

The Causes of the Financial Crises and their Impact on the Economy of Pakistan (A Time Series Analysis)

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Abstract: The goal of this research is to explore the causes as well as the influence of financial crises in terms of trade openness, interest rate, inflation, and external debt on Pakistan's economic growth from 1980-2020. Identify crucial crisis causes so that inflation expectations, higher interest rates, and a rise in external debt levels can be managed. Considering the interrelationship between macro-economic factors and Gross Domestic Product (GDP) the ADF unit root test, Johansen's co-integration test, and Granger-causality test have been set down. The analysis concludes that all included variables like interest rates, inflation rate, trade openness, and foreign debt have considering co-integration between them. In the long run, all the variables except public debt have significantly correlated with GDP. The rate of interest is a key tool that is accessible to the government to interfere with the nation's monetary system. However, upward interest rates in the nation are suppressed stock returns and may consequence in increased debt expenses. Furthermore, that GDP has a relation between all the overall macro-economic variables used in this analysis exempting external debt.

1. Introduction

1.1 Background:

A financial crisis occurs when an economy is experiencing an unexpected recession, current account deficits, and a drop in GDP. A financial crisis, according to Slaessens & Kose (2011), is typically associated with dramatic changes in the amount of credit and asset rates, harsh interruptions in bank financing, availability of outside finance to various markets, distressed balance sheet problems, and large-scale government assistance in the form of debt restructuring and assistance for liquidity. Cecchetti, Kohler, and Upper (2009) discovered that only 20% of crises have a long-term impact on GDP. They did highlight, however, that most systemic financial crises are accompanied by a significant drop in growth, which takes several years to recover to pre-crisis levels. All of this research point to the same conclusion that GDP will be influenced over time. A financial crisis occurs when the value of financial assets, or the financial institutions that manage those assets, drops dramatically. A financial crisis can be started for some reasons, but negative investment sentiment, fear, or panic are frequently amplified. A financial crisis frequently sets off a vicious

cycle, in which an initial fall infuriates investors, who worry that other investors will follow suit, leading to redemptions and further declines. The term "financial crisis" refers to several scenarios in which certain financial institutions or assets lose a significant portion of their value (Adamu *et al.*, 2010).

External crises are essentially a widespread situation in which a large proportion of the minimum value of such capital assets is unexpectedly reduced. Many financial crashes were associated with banking disruptions in the 19th and early 20th centuries, and many recessions were associated with those issues. These crises have contributed not only to capital market fatalities, but also to some macroeconomic fields, such as GDP, inflation, interest rates, discount rates, international debt, commerce, and investment. Consequently, numerous studies (Reinhart, and Rogoff. 2009; Cerra, and Saxena. 2005; Pindyck, and Solimano. 1993) have shown that financial crises are influencing not only the financial sector but also other sectors such as the economic segment. Dwyer *et al.* (2006) looked at the economic impact of two catastrophes on the Australian tourism sector in 2003: the US invasion of Iraq and Severe Acute Respiratory Syndrome (SARS). Both inbound and outbound tourism was harmed as a result of these events. However, the overall effect was less severe since postponing outward vacations resulted in more money being allocated to savings, domestic tourism, or shopping.

The International Financial Crisis of 2008 was unfavorable and the most dangerous since the Great Depression of 1930. The global markets were severely impaired by the effects of the international financial crisis. The world's developing countries were pulled further into poverty, and the global economy's overall growth plummeted to an all-time low. Many steps have been taken around the world to mitigate the consequences of this crisis, and the declaration by the United States of America (USA) of a trillion-dollar bailout program was a perfect example in this context. The main causes behind the 2008 world financial crisis were the surge in asset prices, the failure of the regulatory system, and the credit bubble (Mughal, Khan, & Usman, 2015). The Global Financial Crisis, as described by Bernanke (1995), is a worldwide economic slump. It is a time of broad economic collapse or depression marked by mass unemployment, a droplet in earnings, salaries, rate of interest, expenditure, investment, bank credits and loans, factory closures, and a halt in the building of all sorts of capital goods. The 2008 financial crisis had a significant impact on Pakistan's economy, which was then suffering from significant macroeconomic imbalances. The economic crisis in Pakistan was exacerbated by global crises. The macroeconomic indicators of economic growth have been disastrous. The rate of growth of the Gross Domestic Product (GDP) has slowed dramatically. GDP fell from 5% in the fiscal year 2007 to 0.40 percent the next period in 2008 (Pakistan Economic Survey, 2007-08). According to Panizza, and Saxena (2009), the most open nations had longer crisis amortization times. This might be attributed to less effective tax policies in open economies.

