health and stability. Following this, many academic researchers, central banks and international organizations developed several composite indices, commonly known as Financial Condition Index (indices) or FCIs. In this study, we attempt to construct the monthly financial conditions index for Pakistan using high-frequency indicators from domestic and external markets. Our results show that much of the post GFC period in Pakistan's financial system was characterized by accommodative financial conditions, with three but higher intensity phases of tighter financial conditions. Based on the constructed FCI, we also observed that current ongoing episode of tightening is on average longer than previous two phases. In terms of drivers, our estimations reveal the increasing role of interest rates in determining the financial conditions in Pakistan during the sample period. Moreover, the preliminary analysis does indicate some underlying qualities in our constructed FCI to forecast near-term growth with reasonable precision.

JEL Classification Numbers: C43, C53, E44, E52

Keywords: Financial Conditions Index, Principal Component Analysis, Forecasting

**Disclaimer: The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the SBP or SBP policy. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.**

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# A Measure of Financial Conditions for Pakistan

## I. Introduction

Financial markets experts, for a long time, have used several indicators that tend to gauge the pressures stemming from monetary policy on the economy. The common indicators usually consist of the easily accessible financial prices including the short-term interest rates, stock price index, exchange rate and a representative bond yield. From a logical viewpoint, these indicators capture the instant effect of the central bank's policy tools on financial prices. This in turn can be associated with the outlook on inflation and output via the common transmission mechanism channels. These financial prices play a vital role as they translate both into the important consumption and investment functions. Further, they encompass market expectations of prices in future as well as output developments. This helps market participants to make assessments regarding the potential central bank reactions and guides central banks to assess the monetary policy stance.

In early 1990s, by aggregating the changes in interest rates and exchange rate, also known as Monetary Conditions Index (MCI), central banks of Canada and New Zealand had tried to capture the stance of monetary policy and its impact on the real economy. The proponents of the MCI assert that both the interest rate and the exchange rate are key factors of the overall economic condition. An increase in interest rate or appreciation of exchange rate results into deceleration of the economy which in turn releases the pressure on price levels and vice versa. MCI, however, is criticized on the ground that it does not consider other financial variables that may be important in transmission mechanism. Indeed, overtime, limitations associated with the use of MCI for guiding monetary stance are pretty much highlighted in economic literature (Gauthier et al., 2004 and Hatzius et al., 2010).

Following the global financial crisis (GFC) 2007-08, among other aspects, the process of conducting the monetary policy has gained more scrutiny across the world. In particular, the severity of the impact of financial markets stress on the real economy during the GFC, and the euro area sovereign debt crisis, has led to a renewed focus on identifying and assessing the macroeconomic-financial linkages embodied in financial conditions. In this context, Hatzius et al., 2010 defines financial conditions as, "the current state of financial variables that influence economic behavior and thereby the future of the economy." They also emphasized that the monetary policy focusing only on policy interest rate neglects the important role played by other financial variables, which in turn are influenced by the monetary policy stance. Further, while some important macroeconomic variables such as output gap and neutral interest rate are unobservable, others such as GDP growth and unemployment are available only with lags. At the same time, most financial variables are readily observable at higher frequencies, and can thus provide crucial real time information to policymakers (Osario et al., 2011).

Build on this notion that the financial conditions have important influence on macroeconomic variables, a large amount of researchers – including many at the central banks and other international organizations – have developed their own Financial Conditions Indices (FCI) in order to analyze the economic and monetary policy outlook.<sup>1</sup> In economic literature, a good starting point for understanding the FCIs is the basic monetary policy transmission mechanism where monetary policy influences the economy by altering the financial conditions through its policy instruments. In this process, the structure of the economy is a key determinant of effective transmission. For instance, countries like Singapore that largely dependent on trade activities give considerable weight to exchange rate in formulating monetary policies.

In terms of studies focusing on advanced economies, Swiston (2008) attempt to construct FCI for the US by employing vector autoregressive (VAR) model and impulse response function (IRF) analysis to determine the weights of the sub-components of the index. Guichard and Turner (2008) also follow similar methodology (VAR and reduced-form equations) to come up with FCI for the US by using variables such as exchange rate, interest rates, bond spread, and some asset prices. On the other hand, Hatzius et al. (2010) use the principal component analysis (PCA) method to obtain FCI and examine the predictive performance of the index for economic activity. Regarding the Euro Area, Montagnoli and Napolitano (2005) use Kalman-Filter methodology to obtain the weights assigned to each variables constituting the FCI of the Euro Area and US. Besides that, Angelopoulou et al. (2014) benefit from the PCA method to build FCI for some European countries.

Considering the studies covering emerging markets, Gomez (2011) construct FCI for Colombia by adapting PCA methodology on a broad range of variables comprising interest rates, exchange rates and asset prices. Cottani et al. (2012) build an indicator to summarize the state of financial conditions in Latin American countries. Apart from that, Osario et al. (2011), construct a quarterly FCI for 13 Asian economies including the developing ones. The authors create FCIs based on two main statistical techniques which are VAR model and dynamic factor model (DFM). Gumata et al. (2012) work on an FCI for South Africa that is based on both global and domestic financial indicators via combining PCA and DFM. Kara et al. (2012) build quarterly FCI series for the Turkish economy by employing VAR methodology.

Like elsewhere, financial sector in Pakistan has witnessed various reforms in the past two decades. Up to the early 1990s, monetary policy was implemented through direct instruments like, reserves requirement, directed credit and interest rates rationing for different sectors of the economy. In the early 1990s, however, the process of financial liberalization started with the limited privatization of four large banks. Auction based system introduced for government borrowing from the banking system. Autonomy of the SBP increased with adoption of the market based instruments to implement monetary policy. Further, Pakistan's financial and capital markets have also witnessed significant capital flows post 9/11. Moreover, during the same time, Pakistan's linkages to rest of the world have also increased considerably through the trade channel.<sup>2</sup> Keeping

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<sup>1</sup> See **Annexure** for detailed literature review and practices across the international organizations.

