Evaluating the Impact of Financial Stability and Monetary Stability on Economic Growth: Evidence from an Emerging Economy

Ameet Kumar [ID][1], Simran Jeswani [ID][2], Rabia Farooq [ID][3], Muhammad Haroon Rasheed [ID][4]

[1] Lecturer, Shaheed Benazir Bhutto University, Shaheed Benazirabad, Nawabshah, Pakistan.
  Email: ameetkumar@sbbusba.edu.pk
[2] Department of Management Science, Shaheed Zulfikar Ali Bhutto Institute of Science and Technology (SZABIST), Larkana, Pakistan. Email: sim.jes.99@gmail.com
[3] Department of Management Science, COMSATS University, Islamabad, Pakistan. Email: rabiafarooq092@gmail.com
[4] Malik Firoz Khan Noon Business School, University of Sargodha, Pakistan. Email: haroon.rasheed@uos.edu.pk

ARTICLE INFO

ABSTRACT

Financial stability and monetary stability both make an essential contribution to sustainable industrial growth and well-established industrial sectors contribute to sustainable economic development. The fundamental objective of this study is to create an FSI index to quantify financial strain in Pakistan. While utilizing monthly data starting from 2004-11 to 2017-7 the Financial Stress Index has four indicators which include TED spread, yield spread, stock price volatility, and exchange rate volatility through principal component analysis (PCA). An ARDL co-integration model is used to investigate the long-term and short-term relationships between time series data. The primary takeaways from this research are that financial stability and industrial production are positively correlated, while inflation and industrial production are negatively correlated. This study fills a knowledge gap by analyzing the impact of financial and monetary stability on economic growth in Pakistan using the Financial Stress Index. Lastly, this study sheds light on the financial and monetary concerns of Pakistan.

Corresponding Author's Email: sim.jes.99@gmail.com

1.   Introduction

In the previous two decades, the Asian financial crisis in 1997 and the global financial crisis in 2007-08 both had significant impacts on Pakistan's financial industry and its ability to perform its essential functions. The episodes of financial markets determine that financial disasters and financial instability are pursued by a rapid decrease in real economic activities. In the current era, the domestic financial system is interdependent with the international financial system. The financial system operates regularly when a shock comes to the financial sector without damaging the flow of funding for productive and useful growth purposes, it reflects an indicator of financial system stability (State Bank of Pakistan, 2015). The central bank of a country is leading to make monetary policies useful for the volatility period when financial instability ruins the functions of real economic activity (Younsi & Nafla, 2019). Financial instability seems in the financial system then only monetary policy is to rectify the problems of instability and deregulate the financial system through using its policy tools. Monetary policy plays the intermediary role between financial stability and output. The functions of monetary policy are to control the cost of money, the value of money and the availability of money not only control the behavior of money but also control, the value and availability of credit to achieve the required level of employment, prices, output and other objectives of the country.

Therefore, taking all of this into consideration, we may deduce that monetary policy has a role in the expansion of a nation's economy. In an expansionary monetary policy, the money supply is increased to lower the cost of money or the interest rate to encourage more investment and revive economic activities. In a contractionary monetary policy, the opposite occurs. On the other side, contractionary monetary policy involves reducing the total amount of

money in circulation, which increases the cost of money and a subsequent slowdown in economic activity. Monetary policy shocks affect industrial growth if it controls production. Nevertheless, monetary stability is also known as price stability. Managing price inflation and currency fluctuations is a top priority for central banks. Economic growth is indicative of a stable exchange rate and stable prices. If the prices for general goods and services are stable, then the confidence of consumers and producers will be relying on market mechanisms will be stable. On the other hand, if prices increase rapidly, then the cost of production will also increase, demand for that product will decrease and an economic downturn will start. Consequently, both financial systems and monetary policy tools contribute to the economic growth of a country and the industrial sector is one of the most energetic sectors to contribute to the GDP of a country.

The findings of the earlier studies demonstrated that credit plays a significant role in the spreading of financial strain throughout the entire economy (Carlson, King, & Lewis, 2011). Monetary policy contributes to economic activities but previous studies ignore the industrial sector in case of financial and monetary instability on industrial growth. Theoretical viewpoint, monetary policy influences real economic activities over financial regulator instruments. Macroeconomic variables, their effects on financial institutions, markets, and systems, and the mechanisms that contribute to financial inequality have all been the subject of extensive research. Integration of the financial sector into the broader macroeconomic framework has advanced theoretically in recent years. The link between "Financial Stability and Economic Growth" has received too little attention from academics. However, Pakistan's real GDP fluctuates greatly from year to year. However, in the real scenario, Pakistan's GDP is not consistent over time which is the big hurdle to attaining high-level achievements. In the past, a wide range of studies have scrutinized the fundamental steps for growth. Adopting various theoretical and methodological procedures, all those research works have introduced an emphasis on several explanatory variables for growth purposes and recommended comprehensive theories in the process of growth. On the contrary, the present study fills the gap firstly; by identifying the financial stability and monetary stability both contribute to the economic growth of Pakistan using different indicators of financial markets such as TED Spread, Yield Spread, stock market prices volatility, and exchange rate volatility respectively. Finally, to construct a "Financial Stress Index" that measures the financial stability of the whole country. This study aims to examine the relationship between financial stability and economic growth from 2004-11-07 to 2017-07-07, using monthly time series data. The structure of the paper is followed by 2. Literature, 3. Methodology, 4. Results and then 5. Conclusion.