The major reason is that "during an emerging market financial crisis, a country that has previously received large-scale capital inflows ceases to receive such inflows and instead faces unexpected demands for repayment of existing debts." This sudden reversal of flows causes financial humiliation, as loans default or are on the verge of default (Radelet *et al.*, 1998). The fiscal and current account deficits hit new levels, while foreign direct investment dropped, the trade surplus and deficit grew, and inflation soared. However, to preserve macroeconomic stability and bring the economy back on track, the Pakistani government has declared a stringent monetary policy, which is being properly enforced by the State Bank of Pakistan (Mughal, Khan, & Usman, 2015).

Interest rates, inflation rates, and a spike in the volume of global debt are the accountable variables for the financial crisis. It was demonstrated by Kwack, (2000) as a sudden depreciation of the exchange rate or a sudden decline in foreign reserves. A spear in international interest rates will therefore raise interest payments on external debt and non-effective debts while on the other side, most anti-mortgages will be decreased by a significant trade surplus. The rate of inflation is also a key element of the financial crisis (Din,

2020). Inflation has an unfavorable correlation with the growth of the banking zone and stock market operations. If inflation rises in an economy, the lending intensity of the bank will drop since the interest rate rises and the debtor is reluctant to still get funds from the bank and the stockpile market act also decreases with the increase in inflation simply because of the rationale that people are not concerned with securities due to increased stock and securities market prices on the market. There is a strong detrimental correlation between inflation and the success of the financial mediator (Meissner, and Brodo, 2006).

In contemporary financial crises, the purpose of foreign debt varies from a historical point of view, and in the past, fiscal and monetary policies seem to be the key drivers of financial crises. Banking problems, current currency crises, and debt crises are tied together and are responsible for recent crises. There are two reasons for the currency crisis: higher interest rates and currency imbalances. The concept of currency mismatch is modern. By mismatching currencies, it means that if a country wants debt and needs other countries to repay, nations can borrow in eurodollars or yen dollars. It's just not in the domestic currency, and the government needs to swap it for its currency to pay off the debt. Not only the rigid currency debt is the prime cause of financial crises in almost any economy, but other factors often interact with it to generate a tragic outcome.

In short, not only the financial market but also the economy as a whole, such as the real economy, was adversely affected by financial crises. This financial crisis is due to a downturn in the production of industry and foreign exchanges, etc., resulting in an economic contraction. In addition, the fall in demand for raw materials and output in developed countries is due to the recession. That will have a more effect on developing countries' economic activity and, as a consequence, on such countries' economic crises.

The present study's goal istoestimate the effect of financial crises, such as inflation, interest rate, public debt, and trade openness, on Pakistan's economic development. As well as investigate the causal relationship between Pakistan's economic growth, inflation, interest rate, public debt, and trade openness.

The remainder of this research paper is arranged as follows. A summary of the related literature is given in the next section. The methodological structure and data references are found in Section 3. The main scientific and robust outcomes are discussed in section 4. Conclusions and consequences are discussed in section 5.

1.2 Statement of the study

If Pakistan has been more affected by the global crisis; what has been more important for Pakistan's economy, internal conflicts, or external financial crises, which have created a huge gap between Pakistan and other nations in terms of economic development? For this purpose, the study identifies how the financial crisis is affecting Pakistan's economic growth and whether is there a causal link between inflation, interest rates, external debt, trade openness, and Pakistan's economic growth.

1.3 Significance of the study

The current paper is relevant to deliver the best knowledge and to consider factors such as trade openness, inflation, interest rate, and public debt that have an economic effect on Pakistan's development. New measures and policies to manage public debt and inflation have also been used in the current report to boost Pakistan's gross domestic product economy, which can be accomplished by expanded economic transparency and trade liberalization, and foreign direct buyers' investment opportunities in Pakistan.

2. Literature Review

2.1. Theoretical Evidence

2.1.1. Financial crises and Economic growth

Jarrow's(2014) developed a basic comprehensive financial crisis and economic development model where financial markets influence actual economic activity, showing that financial markets upsurge actual production by encouraging investment by lending/borrowing money. Analytically, some literature analyses illustrate the possible influence of financial crises on sustainable progress (i.e. Hutchison and Noy 2005; Kroszner, Laeven, and Klingebiel 2007; Dell'Ariccia, Detragiache, and Rajan 2008; Ben Salha, Bouazizi, and Aloui 2012; Furceri and Mourougane 2012; Bekhet and Yasmin 2014; Aboura and Roye 2017).