<sup>2</sup> For instance, during 1990s, on average Pakistan's total trade was 25 percent of its GDP which increased to 31 percent in the last decade. Similarly, financial inflows (both private and official) increased from 3 to 6 percent of GDP during the same period.

in view these developments, Hyder and Mazhar (2006) estimated the MCI for Pakistan economy in order to capture the combined effect of both interest rate and exchange rate on monetary conditions. However, overtime, like elsewhere, the use of MCI as an indicator for monetary policy stance reduced in the SBP's analysis.

In this backdrop, the aim of this paper is to develop FCI for Pakistan so that impact of other markets indicators and credit environment is also added to gauge monetary policy stance. Our results show that much of the post GFC period in Pakistan's financial system was characterized by accommodative financial conditions, with three but higher intensity phases of tighter financial conditions. Based on the constructed FCI, we also observed that current ongoing episode of tightening is on average longer than previous two phases. About the FCI as a measure of monetary policy stance, our constructed FCI provided more comprehensive way to look at the stance of monetary policy than just tracking the changes in policy rate. In particular, during the GFC and Covid shocks, this distinction was quite visible. Moreover, in the recent tightening phase, that started after the Covid shock, the FCI indicated slightly lesser tightening in financial conditions by late 2023. We also attempt to test predictive power of FCI to forecast near-term growth. The preliminary analysis does indicate some underlying qualities in the constructed FCI to forecast near-term growth with reasonable precision. Nonetheless, this analysis need more rigor before reaching a positive conclusion.

The rest of the article is divided in three sections. The next section details the methodology to construct FCI in case of a country like Pakistan. Third section comprehensively discusses the results and compare the performance of FCI as a measure of SBP's monetary policy stance and test its predictive qualities with reference to near-term growth. The last section concludes and discusses the way forward.

## **II. Methodology to construct Financial Condition Index for Pakistan**

Before delving into the methodologies to construct the FCI, it is essential to first discuss the potential variables that can prove to be significant for reflecting the underlying trend in financial conditions. For this, the construction of the FCI should take into account the characteristics of Pakistan economy. As noted by Cushman and Zha (1997), small open economies are most likely sensitive to a variety of foreign variables. Exchange rate movements are found to induce sizable changes in domestic financial conditions of small open economies (Kearns and Patel, 2016). A flexible exchange rate regime can mitigate financial condition shocks originating abroad but typically only partially. There is broad evidence that domestic financial conditions are determined, to a large extent, by foreign shocks. Rey and Miranda-Agrippino (2015) argue that the Global Financial Cycle, which is driven by US monetary policy shocks, determines the prices of risky assets (equities and corporate bonds) across countries. Co-movements in risk-premiums effect local economies by changing collateral valuations and borrowing constraints. Capital flows, and in particular changes in credit volumes, also act as important channels of transmission of financial conditions across borders.

In addition to external influences, it is possible to include any financial market variable in the construction of a FCI as every financial market variable contains some information. However, it is impractical to include every financial variable. Literature on FCI serves as an important guide in identifying variables which could be included in the FCI for a country like Pakistan. Financial markets in Pakistan can broadly be classified into four segments namely: i) money market; ii) bond market which largely comprises of the government bond market, iii) foreign exchange market; and iv) equity market. Each market plays a significant role in the economy and changes in these markets also affect economic variables. Broadly speaking, all these markets also play a role in monetary transmission in some way or the other.

Taking into consideration the above discussion and lead from the existing literature – especially available on emerging economies, **Table 1** list down the 21 potential indicators from key sectors that in some way or other reflects the underlying trend in financial conditions in case of Pakistan. Moreover, using monthly data, our sample period for this study starts from June 2007 till December 2023. One obvious reason for the selection of starting date was unavailability of most of the monthly indicators beyond 2007. Table 1 also shows the transformation for each indicator before the construction of FCI.

| Sector                  | Indicator (Code)                             | Transformation      |
|-------------------------|--|---------------------|
| Money and bond markets  | Central bank's policy rate (CBPR)            | Level, percent      |
|                         | Weighted average overnight repo rate (WAONR) |                     |
|                         | 6-month PKRV rate (M6PKRV)                   |                     |
|                         | 3-year PKRV rate (Y3PKRV)                    |                     |
|                         | Weighted average lending rate (WALR)         |                     |
|                         | Weighted average deposit rate (WADR)         |                     |
| Liquidity conditions    | Broad money to GDP (M2GDP)                   | y/y percent change  |
|                         | Reserve money to GDP (RM2GDP)                |                     |
|                         | Loans to the private businesses (LPSBGDP)    |                     |
|                         | Loans to households (LHHGDP)                 |                     |
| Equity market           | Stock exchange index (PSX)                   | m/m percent change  |
|                         | Stock exchange volumes (PSXVOL)              |                     |
|                         | Stock exchange price-to-book ratio (PSXPBR)  | Level, ratio        |
| Foreign exchange market | Nominal effective exchange rate (PKRNEER)    | m/m percent change  |
|                         | Nominal exchange rate (PKRNER)               |                     |
|                         | Pakistan's credit defaults spreads (PAKCDS)  | Level, basis points |
| External indicators     | Global oil prices (OIL)                      | m/m percent change  |
|                         | MSCI emerging markets index (MSCIEM)         |                     |
|                         | MSCI price-to-book ratio (MSCIEMPBR)         | Level, ratio        |
|                         | VIX index (VIX)                              | m/m percent change  |
|                         | Federal funds rate (FFR)                     | Level, percent      |

Note: Since GDP is available on annual basis, we used the same annual number for each month to calculate liquidity ratios

Source: SBP, PBS, PSX, IMF, Haver, Bloomberg

Regarding the methodologies, as highlighted above, cross-country experiences and literature shows two basic approaches have been largely used to construct the FCIs. The first, called the weighted-sum approach, generally assigns weights on each financial variable based on the

estimated relative impacts of changes in these on real GDP. Statistical methods commonly used to estimate the weight of the financial components include: i) simulation of structural macro-econometric models; ii) estimation of reduced-form aggregate demand equations; and iii) estimation of VAR systems and their impulse response functions. The second approach involves estimating common factors – also known as loading factors, from a set of financial variables through PCA or related methodology. The assumption is that common factors, which capture the greatest common variation in the set of financial variables, can be seen as representing the fundamental forces influencing the financial system and can be used as the FCI.