2. Literature Review

Financial and monetary stability, and the effect they have on economic growth, are topics that have generated a great deal of research. The literature review elaborates on some of the studies that have been conducted in different regions of the world related to associated problems both in the theoretical and empirical literature. The previous literature was well-researched on financial stability and macroeconomic variables for developed countries individually and grouped wisely to construct the Financial Stress Index (FSI) as a measurement tool for financial stability.

Schwert (1989), examines the behavior of financial crises, business cycles, and stock market volatility from 1834-1987. The mentioned period covers the industrial history of the USA. The finding of this study concludes the idea that financial instability is attached to real economic activities. Consequently, stock market volatility increases when stocks come into the financial sector, and also find that stable and consistent stock prices are an important indicator for real economic activities. Yeyati and Sturzenegger, (2003), examine the influence of exchange rate regimes, such as floating exchange rates or fixed exchange rates, on economic growth for 183 countries using annual time series data spanning the period from 1974 to 2000. The data covers the period from 1974 to 2000. The exchange rate regime doesn't affect countries with an industrial structure, but it does affect countries without an industrial structure. Cardarelli, Elekdag, and Lall (2011), investigate the effect of financial turmoil incidents on economic activities. The period starts from 1980 to 2007 for 17 developed countries. To capture the financial stress in the selected economies, use FSI and adapt the method to the construction of FSI through equal variance weighted average and GARCH techniques used in this study. It concludes that stress predominantly in the securities and

exchange markets is less likely to be linked to longer and deeper downturns than stress classified as banking distress.

Blot, Creel, Hubert, Labondance, and Saraceno (2015), In the US and the Eurozone, explored the association between FS and price stability. As a result, a positive association between price stability and financial stability remains constant across time is observed. The correlation between price stability and financial stability is also established by the result, which casts doubt on the viability of the "leaning against the wind" monetary policy. Scrutinize to check out the impact of stock returns volatility and selected macroeconomic variables from Pakistan. The results show that macroeconomic indicators of stock market variability discovered that macroeconomic variables contribute to defining the stock market volatility. A rise in the monetary rate of a nation, oil prices, and real exchange rate improved factors of stock market volatility positively while the rise in industrial production, output of a country, and real money supply hurt volatility (Hussain, Zaman, & Ahmad, 2015).

Vašíček et al. (2017), inspect the relationship among selected variables i.e., financial, fiscal, macroeconomic, and monetary variables, and FS for 25 OECD countries. Applying the financial stress index (FSI) introduced by Canadian economists (Illing & Liu, 2003) and the Bayesian model balancing to recognize important indicators of financial stress. Results indicate that it is crucial to recognize the main indicators for FS in OECD countries. Stock market growth positively and significantly contributes indirectly to economic growth by using the proxy of economic growth i.e., industrial production growth (A. Sharif & S. Afshan, 2016). Ghumro, Jamro, Dakhan, and Khawaja , research demonstrates that the exchange rate, stock market, and bond market all have a short-term and long-term relationship with one another. In the short and long term, the exchange rate shifts when the stock market and bond market do. However, currency fluctuations do not explain stock market swings. Short-term and long-term economic growth are both influenced by monetary policy. It appears that there is a favorable and considerable effect of financial development and monetary policy reforms on economic growth. (Friedrich, Hess, & Cunningham, 2019). Sadia, Bhatti, and Ahmad (2019) principal Component Analysis was used to develop the financial stress index and analyze Pakistan's economy for the period 1993M1-2016M12. In addition to financial market factors, the study concludes that political and economic hazards are significant contributors to financial stress. Price stability and financial stability in important emerging economies are also examined and suggest prudent monetary policy significantly impacts price and financial stability (Kırcı Çevik, Koç Yurtkur, & Dibooglu, 2019). The Panel Vector Autoregressive (PVAR) model was used to examine the link between Financial Stability and Monetary Stability in twelve industrialized economies. The investigation indicates that macroeconomic variables have a negative reaction to financial stress shocks (Apostolakis & Papadopoulos, 2019).

Similarly, recent studies by Duprey (2020); Ilesanmi and Tewari (2020); Ishrakieh, Dagher, and El Hariri (2020); Mundra and Bicchal (2021) show an economic decline and FS have a negative association between a country's GDP and economic development. Lastly, Hayat et al. (2021) stated that Global economies have been impacted by the COVID-19 epidemic, particularly in light of the actions taken by the government regarding compulsory lockdowns and social segregation. Their study concludes that the findings of the multi-scale and wavelet, in the short and medium term, the link between these variables is unidirectional, but in the long run, it is bidirectional, as shown by Granger causality tests.