2.1.2 Endogenous growth theory

The endogenous growth model formed in the 1980s, which originated largely as an effort to incorporate the origins of technical development and thus sustainable productivity growth within the overall equilibrium paradigm of neoclassical growth theory (Ogujiuba and Adeniyi, 2005), improved upon the shortcomings of the neoclassical growth model and the Harrod-Domar growth model. It asserts that endogenous rather than exogenous conditions are the primary drivers of economic development. It claims that investing in human resources, creativity, and expertise are important drivers of economic development. Romer (1986), who regarded classical and neoclassical models as overgeneralizing a dynamic mechanism, developed the endogenous growth model. Investment in human resources, creativity, and expertise, according to the endogenous development paradigm, are major determinants of economic growth. Furthermore, the model emphasizes the optimistic externalities and ripple effects of a knowledge-based economy, which can result in economic development. The following is a representation of the model:

$$Y = A(R)f(R_j K_j L_j)$$

Y = output of growth rate

K_j = Physical and human capital stock

R = Cumulative stock of knowledge

L_j = Total Labor

R_j = Inventory of research and development cost

Human capital has increasing returns to size, resulting in a surpassing degree of capital income development in a country with a higher initial level of K . The form of capital that a nation invests in influences its rate of growth.

2.1.2. Schumpeterian growth (1912)

Schumpeterian development is named after a twentieth-century economist. Development by the invention, according to Austrian economist Joseph Schumpeter, is a method of creative destruction, which captures the dual essence of technological change by making old inventions and goods redundant in the process of creating new ones. This is the destruction that Schumpeter refers to, which can also be defined as the cancellation of previous innovations, rendering them archaic.

2.2.3. Solow-Swan model of economic growth

The neoclassical growth model of Solow and Swan (1957) is a standard paradigm for researching economic growth by seeking to know the predictor of long-term economic growth rate via the accretion of factor inputs like physical resources and labor. The position of technological progress, according to this model, is critical, perhaps more so than capital accumulation. The model is given by

$$Y = f(K, L)$$

$$Y = AK^\alpha L^\beta$$

Whereas, K = Capital &

L = Labour

2.2.4. Theories of Business Fluctuation

The upward or downward movement of economic activity around the growth trend is referred to as a business cycle or fluctuation (Colander, 2004). These swings may be seen in a variety of economic indicators, including consumption, investment, unemployment, and GDP, to name a few. Economists have tried to come up with ideas to explain how businesses fluctuate. These ideas were divided into two categories. External theories ascribe business cycles to forces outside of the economic system's component elements' systematic interconnections (Poindexter, 1981). External theories have historically centered attention on events like wars, discoveries, and important inventions. Internal cycle theories credit variations to endogenous forces or forces inside the economy that naturally reverse accumulated expansions and contractions in economic activity. Investment fluctuations, according to the majority of economists, have a substantial influence (Baumol, 1970 Samuelson, 1939).

2.2. Theoretical Framework

In the Cobb-Douglas production function, the Solow(1956) model portrays the relationship between aggregate inputs and outputs.

$$Y = AL^{1-\alpha} Kp^\alpha \quad (1)$$

Many causes are cited by Solow (1956) and Barro (1991; 1996) that influence the economy's growth. Financial crises and other influence factors have all been shown to have a close relationship with economic growth in the literature.

$$GDP = \beta_0 + \beta_1 INF + \beta_2 INTR + \beta_3 PDBT + \beta_4 TOP + u_i \quad (2)$$

A low rate of economic growth is encouraged by an acceptable high amount of financial crisis. According to literature, depending on how the financial crisis is affecting Pakistan's economic growth, it can be both positively and negatively associated with economic growth (Bordo, & Meissner, 2011, Mughal, Khan, & Usman, 2015 & Yakubu, & Akerele, 2012).