As detailed in Herculano (2022), the various strategies to calculate the weight of financial variables to construct FCI have been chosen for diverse reasons. For instance, while large-scale macro-econometric models are often considered to be superior – i.e. they try to capture the structure of the economy and have wider coverage of indicators – they are quite unwieldy and difficult to run. Reduced-form models that typically consist of an aggregate demand equation relating the output gap or output growth to FCI components have been commonly used. They have modest requirements and are simple to estimate, while the impact of potential transmission channels can be easily identified.

Similarly, the VAR framework, which imposes minimal structure with no particular view on transmission mechanisms, has also been widely used because of the ability to capture dynamic interactions between variables. Unlike reduced-form aggregate demand analysis, all variables are made endogenous. Aside from estimating the linkage between financial markets and the real economy, VAR analysis also captures the feedback mechanisms among the financial components, specifically the impact of financial shocks (Swiston, 2008). The downside is that only a limited number of indicators can be accommodated in view of relatively small degrees of freedom.

For the PCA approach, as noted by Gauthier et al. (2004), this method does not depend on any particular kind of economic model. The method also gauges the contribution of financial indicators consistent with the historical importance to fluctuations in the broader financial system and allows for an interpretation of the systemic importance of each component. Moreover, the PCA approach is also considered to be practical as it can extract information from a large number of indicators and can be conveniently run at higher frequency.

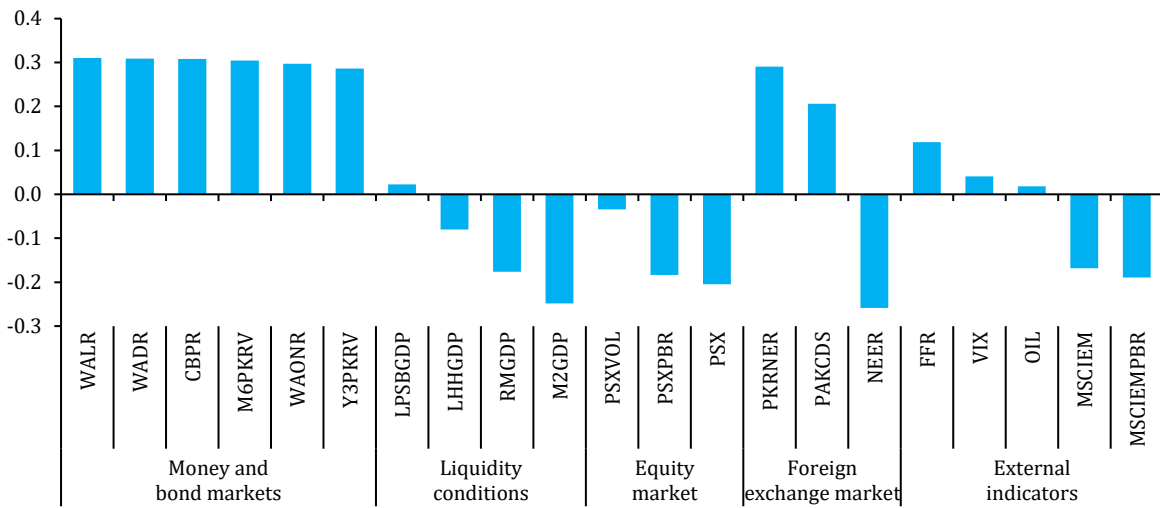
For this study, following Hatzius et al. (2010), we also apply PCA method to construct FCI for Pakistan. Specifically, PCA methods help reduce the dimensionality of many variables while preserving data variation. PCA represent the eigenvector of the data variance-covariance matrix. Therefore, from a computational standpoint, they can be extracted via the eigen decomposition of the correlation matrix or a singular value decomposition of the data matrix. The first principal component can equivalently be defined as a direction that maximizes the variance of the projected data. We interpret this first principal component as a proxy for financial conditions. Mathematically, the first principal component or the FCI, which captures around 45 percent of the information available from each indicator, can be derived as:

$$FCI_t = (\alpha_1/\gamma)X_{1t} + \dots + (\alpha_4/\gamma)X_{4t}$$

where  $\alpha_n$  is the first eigenvector and  $\gamma$  is the first eigenvalue derived from the PCA.

Based on the PCA method defined above, **Figure 1** shows the factors loading for each indicator. These loadings reveal the signs and magnitudes of variables included in the FCI construction. The signs and magnitudes are important in capturing and assessing the systematic relationships with the identified common factor. The more correlated the factor is with other variables, the higher the allocated weight. Also, provided the way we are constructing the FCI, positive sign denotes that an increase in respective indicator leads to tighter financial conditions and vice versa.

**Figure 1: Factor Loading (Weights) from the PCA to Construct the FCI for Pakistan**



Source: Authors' estimations

In particular, Figure 1 shows that, money and bond markets' indicators have not only high but also showing broadly same level of loadings. In contrast, while liquidity variables are on average estimated to have relatively lower weights in the PCA, changes broad money supply remains significant to identify loose or tight financial conditions. In the equity market, changes in index in itself and price-to-book ratio appears to have larger weight in driving the financial conditions. In the foreign exchange market, exchange rates are having more weights in impacting the financial conditions compared to changes CDS spread. And lastly, for external indicators, changes in policy rate of the US Federal Reserve is having a significantly unfavorable impact on Pakistan's financial conditions. Surprisingly, changes in global oil prices have little role in influencing the financial conditions in Pakistan, whereas activity in global stock markets do impact domestic financial conditions.