3.   Conceptual Framework

Monetary stability involves maintaining the stability of the money supply and a sound financial system. It directly affects economic growth through stable price levels and interest rates. Price stability provides a favorable environment for consumers and investors. The Steady and predictable price levels are outcomes of stable money supply. Similarly, Stable interest rates are the result of monetary stability. The stability in interest rates encourages investments, reduces uncertainty and cost of borrowing for businesses and individuals leads to an increase in economic growth. Similarly, the health and resilience of the financial system is depicted by financial stability. The Stable financial system facilitates economic growth by promoting efficient intermediation and ensures the availability of credit to economic activities, investments, and economic growth. The stability in the financial system reduces financial crises and thus contributes to sustained growth and economic stability. Thus, the study has used economic growth as a dependent variable which is measured through a proxy of the Industrial

Production Index and the independent variables are financial stability which is measured through the Financial Stress Index, and Money stability measured through the proxy of the Consumer Price Index. However, according to the main objective of this study, we will make a financial stress index using TED spread, yield spread, exchange rate volatility, and stock market rate. According to the state bank of the country, as stated by Michael D Bordo and Schwartz (1983), it is necessary to keep the price stable to have sustainable economic growth in the country. The price stability includes both terms, financial and monetary stability of the country. However, we construct a conceptual model for this study in Figure I.

Figure 1
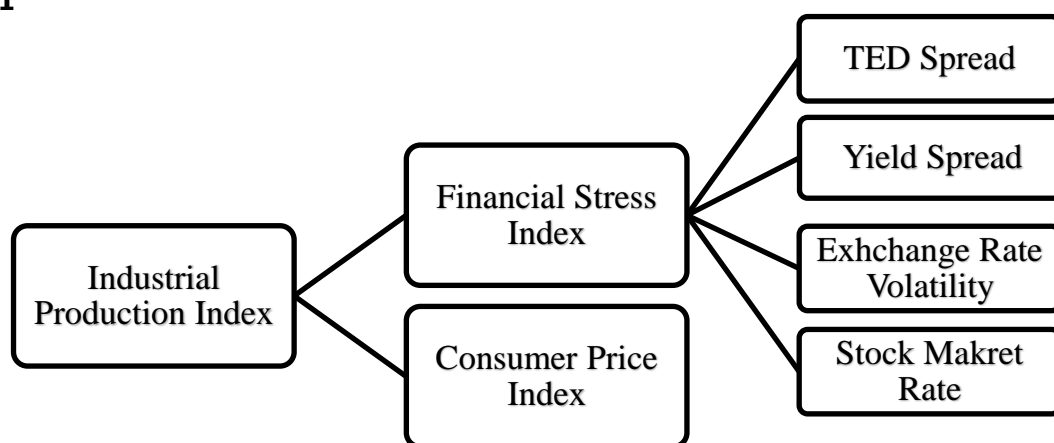
4. Methodology

In this part of the study, empirical techniques, data sources, construction of variables, also d dependent and independent variables, construction of financial stress index (FSI), usage, and importance of methods which method is most suitable for given data is defined. Also, this research work explores the problems faced by investors and some complex hurdles faced by industrial production. Because, in the current situation of Pakistan financial institutions are going on the wrong side continuously and one of the prominent factors of the financial sector is the "Foreign Exchange Rate" This sector is still facing abnormal changes on a daily, monthly, and even quarterly basis.

4.1. Data and Variables

The data is collected from different sources starting from 2004-11 to 2017-7 on a monthly basis. The data has been taken from relevant sources and the variables are the macroeconomic variable which is the industrial production index (IPI) proxy for the gross domestic product (GDP) and the monetary variable is the consumer price index (CPI). The data has been collected for both variables from the census and economic information center (CEIC). Financial variables are TED spread, yield spread, stock market prices, and exchange rate. The data on TED spread is collected from the State Bank of Pakistan and Mutual Funds. Yield spread and exchange rate data have been taken from Investing.com. Stock market price data has been taken from Yahoo Finance. The processes of gathering, refining, and scrutinizing data demand a considerable amount of time. These research endeavors commenced before 2017, and have been steadfastly dedicated to them ever since. The analyses and conclusions of this study are founded on the information accessible up to 2017, and the prospect of incorporating data from 2023 into this study may not have been practically attainable given its existing scope.