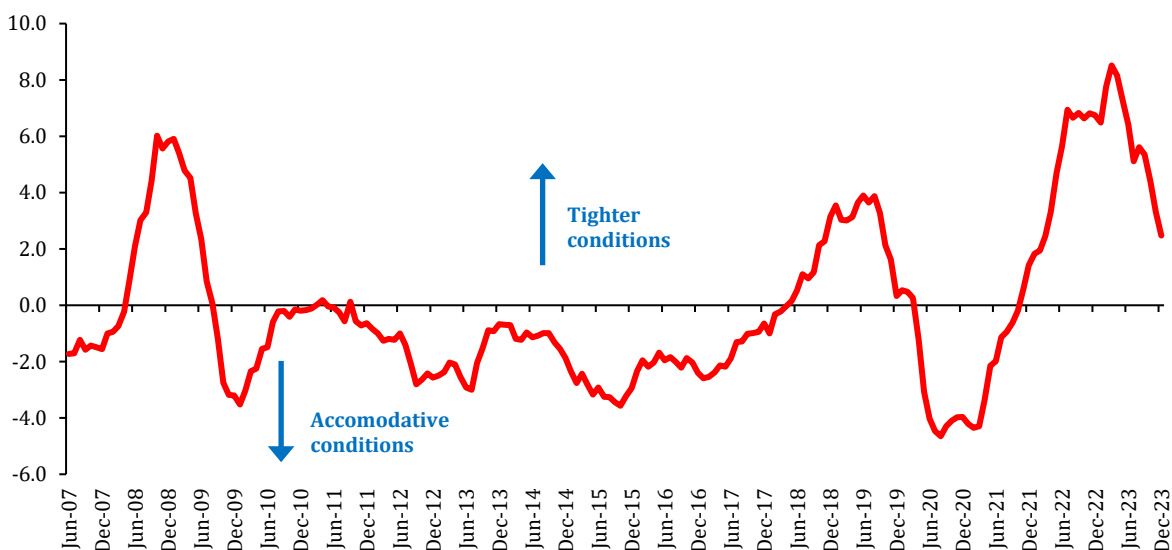
### III. Estimated Financial Conditions Index for Pakistan: Results and Discussions

The estimated FCI for Pakistan is depicted in **Figure 2**. An upward movement of the index implies tighter overall financial conditions, whereas a decline indicates more accommodative financial conditions. It could be observed that, for our estimate sample from June 2007 till



December 2023, only three cycles of tighter financial conditions appear. Specifically, out of 199 months – of which our data sample consists of, 68 months could be classified as tightening periods while rest could be associated with accommodative financial conditions. The first tightening cycle coincides with the GFC and impact of oil price shock, which led to significant pressures in the domestic financial system, and also on the external front. In order to arrest this downturn, government approached the IMF in late 2008 and hiked to rate policy rate to curtail domestic demand.

**Figure 2: Constructed Monthly Financial Conditions Index (FCI) for Pakistan**



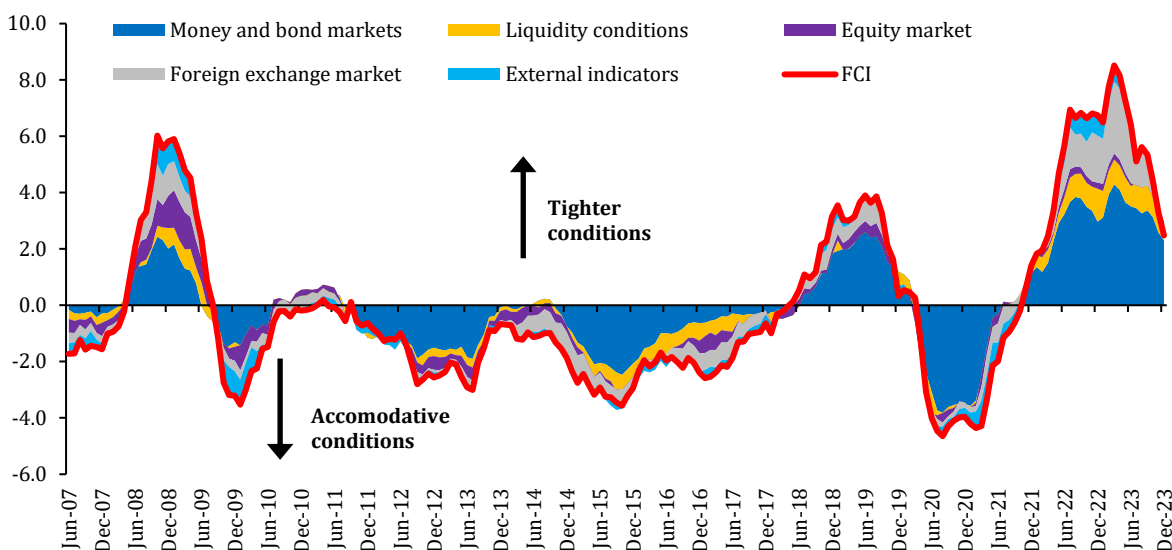
Source: Authors' estimations

As depicted in Figure 2, the second tightening cycle coincides with the pre-Covid stabilization phase. Once again, infrastructure induced pressures on the external sector amid fixed exchange rate policy caused substantial depletion in foreign reserves. This forced SBP to raise its policy rate and at the same time, under the IMF agreement, led more flexibility in exchange rate mechanism. The last tightening cycle, which as of December 2023 continued to depict tighter stance, exhibits the impact of strong recovery in domestic demand after Covid and its ensuing impact on domestic inflation and financial conditions. These conditions were further aggravated by emergence of global terms-of-trade shock and an unprecedented domestic floods. In order to curtail the entrenchment in inflation and its expectations, SBP raised policy rate to historic high, which led to sharp slowdown in domestic activity.

In terms of drivers, **Figure 3** shows the contribution of different markets to the FCI for Pakistan. It appears that interest rates do play an important role in driving the overall financial conditions in Pakistan. However, at times, foreign exchange market also influences the domestic conditions significantly. The role of liquidity conditions and equity, and external indicators is estimated to be lower in effecting the financial conditions in Pakistan. However, Figure 3 also shows an overtime interesting underlying development in the financial system of Pakistan. For instance, in the first tightening cycle, which appeared during the GFC and oil price shock, almost all the selected

markets contributed towards tightening financial conditions. Afterwards, it could be observed that the role of interest rates become increasingly important in driving the FCI on both sides.<sup>3</sup> For example, in the second tightening phase, almost all of the increase in FCI was explained by changes in interest rates followed by changes in the foreign exchange market indicators.

**Figure 3: Drivers of Financial Conditions in Pakistan**



Source: SBP, PSX, Haver, IMF, authors' estimations

Notwithstanding this increasingly important role of interest rates in effecting financial conditions in Pakistan – as depicted in Figure 3, more recently – i.e. after Covid shock, role of exchange rate is also gaining significance. This certainly has to do with the adoption of market-based exchange rate regime in May 2019 that remained responsive to evolving global and domestic economic developments in recent years. These developments mainly included, Covid induced panic in the global capital markets in the summer of 2020, emergence of commodity super cycle crisis after Russia-Ukraine war erupted in February 2022 and escalated pressures on domestic external sector in late 2023. Cumulatively, since Covid, PKR is estimated to depreciate by around 50 percent vis-à-vis USD. This has certainly added another layer of financial tightening in recent years besides increase in interest rates.

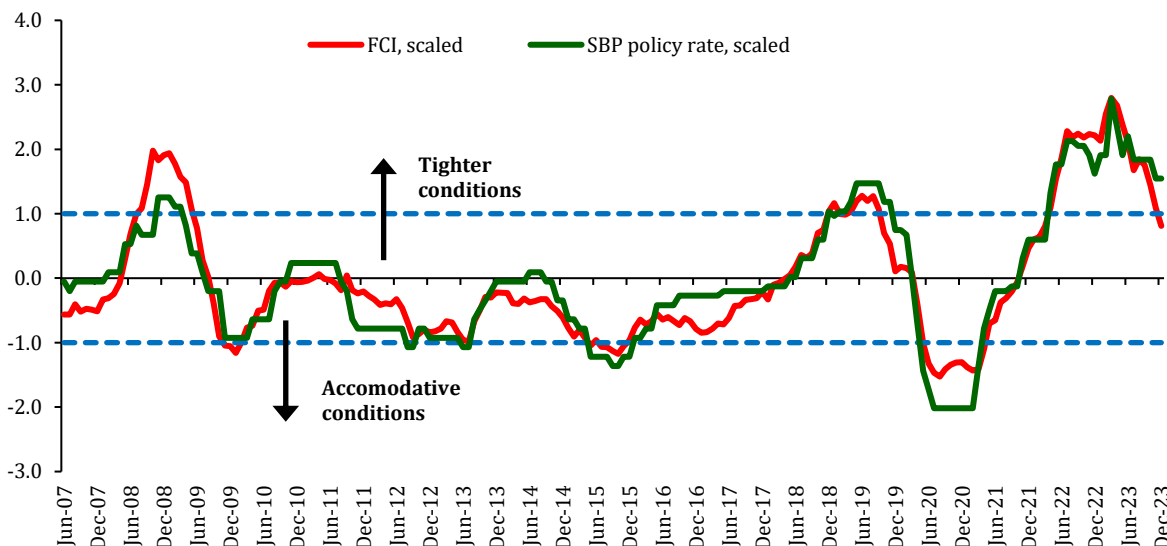
Moreover, literature shows that an FCI can also serve as a guide to the effectiveness of the monetary policy stance because it could identify periods in which the normal monetary policy transmission channels may be impaired on account of increased financial market frictions.<sup>4</sup> To identify the periods in which conditions showed large changes, we scaled the FCI by the sample's standard deviation. Measured this way an index value of -1 is associated with financial conditions that are accommodative than on average by one standard deviation, while an index value of 1

<sup>3</sup> While exploring this development is beyond the scope of this study, it could be triggered by the SBP's introduction of the interest rate corridor framework for monetary policy operations in August 2009. In the new framework SBP aims to target the overnight interest rates and also announced a new target policy rate in May 2015.

<sup>4</sup> For example, see Hakkio and Keeton (2009),

indicates that financial conditions are tighter than average by one standard deviation (**Figure 4**). In addition to FCI, in a similar way, we also scaled the SBP policy rate for the same period.