Table 1: Variables and Measurement Unit

Variables	Symbol	Measurement Units	Source
Economic Growth	IPI	Industrial Production Index (IPI) (A. A. Sharif & S. Afshan, 2016)	PSX, SBP
Monetary Stability	CPI	Consumer Price Index	WDI
Financial Stability	FSI	-TED Spread	SBP
		-Yield Spread & Exchange Rate Volatility	Investing.com
		-Stock Market (Mahmood & Hussain, 2016)	Yahoo Finance
Note: World Development Index (WDI), State Bank of Pakistan (SBP), Pakistan Stock Exchange (PSX)			

4.2. Construction of Financial Variables

This study constructs Pakistan's Financial Stress Index (FSI) from pertinent financial indicators. (TED spread, yield spread, stock market prices, and exchange rate). To subtract one month of KIBOR from one-month PKRV (KIBOR-PKRV), which means unsecured interest rate minus secured interest rate, is equal to TED spread. After that, the yield spread is constructed which is based on Pakistan's three-year bond yield minus Pakistan's six-month bond yield. Forward this study will find stock market volatility and exchange rate volatility through the recursive window.

4.3. Construction of Financial Stress Index

There are four indicators used to construct FSI for Pakistan three indicators from the national market and the remaining from the foreign exchange market. Domestic indicators are TED spread, yield spread, and stock market price volatility. The international indicator is exchanging rate volatility. After taking the data for the mentioned financial variables, the FSI is constructed. The series is normalized through the moving average which is a technical step toward FSI. Therefore, before constructing the index thirty (30) days moving average of each variable is calculated with the help of the formula mentioned below

$$.xi^{norm} = \frac{xi - \mu}{\delta} \tag{1}$$

After applying the above-mentioned formula and normalizing the data series, Principal Component Analysis (PCA) can be constructed.

x_i = Observations of the variables.
μ = calculated sample mean.
δ = calculated standard deviation.

In the first stance, the principal component analysis is applied for the index to make the selected financial variables data meaningful into a single variable data, and principal component analysis also solves the problem of correlation among similar behavior variables. The PCA gives the most comprehensive information about the financial system and financial elected variables. It applies to reduce the data and to clarify the data. The financial stress index can be measured using the following formula.

$$\text{"}FSIt = TED\ Spreadt + Yield\ Spreadt + Stock\ Prices\ Volatility + Exchange\ Rate\ Volatility\text{"} \tag{2}$$

$$FSIt = \left(\frac{\alpha 1}{\gamma}\right) X1t + \dots\dots\dots\dots + \left(\frac{\alpha 4}{\gamma}\right) X4t \tag{3}$$

In Equation (3), α is the eigenvector and γ is the eigenvalue derived from principal component analysis. *X1* represents the 4 total derived values from PCA.

4.4. Econometrics Analysis

The research study's empirical estimations are examined using this econometric approach. The simplest form of the equation includes a logarithm of variables to make the data simpler for analysis. It is represented by Equation (4) as follows

$$\llbracket IPI \rrbracket\_t = \alpha + \beta\text{"}1\text{"}\ FSI\text{"}t\text{"} + \beta CPI\text{"}t\text{"} + \epsilon\text{"}t\text{"} \tag{4}$$

The estimated econometric equation for the model (ARDL) is as specified in the below equation:

$$\Delta IPI\text{"}t\text{"} = \alpha\text{"}0\text{"} + \beta\_1\ \llbracket FSI \rrbracket\_{(t-1)} + \beta\_2\ \llbracket CPI \rrbracket\_{(t-1)} + \sum\_{(i=1)}^n \llbracket \Delta\pi\text{"}1\text{"}\ FSI\text{"}t - 1\text{"} \rrbracket +$$
$$\sum\_{(i=1)}^n \llbracket \Delta\pi\text{"}2\text{"}\ CPI\text{"}t - 1\text{"} \rrbracket + \mu\text{"}t\text{"} \tag{5}$$

In the above Equation (5), *t* indicates time (2004-11–2017-7), and a_0 is known for the constant term while μ_t is used for the error term. However, β_n demonstrates the coefficients and Δ represents the difference of the lag values in the data due to model requirement. $\sum$ represents the summation of lag values. Meanwhile, economic growth is used for IPI representing the Industrial Production Index used; FSI is a Financial Stress Index used as a proxy for Financial stability and CPI demonstrates the Consumer Price Index used as a proxy to measure Monetary Stability. The null hypothesis to be tested for the variables is ($H_0 \neq \beta_1 \neq$

$\beta_2 \neq 0$) against the alternative hypothesis ($H_0 = \beta_1 = \beta_2 = 0$) which serves the objective of the study.

4.5. Empirical Methodology

In particular, the construction of variables is made through indexes. Therefore, the Principal component analysis technique is applied to generate a fine value of the FSI index. On the other hand, picking the right lag values for the model requires an examination of the unit root and some optimization work. The primary objective is to guarantee that the data is static. A stationary time series monthly data displays autocorrelation, variance, and mean that is almost constant. To check if a variable is stationary, we utilize the Augmented Dickey-Fuller test and the Phillips Perron. In addition, statistical ideas are derived from the data using descriptive statistics and correlation. Co-integration analysis use uses an auto-regressive distributed lag model (ARDL) to calculate the long-run and short-run connection coefficients. In addition, stability and diagnostic testing will be done through CUSUM and CUSUM square.