**Figure 4: Financial Conditions Index (FCI) and SBP Policy Rate, Scaled**



Source: SBP, authors' estimations

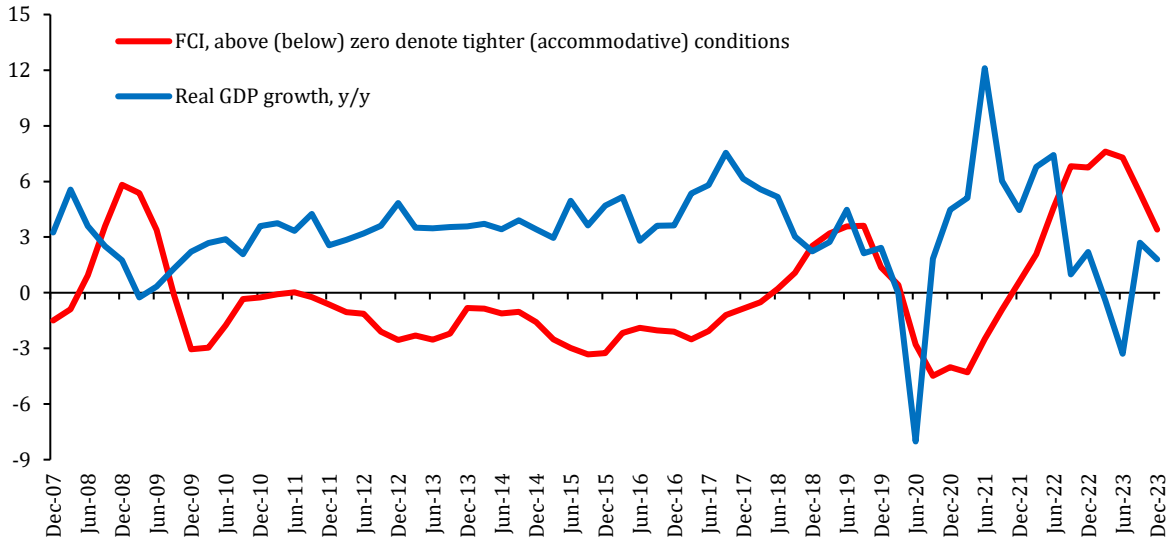
It could be observed from Figure 4 that, the earlier identified three tightening cycles with respect to financial conditions can be classified as having much tighter conditions compared to other periods where the index remained above zero. However, a closer inspection reveals that, for instance during the GFC stress, financial conditions were much tighter than what the changes in SBP's monetary policy decisions were reflecting. In other two tightening phases, broadly this was not the case. Moreover, in recent episode, it appears that the FCI is falling below the 1 standard deviation benchmark, while the policy rate stays above. This lesser tightening in FCI is basically capturing the recently appreciating trend in PKR, which has partially lessened the impact of interest rates and also lowered the otherwise increasing inflation expectations. In case of accommodative phases, it could be seen from Figure 4 that measuring from the FCI perspective, the conditions were slightly lesser accommodative that what was the sharp decrease in SBP policy rate was depicting. Overall, it appears from this analysis, that FCI could also serve as an important and effective indicator to measure the monetary policy stance.

In addition to serve as an indicator for measuring monetary policy stance, literature also shows FCIs predictive power in forecasting near-term growth outlook.<sup>5</sup> For this, we first observe whether there is co-movement between the constructed FCI and GDP growth through graphical presentation and correlation. Second, we conduct Granger causality test to check whether or not the FCI cause GDP growth. And third, we conduct out-of-sample forecast to assess the FCI's predictive ability of near-term GDP growth. **Figure 5** depicts estimated FCI and trend in quarterly real GDP growth over the last one and a half decade. It could be observed that the FCI and real GDP growth closely move in opposite directions, which indicates the unfavorable or favorable impact of

<sup>5</sup> For details, see Herculano (2022)

tighter or accommodative financial conditions on economic activity. Moreover, from statistical point of view, for the given sample period, there exists a negative correlation of about 0.32 between two series, which increase to slightly above 0.50, when we introduce the FCI with lag of one and two quarters. This indicates some predictability on part of FCI for near-term growth.

**Figure 5: Financial Conditions Index (FCI) and Quarterly Real GDP Growth**



Note: Quarterly real GDP growth from PBS is available from Q3 2015. Data before that is based on in-house estimation using the PBS method.  
Source: PBS, authors' estimations

In second step, as discussed above, **Table 2** shows the results of the Granger causality tests of the FCI and near-term GDP growth. The test validates the hypothesis that FCI do contains futuristic content that help predict growth in near-term.

**Table 2: Pairwise Granger Causality Tests**

Sample: 2007Q3 2023Q4, lags 2

| Null Hypothesis:               | F-Statistic | P-value  |
|--------------------------------|-------------|----------|
| GDP does not Granger Cause FCI | 1.9020      | 0.1583   |
| FCI does not Granger Cause GDP | 7.3063      | 0.0015 * |

\* represent significance at 5 percent level

Source: PBS, authors' estimation

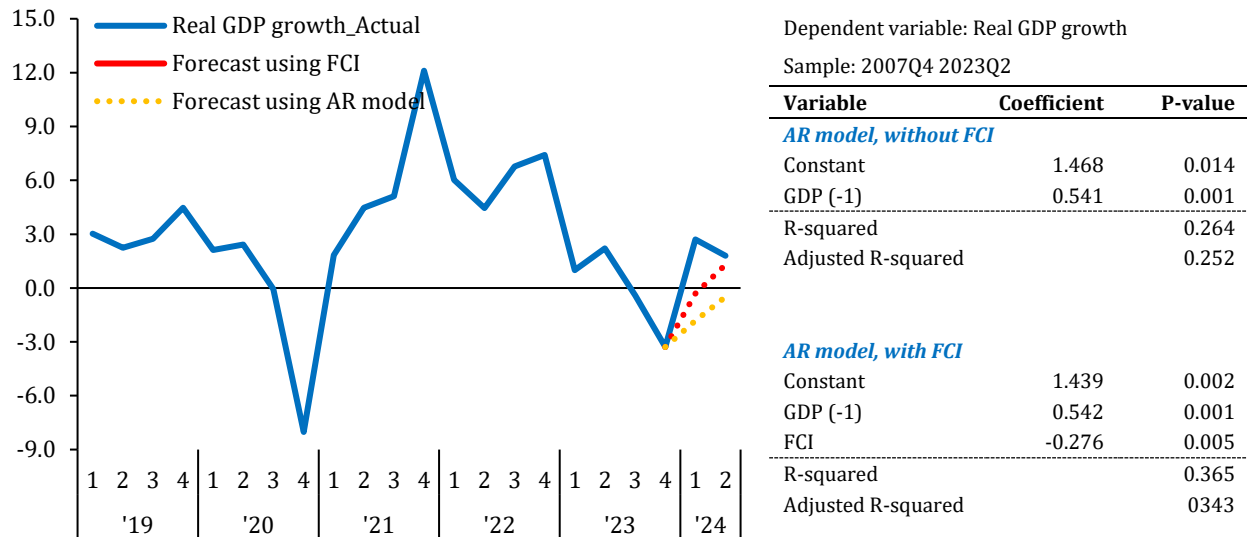
For third step about testing the relative predictive performance of our constructed FCI, we estimate the following equation:

$$Growth_{t+h} = \alpha + \sum_{i=1}^q \beta_i Growth_{t+1-i} + \omega FCI_t + \varepsilon_t$$

where FCI refers to the constructed index and growth indicates quarterly real GDP growth. The forecast horizon (h) is set to 2 quarters ahead and the estimation is based on 2007q3–2023q2.

The optimal lag of the GDP growth is determined by Akaike Information criterion (AIC) by first estimating the above equation without FCI. The results from the equation are presented in **Figure 6** along with usual statistical significance.

**Figure 6: Near-term Real GDP Growth Forecast, with and without FCI**



Note: Quarterly real GDP growth from PBS is available from Q3 2015. Data before that is based on in-house estimation using the PBS method.  
Source: PBS, authors' estimations

It could be observed from Figure 6 that the FCI help in explaining the near-term GDP growth as the coefficient is significantly different from zero with an expected sign. Moreover, the results also show that the AR model without FCI produce lower predictive power compared to the model augmented with the FCI. Overall, the initial estimates show that the FCI, in addition to its earlier roles of measuring financial conditions and the monetary policy stance, can also be used a predictor for near-term growth in case of Pakistan.

#### IV. Conclusion and Way forward

In this study, we attempted to construct the monthly financial conditions index for Pakistan using high-frequency indicators from domestic and external markets. The analysis extracts the index by applying the principal component analysis, which identify an unobservable common factor from a group of external and domestic financial indicators. We also analyzed the FCI as a measure for the SBP's monetary policy stance. Also, we tested the predictive power of the FCI using out-of-sample forecasting exercise for two quarter ahead.

Our results show that much of the post GFC period in Pakistan's financial system was characterized by accommodative financial conditions, with three but higher intensity phases of tighter financial conditions. Based on the constructed FCI, we also observed that current ongoing episode of tightening is on average longer than previous two phases. In terms of drivers, our estimations reveal the increasing role of interest rates in determining the financial conditions in

Pakistan during the sample period. At times, we also see the important role of exchange rate in this regard but the contribution from other sectors like equity and external remained insignificant.

About the FCI as a measure of monetary policy stance and predictor for near-term growth, we observed insightful results. For instance, our constructed FCI measure provided more comprehensive way to look at the stance of monetary policy than just tracking the changes in policy rate. In particular, during the GFC and Covid shocks, this distinction was quite visible. Moreover, in the recent tightening phase, that started after the Covid shock, the FCI indicated slightly lesser tightening in financial conditions by late 2023 than what appeared from the stability in policy rate. On the predictive part, the preliminary analysis does indicate some underlying qualities in the constructed FCI to forecast near-term growth with reasonable precision. Nonetheless, this analysis need more rigor before reaching a positive conclusion.

Going forward, this study provides the basic framework for the construction of FCI. In the next step, one can develop further FCIs using different methods as identified in several other studies elsewhere. Also, sectoral FCIs could also serve as effective input for more granular analysis in future to measure the impact of monetary policy stance of the SBP. More importantly, there is need to link the analysis obtained from the FCIs to other financial indicators. This will be an important value-addition given the SBP's second objective, according to the new Act, is to maintain financial stability.

## References

- Angelopoulou, E., Balfoussia, H. and Gibson, H.D., 2014. Building a financial conditions index for the euro area and selected euro area countries: what does it tell us about the crisis? *Economic Modelling*, 38, pp.392-403.
- Avalos, F., Igan, D., Manea, C. and Moessner, R., 2023. Monetary policy, financial conditions and real activity: is this time different? (No. 80). Bank for International Settlements.
- Cushman, D.O. and Zha, T., 1997. Identifying monetary policy in a small open economy under flexible exchange rates. *Journal of Monetary economics*, 39(3), pp.433-448.
- Gauthier, C., Graham, C. and Liu, Y., 2004. Financial conditions indexes for Canada (No. 2004-22). Bank of Canada.
- Gómez-González, E., 2011. Financial conditions index: early and leading indicator for Colombia. *Revista Ensayos Sobre Política Económica*; Vol. 29. No. 66. Diciembre, 2011. Pág.: 174-220.
- Guichard, S. and Turner, D., 2008. Quantifying the effect of financial conditions on US activity.
- Gumata, N., Ndou, E., Gumata, N. and Ndou, E., 2017. Do Positive Tax Revenue Shocks Impact Financial and Credit Conditions? Labour Market and Fiscal Policy Adjustments to Shocks: The Role and Implications for Price and Financial Stability in South Africa, pp.433-445.
- Hatzius, J., Hooper, P., Mishkin, F.S., Schoenholtz, K.L. and Watson, M.W., 2010. Financial conditions indexes: A fresh look after the financial crisis (No. w16150). National Bureau of Economic Research.
- Herculano, M.C., 2022. A monthly financial conditions index for New Zealand (No. DP2022/01). Reserve Bank of New Zealand.
- Hyder, Z. and Khan, M.M., 2006. Monetary conditions index for Pakistan. Karachi: State Bank of Pakistan.
- Kara, H., Ozlu, P. and Unalmis, D., 2012. Financial Conditions Indices for the Turkish Economy. Central Bank of Turkey research notes in economies. Central bank Turkey.
- Kearns, J. and Patel, N., 2016. Does the financial channel of exchange rates offset the trade channel? *BIS Quarterly Review* December.
- Lack, C. 2002. A Financial Conditions Index for Switzerland. BIS Paper No. 19.
- Miranda-Agrippino, S. and Rey, H., 2015. World asset markets and the global financial cycle (Vol. 21722, pp. 1-68). Cambridge, MA: National Bureau of Economic Research.

Montagnoli, A. and Napolitano, O., 2005. Financial Condition Index and interest rate settings: a comparative analysis. Istituto di Studi Economici Working Paper, 8, p.2005.

Osario, C., Unsal, D.F. and Pongsaparn, R., 2011. A quantitative assessment of financial conditions in Asia.

Rosenberg, M. 2009. Financial Conditions Watch. Bloomberg, December 2009.

Swiston, M.A., 2008. A US financial conditions index: putting credit where credit is due. International Monetary Fund.