5. Empirical Results

This part of the study contains the results of the specified data investigated. Whereas, the initial stages cover the descriptive statistics for raw data, checking out time series properties for further process, and applying principal component analysis for index. Subsequently, evaluating the empirical results can be obtained while adopting the ARDL and ECM respectively.

5.1. Descriptive Statistics

To prove the theoretical concepts, the central tendency, normality, and dispersion of variables are computed. This part of the study gives information on raw data. With that, average mean, maximum and minimum values, skewness, and Jarque-Bera tests are done for the financial series.

Table 2: Descriptive Statistics

Variables	Mean	Max	Min	JB	Prob.	SD
YS	0.636	5.350	-3.300	338.270	0.000	1.044
TED	0.490	2.640	0.000	926.901	0.000	0.408
LSP	9.664	10.831	8.589	11.352	0.003	0.593
ER	84.812	108.45	59.32	15.152	0.000	17.343
LIPI	21.815	22.084	21.534	0.132	0.936	0.109
LCPI	4.669	5.117	4.049	14.621	0.000	0.350
FSI	-0.001	3.249	-3.394	4.521	0.104	1.446

The statistical data in Table 2 can be employed for further analysis.

5.2. Correlation

The direction and strength of the relationship between variables are stated by correlation analysis. Table 3 explains the estimated results as data is clear from the problem of multi-collinearity and shows the correlation of the variables of this study. The Financial Stress Index is positive and significant to the industrial production index which means that with the increase of financial stability, economic growth will increase by 0.848. Moreover, the consumer price index which is a measure of monetary stability shows a negative relationship with both the Industrial production index and is positively linked with the Financial Stress Index

Table 3: Correlation of Variables

	LIPI	FSI	LCPI
LIPI	1		
FSI	0.8485	1	
LCPI	-0.8220	0.857	1

5.3. Principal Component Analysis

Basically, for the reduction of data, the best method to use for that reason is principal component analysis (PCA). The comprehensive step is, that the following eigenvector can be drawn from the source to use eigen decomposition of the given correlation matrix. Encompassing the application of matrices, the mentioned financial variables show the orthogonal linear relationship. In Table IV, the first two eigenvalues are equal or more than one

and the Crammer's rule says that keep those eigenvalues whose value must be greater than one. Similarly, if the value of cumulative is greater or equal to 70 percent variation in the data, then decide to keep it. Thenceforward to another step, to decide to keep the eigenvalue that is the scree-plot in the given

Table 4: Principal Component Analysis

Component Number	Eigen Value	Difference	Proportion	Cumulative
1	2.0645	1.0440	0.5161	0.5161
2	1.0204	0.2625	0.2551	0.7712
3	0.7578	0.6006	0.1895	0.9607
4	0.1571	---	0.0393	1
Eigen Vectors				
Variable	PC 1	PC 2	PC 3	PC 4
TED	-0.4645	0.0122	0.8473	0.2573
YS	-0.0064	0.9878	0.0288	-0.1532
SPV	0.5950	-0.1056	0.5129	-0.6098
ERV	0.6559	0.1142	0.1351	0.7338
Note: PC 1 to 4 represent 4-factor analysis used in the principal component				

5.4. Scree Plot for PCA
Figure I

5.5. Unit Root Analysis

The unit root analysis computes if the data is stationary or non-stationary. The tests in Table. V is Augmented Dicky Fuller (ADF) and Phillip Perron (PP) at the level and 1st difference. Whereas, the results indicate that the variable Industrial Production Index- IPI is non-stationary at the trend and intercepts at the level and 1st difference as well. Henceforth, IPI is placed in the integrated order zero. However, CPI and FSI are at the significant level of $p<5\%$ and the data is non-stationary at the 1st difference of time series data. For that reason, variables; the Consumer Price Index (CPI) and Financial Stress Index (FSI) are placed in order one. According to the findings, the null hypothesis cannot be rejected at any level lower than the level of the first difference.

Table 5: Unit Root Analysis

Variables	ADF		PP		Integrated order
	Level	1st Diff.	Level	1st Diff.	Decision
lnIPI	0.1376	0.000***	0.0074***	0.000***	I(0)
lnCPI	0.9998	0.000***	0.9993	0.000***	I(1)
FSI	0.1001	0.000***	0.4007	0.000***	I(1)

Note: 5%*** and 10%* represent significance levels, respectively.

5.6. Auto-Regressive Distributed Lag Model (ARDL)

In the first step, autoregressive distributed lag is essential in the selection of lag length to estimate a plausible and well-explained model. Therefore, the Akaike Info Criterion is the best way to compare and decide on the statistical models and variables to reach a feasible regression of the variables because it gives the lowest value as required for the estimation.

5.7. Bound test

Table VI shows the value of F-stat is about (7.35) means it is higher compared to upper bound I(1). This finally means, there must be the existence of long-term association within the

model. Furthermore, when the F-stat value exceeds from upper bound value then concluding remarks pertain to taking one more step for analyzing the long-run model via the error correction mechanism (ECM). Ultimately, when time series variables are co-integrated this pertains that a long-run relationship prevails in the series.