## Annexure: Matrix of Literature Review

| Title  | Author(s)   | Variables   | Data Frequency | Methodology   |
|--|---|---|----------------|---|
| A New Index Of Financial Conditions  | Gary Koop , Dimitris Korobilis  | Used 18 financial variables which cover a wide variety of financial considerations (e.g. asset prices, volatilities, credit, and liquidity). These are gathered from several sources.   | Quarterly      | Augmented VAR   |
| Financial Conditions Indexes For Canada                                      | Céline Gauthier, Christopher Graham, And Ying Liu                                     | Housing prices, equity prices, and bond yield risk premiums, in addition to short- and long-term interest rates and the exchange rate, are significant in explaining output from 1981 to 2000.  | Monthly        | Reduced form Generalized IRF VAR and Factor Analysis  |
| Financial Conditions Indexes:A Fresh Look After The Financial Crisis         | Jan Hatzius, Peter Hooper, Frederic S. Mishkin, Kermit L. Schoenholtz, Mark W. Watson |   | Monthly        | Weighted sum approach Reduced Form Equation, PCA, AR model  |
| Financial Conditions Index And Credit Supply Shocks For The Euro Area        | Matthieu Darracq Paries, Laurent Maurin And Diego Moccero                             | Variables considered include: bank lending rates, MFI loans to households and NFCs, money growth, spreads between government bond yields of different maturities, bank capital and liquidity, equity and securities issuance by MFIs and NFCs, bank and corporate bond yields, stock market returns of financial and non-financial institutions, volatility in equity and exchange rate markets, and correlations among different financial variables, among others | Monthly        | Two-step approach to construct the FCI using PCA for construction and VAR model   |
| Financial Condition Index And Interest Rate Settings: A Comparative Analysis | Alberto Montagnoli And Oreste Napolitano  | Focused analysis on three asset prices: exchange rates, house prices and stock prices.  |                | Simulation of a large scale of macro-econometric model system with reduced-form aggregate demand equations VAR impulse response |
| Financial Conditions Indexes Bank Of Finland Discussion Papers 17/2001       | David Mayes – Matti Virén   | Using panel datasets for Western Europe we explore how asset prices, particularly house and stock prices, can provide useful additional indicators of future changes in output and inflation  | Quarterly      |   |
| Monitoring Financial Stability: A Financial Conditions Index Approach        | Scott Brave & R. Andrew Butters   | Segmented the financial indicators in our FCI and adjusted FCI into three categories: money markets (28 indicators), debt and equity markets (27), and the banking system (45)  | Weekly         | Weighted sum approach, Reduced Form Equation, PCA, AR model   |
| Estimating Financial Conditions Index For India                              | Jeevan Kumar Khundrakpam, Rajesh Kavediya & Jessica M. Anthony                        | GDP,IIP NEER, REER, Money Supply, NFC, Yield on 10year gov bond, corporate bond yield, 3M bill yield  | Monthly        | VAR and PCA   |

| Title   | Author(s)   | Variables  | Data Frequency | Methodology   |
|---|---|--|----------------|---|
| Financial Conditions Indexes For Asian Economies                            | Debuque-Gonzales , Margarita; Gochoco-Bautista, Maria Socorro | money markets, for short-term borrowing and lending; capital markets, for both equity and debt securities; foreign exchange markets; and the banking system. | Quarterly      | PCA   |
| Monetary Conditions Index For Pakistan                                      | Zulfiqar Hyder And Muhammad Mazhar Khan                       | Exchange rate movements and 6 month Tbills rate changes  | Monthly        | Vector Autoregressive (VAR) and Johansen's cointegrating models               |
| Asset Prices, Financial Conditions, And The Transmission Of Monetary Policy | Charles Goodhart And Boris Hofmann                            | A weighted average of the short-term real interest rate, the effective real exchange rate, real property and real share prices                               | Quarterly      | VAR impulse responses   |
| A Financial Conditions Index For Switzerland                                | Caesar P Lack & Swiss National Bank                           | Adding housing prices and stock prices to MCI  | Monthly        | Structural vector autoregression (VAR)  |
| Quantitative Assessment Of Financial Conditions In Asia                     | Carolina Osorio, Runchana Pongsaparn, D. Filiz Unsal          | Interest rates, exchange rate, credit, stock market,   | Monthly        | VAR-based weighted, sum approach and GDFM-based principle component approach. |

#### Financial Conditions Indices produced by the International Organizations

| Institution        | Main purpose   | Methodology  | Coverage   |
|--------------------|--|--|--|
| Goldman Sachs FCIs | Impact of financial conditions on GDP growth           | Five variables: nominal short-term rate, nominal long-term rate, corporate spread, equity price, trade-weighted exchange rate. A sixth variable for some countries: sovereign spread (EA countries), debt weighted FX rate (some EMEs).<br>Weights based on one-year GDP impact                                      | Daily frequency, AEs and EMEs, Since 1980s for most AEs and 2000s for most EMEs    |
| OECD FCIs          | Impact of financial conditions on GDP growth           | Eight variables: real short-term rate, real long-term rate, real effective exchange rate, loan survey results, real house prices, real share prices, bond yield spreads between corporate and public bonds.<br>Weights based on 1/1.5 years GDP impact   | Quarterly frequency, Seven OECD countries, Since 1995                              |
| IMF FCIs           | Tightness of financial conditions historical standards | Eleven variables: real short-term rate, interbank spread, term spread, sovereign local debt spread, sovereign dollar debt spread, corporate local currency spread, corporate dollar debt spread, equity price, equity volatility, exchange rate, real house price.<br>Weights based on principal components analysis | Monthly frequency, AEs and EMEs, From 1990 to 2017, depending on data availability |
| Bloomberg FCIs     | Financial stress                                       | Ten variables from money, bond, and equity markets<br>Equal weights  | Daily frequency, US, EA, GB, Since early 1990s                                     |

Source: BIS, Avalos et al. (2023)