Table 6: Bound Test Results

F-statistic	7.356	
Significance	I(0) Bound	I(1) Bound
10%	2.63	3.35
5%	3.1	3.87
1%	4.13	5

5.8. Long-run Dynamics

Industrial sector development is observed as the engine of economic prosperity and the sound financial sector is considered the lubricant for that engine. Table VII illustrates the long-run connectivity of the variables although the interpretation can be done through illustrative coefficients. In the first stance, the financial stability index (FSI) represents the positive and significant impacts on industrial production at a 5 percent level of significance. It further clarifies that when a unit changes (increase) in financial stability this will change (increase) industrial production by 18 units. However, mobilization of the savings comes from household sectors to the domestic financial sector for productive purposes not only to increase production but also to enhance creativity in production and produce technological and innovative products for exports because the increase in exports leads to high economic growth as compared to other indicators.

Therefore, the financial system does a pivotal task in the economy and the financial system helps in collecting savings hence there are more savings and due to more savings in the financial system more capital formation is there, and there is a positive balance of payments because higher investment in the economy boosts the output of goods and services, which in turn boosts exports and reduces imports. After that, financial institutions offer different types of funds for sustainable growth like short-term, medium-term, and long-term investments. Thus, when one percent increase in the consumer price index this will decrease industrial production by -21 percent. Justification of the results via theoretical linkages, (M. D Bordo & Schwartz, 1987), preliminary states that, the state bank of a country is to keep price stability to achieve high and sustainable economic growth and overall economic stabilization. Along with the researcher's view and the main empirical findings by Musa and Sanusi (2013), there is a negative and significant relation subsists within the consumer price index (inflation) and industrial output.

Table 7: Long-run Dynamics

Variable	Coefficient	Std. Error	t-Statistic
FSI	0.1884	0.0236	7.953
lnCPI	-0.21886	0.0974	-2.242
C	22.2572	0.4609	48.2844

5.9. Short Run Dynamics (ECM)

Table VIII displays the results of the short-run for financial stability and monetary stability are positive significant and negative significant respectively. Despite that, long-run estimation of the model through employing the ECM. The dependent variable's lag explains the coefficient's negative and significant association with the present period. The inverse coefficient of the lag value is a good sign because this negative value represents the convergence at the current time. The sign of financial stability is favorable in the short run. ECM represents the "speed of adjustment" and the coefficient of ECM (-1) must be in negative form and constructed from residuals due to short-run shocks, the series divergent from its equilibrium point whereas the negative and significant sign tells about the convergence of the series in the long run.

Table 8: Results of Short-run Dynamics

Variable	Coefficient	Std. Error	t-Statistic
D(LIPI(-1))	-0.3381	0.0707	-4.418
D(LIPI(-2))	0.1393	0.0763	1.826
D(FSI)	0.3327	0.1112	2.992
D(LCPI)	-0.12450	0.0445	-3.0355
CointEq(-1)	-0.1809	0.0349	-5.2753

Dependent Variable: lnIPI

5.10. Diagnostic Test

Table IX shows that data and model are serially uncorrelated, absence of heteroscedasticity, and finally, the model is well fitted because the R-squared value is significantly high i.e., 92%.

Table 9: Diagnostic Test

R^2	0.926
DW	2.04
F-Statistic	364.881
Prob.(F-Statistic)	0.000
Heteroscedasticity	0.835
Serial Correlation LM	0.542

5.11. Stability- CUSUM Test

As for the model stability tests, CUSUM and CUSUM of Square are more practical in economic research. Therefore, the basic aim of applying this test is to check the stability of the model. However, if the blue line is under the two red lines then we conclude that the model is stable, and the parameters are stable following the intercept. In contrast, when the blue line crosses the two red lines then the conclusion is model is unstable. The results of the CUSUM and CUSUM of squares are in Figure. III at a 5% significance level shows the model is consistent regarding intercept the reason is that the blue line is under the two red lines.

Figure 3
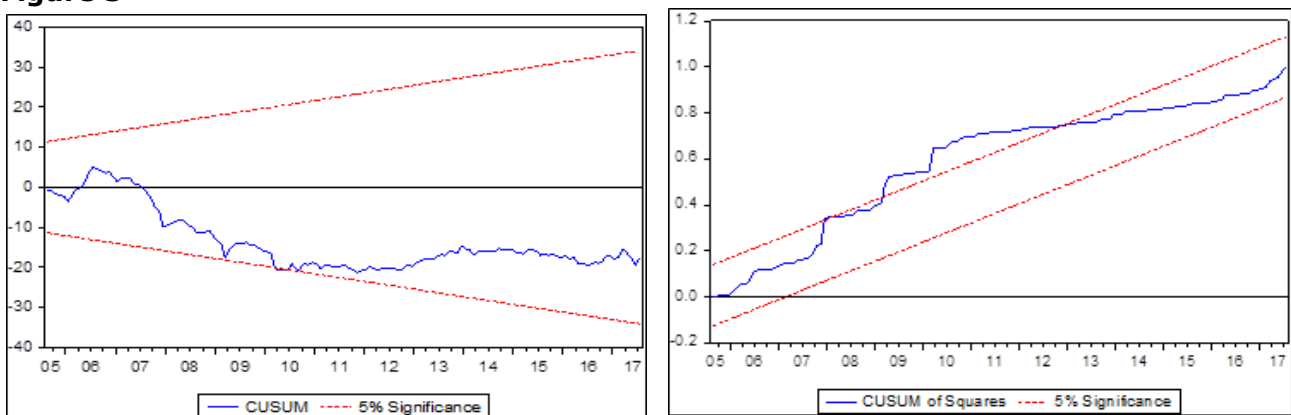
6. Conclusion

The current study emphasizes scrutinizing the role of financial and monetary stability as well as their consequences on industrial production. In addition, in the long run, financial stability contributes to industrial output positively. In contrast, inflation in the long run explains the spread within industrial output negatively. The comprehensive results of the present study for financial stability and industrial production are obtained via the autoregressive distributed lag and error correction model (ECM). However, the findings of the current study are when financial stability exists in the economy the industrial sector greatly contributes to productivity meaning that when central bank authority improves the financial sector like stability in the exchange rate, increase in stock price indices, maintained secure and unsecured interest rate (KIBOR and PKRV) and finally higher the yield curve thence enjoy higher the productivity in future. Subsequently, the existence of monetary stability is also important for sustainable productivity in the economy. As well as for monetary stability and industrial production are also obtained via autoregressive distributed lag (ARDL) as well as error correction model (ECM) and the findings are, that when inflation crosses its limit, this will inversely change industrial production. As a result of the fact that a high rate of inflation can reduce purchasing power. This phenomenon leads to low savings and low saving means low investment and this finally

concludes a decrease in the production of goods and services. From this point of view, in the case of deflation increase in purchasing power and less profit for investors leads to a loss of jobs and unemployment which can cause to decrease in purchasing power.

Finally, in case of price instability (monetary instability) profit and revenue decrease, the debt burden increases, and less capital is invested in the economy, Ultimately, the financial stress index formulation employs four indicators. i.e., TED spread, yield spread, stock price volatility, and exchange rate volatility through employing principal component analysis (PCA). Therefore, the focus on financial stability and monetary stability is prominent because a decade ago to financial crisis damaged the real sectors of the economy, and for Pakistan "The Industrial Sector" was also badly affected and that time production sector participation in the gross domestic product had dramatically decreased and even in negative sign. Therefore, industrial production is one of the energy sectors that gives employment opportunities for skilled and qualified workers on impressive wage packages as well as its high-quality products also give rise to exports and earn high foreign reserves. In that uneven situation, the central bank of a country is active in handling these miserable conditions that destroy the macroeconomic functions. Still on the point, rethinking financial stability is the most important factor that can channel the whole sector and play a role like fuel for the economic engine,

6.1. Policy Implications

Under the current situation in Pakistan financial institutions are not satisfactory for investors because, in the previous few months, abrupt changes can be seen in the exchange rate which is almost 40% depreciated Pakistani rupee which is not a good sign for the the the producers as well as for the whole financial system. Therefore, theoretically, if the exchange rate goes up against other international currencies this means that depreciation of the domestic currency and in this regard stock indices will go down. Ultimately, it is not a good sign for productivity. One way is to monitor financial instability because a sound financial system can easily absorb any internal or external financial shock. For this purpose, it is a prerequisite for productivity to increase R&D in financial institutions. Lastly, exports can also be increased through proper reforms in the industrial sector because the Pakistan industry sector is dependent on outdated machinery and lack of technology as compared to neighbouring countries. Also, this study will help policy makers and government to look into monetary and financial stability wisely and initiating suitable reforms for the country.

6.2. Limitations of the study

First, the dataset only extends to 2017, potentially omitting more recent developments, which represents a constraint in this study. This period is not capturing the global financial crisis period of 2007-08. A potential avenue for future research involves conducting a similar study using the latest available data. Second, there is the inclusion of a new variable TED Spread which has no proper literature from Pakistan's perspective. Also, the current study is not able to capture the overall growth of a country because, in the case of Pakistan, there is no availability of monthly data for the gross domestic product (GDP). Therefore, in this study alternate variable of GDP that is industrial production index is used.

References
Apostolakis, G., & Papadopoulos, A. P. (2019). Financial stability, monetary stability and growth: a PVAR analysis. *Open Economies Review, 30*, 157-178. doi:https://doi.org/10.1007/s11079-018-9507-y

Blot, C., Creel, J., Hubert, P., Labondance, F., & Saraceno, F. (2015). Assessing the link between price and financial stability. *Journal of financial Stability, 16*, 71-88. doi:https://doi.org/10.1016/j.jfs.2014.12.003

Bordo, M. D., & Schwartz, A. J. (1983). Importance of Stable Money: Theory and Evidence. *Cato J., 3*, 63.

Bordo, M. D., & Schwartz, A. J. (1987). The Imporatnce of stable Money:. *NBER Working paper*, 255-270.

Cardarelli, R., Elekdag, S., & Lall, S. (2011). Financial stress and economic contractions. *Journal of financial Stability, 7*(2), 78-97. doi:https://doi.org/10.1016/j.jfs.2010.01.005

Carlson, M. A., King, T., & Lewis, K. (2011). Distress in the financial sector and economic activity. *The BE Journal of Economic Analysis & Policy, 11*(1). doi:https://doi.org/10.2202/1935-1682.2697

Duprey, T. (2020). Canadian financial stress and macroeconomic condition. *Canadian Public Policy, 46*(S3), S236-S260. doi:https://doi.org/10.3138/cpp.2020-047

Friedrich, C., Hess, K., & Cunningham, R. (2019). Monetary policy and financial stability: cross-country evidence. *Journal of Money, Credit and Banking, 51*(2-3), 403-453. doi:https://doi.org/10.1111/jmcb.12526

Ghumro, N. H., Jamro, M. A., Dakhan, S. A., & Khawaja, F. M. Stock Market, Exchange Rate and Bond Market Integration: Evidence from Pakistan.

Hayat, M. A., Ghulam, H., Batool, M., Naeem, M. Z., Ejaz, A., Spulbar, C., & Birau, R. (2021). Investigating the causal linkages among inflation, interest rate, and economic growth in Pakistan under the influence of COVID-19 pandemic: A wavelet transformation approach. *Journal of Risk and Financial Management, 14*(6), 277. doi:https://doi.org/10.3390/jrfm14060277

Hussain, M., Zaman, B., & Ahmad, N. (2015). Relationship between stock market volatility and macroeconomic variables: Evidence from Pakistan. *Pakistan Business Review, 16*(4), 723-743.

Ilesanmi, K. D., & Tewari, D. D. (2020). Financial stress index and economic activity in South Africa: New evidence. *Economies, 8*(4), 110. doi:https://doi.org/10.3390/economies8040110

Illing, M., & Liu, Y. (2003). *An index of financial stress for Canada*. Retrieved from

Ishrakieh, L. M., Dagher, L., & El Hariri, S. (2020). A financial stress index for a highly dollarized developing country: The case of Lebanon. *Central Bank Review, 20*(2), 43-52. doi:https://doi.org/10.1016/j.cbrev.2020.02.004

Kırcı Çevik, N., Koç Yurtkur, A., & Dibooglu, S. (2019). The relationship between price stability and financial stability: evidence from major emerging economies. *Global Economic Review, 48*(1), 25-45. doi:https://doi.org/10.1080/1226508X.2018.1531353

Mahmood, A., & Hussain, S. Z. (2016). Measure of Financial Market Stress for pAKISTAN. *SBP Research Bulletin, 12*(1), 43-51.

Mundra, S., & Bicchal, M. (2021). Evaluating financial stress indicators: evidence from Indian data. *Journal of Financial Economic Policy, 13*(1), 116-135. doi:https://doi.org/10.1108/JFEP-11-2019-0232

Sadia, H., Bhatti, A. A., & Ahmad, E. (2019). Developing a financial stress index for Pakistan. *Business & Economic Review, 11*(4), 113-132.

Schwert, G. W. (1989). *Business cycles, financial crises, and stock volatility.* Paper presented at the Carnegie-Rochester Conference series on public policy.

Sharif, A., & Afshan, S. (2016). Impact of stock market on economic growth of Pakistan. *International Journal of Economics and Empirical Research, 4*(10), 562-570.

Sharif, A. A., & Afshan, S. (2016). Impact of Stock Market on Economic Growth of Pakistan. *International Journal of Economics and EmpiricalResearch*, 562-570.

State Bank of Pakistan, s. (2015). Retrieved from https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjyqqz2ra-EAxV5SaQEHcqoABoQFnoECBoQAQ&url=https%3A%2F%2Fwww.sbp.org.pk%2Fbprd%2F2015%2Findex.htm&usg=AOvVaw2Qr9J1FRN3NNIgZ1cY0V6m&opi=89978449

Vašíček, B., Žigraiová, D., Hoeberichts, M., Vermeulen, R., Šmídková, K., & de Haan, J. (2017). Leading indicators of financial stress: New evidence. *Journal of financial Stability, 28*, 240-257. doi:https://doi.org/10.1016/j.jfs.2016.05.005

Younsi, M., & Nafla, A. (2019). Financial stability, monetary policy, and economic growth: Panel data evidence from developed and developing countries. *Journal of the Knowledge Economy, 10*, 238-260. doi:https://doi.org/10.1007/s13132-017-0453-5