2.3 Empirical Evidence

The financial crises effects on GDP growth and investment are investigated by Ksantini, & Boujelbene, (2014). A sophisticated panel model is used to investigate these interactions. Control variables were also used in the model, which may illustrate variations in growth and investment from 1998 to 2009. The key findings suggest that having a financial crisis in a nation has a significant negative effect on the growth of GDP and investment levels. Bordo, Meissner, and Stuckler, (2010) studied long-run relationships between foreign currency debt and financial crises and economic development from two eras: 1880–1913 and 1973–2003. The findings show that both hard currency loans and capital inflows are linked to crises that decrease growth momentarily and enduringly relative to the long-run tendency. Our research also reveals that hard currency debt explains just a portion of the hazards associated with financial crises. Countries in our sample have demonstrated their ability to minimize the risks of severe financial crises by combining foreign currency debt with robust financial development and a big reserve base. Despite substantial currency mismatches during the nineteenth century, the United States, Australia, Canada, and Scandinavian nations

managed to avert major economic calamities. Furceri, & Mourougane, (2009) the effect of financial crises on GDP has been measured. The panel techniques are used in which GDP depends on its history and its dummy causes (relating to crises). In aggregate, after the recession, GDP dropped from 1.5% to 2.4%. The decline will last for five years. Khan, Alghorbany, Djihad, Messaouda, & Ellahi, (2020) examined the effects of the Global Financial Crisis of 2007-09 on the performance of Islamic banks with licenses to operate in Pakistan. From 2006 to 2018, a sample of five full-fledged Islamic banks operating in Pakistan was taken. According to the findings, the Global Financial Crisis had little impact on the performance of Islamic banks in Pakistan (GFC). In terms of control factors, the size of Islamic banks had a favorable influence on their performance. Overall, this analysis concludes that Islamic banks in Pakistan did not respond in a slight way to the worldwide monetary crisis of 2007-09. Azam et al. (2010) analyzed the time series relation between the financial crisis of 2008 and Pakistan's economic development from 1972 to 2010. The study's main goal was to find out the connection between the primary indices of economic development in the financial crisis and the sustainability of that relationship. To validate the long-term correlations between the factors, Johansen's Co-integration test was incorporated and it was observed that there was a long-term stable balancing association between GDP and all the elements of the financial crisis in Pakistan. It was inferred that they co-integrate only international debt and interest rates and that gross domestic product has a long-term correlation between all the variables used in the study, excluding foreign debt. Both 1880-1913 and 1973-2003, looked at the influence of external currency debt on currency and debt crises, as well as its adverse effects on short-term growth and long-run production effects for 45 nations. Greater foreign currency debt-to-total debt levels are related to higher chances of currency and debt crises, though the severity of the relation is dependent on the scale of a country's monetary base and policy legitimacy. We discovered that financial crises triggered by foreign currency acquaintance instigated substantial long-term production losses. Hye, & Wizarat, (2013) the semi-log function for Pakistan's economy from 1971 to 2007 is used to evaluate the financial liberalization hypothesis. Financial liberalization is negative and negligible, but the RI is negative and important in the long term, according to our findings. In the instance of Pakistan, our findings disprove the neoclassical worldview over time. Even though labor and capital are inextricably linked to the growth of the economy. The FI and RI exhibit a strong (statistically significant) relationship with economic growth in the short run. Schnabel, & Seckinger, (2019) scrutinized the short-run real growth impact of international bank presence in the European Union from 2000 to 2012, using Eurostat market statistics and the Rajan-Zingales approach, and covers the period of accelerated financial convergence before the global financial crisis, as well as the subsequent period of financial fragmentation and bank deleveraging. The study found evidence that the presence of international banks had a growth impact that was more than four times higher during the crisis than in usual times. In periods of domestic bank deleveraging, growth effects are even higher. Given these findings, the conclusion demonstrates that reintroducing the European banking system is a critical component of the European Union's potential development prospects. Latif, Nazar, Shah, & Shaikh, (2011) analyzed the global financial crisis by comparing it with Pakistan's economy's growth and development in the agricultural sector. The result describes the negative and inverse consequences of the global financial crisis on the development of Pakistani trade. The country's exports are being seriously impacted by a further global financial crisis. The magnitude, duration, and costs of different shocks were investigated by Becker, & Mauro, (2006). They find that financial shocks and macro-economic ties are more expensive for developed countries (in terms of annual per capita GDP losses) and that trade-related shocks and interest rates for developing countries are more disruptive. Yakubu, & Akerele, (2012) evaluated the international financial crisis effect on the stock market of Nigeria between 2008 and 2011. They used market capitalization as a substitute for the stock exchange in Nigeria, around the same time, money inflows and foreign exchange prices have been used as a benchmark for the global economy. The outcome explains the negligible effect of the worldwide financial crisis on Nigeria's stock market. The Nigerian Government has recommended that these steps be placed in place so that investor trust can be strengthened and business operations can be improved in a way to extend to Nigeria's economy. The aim of

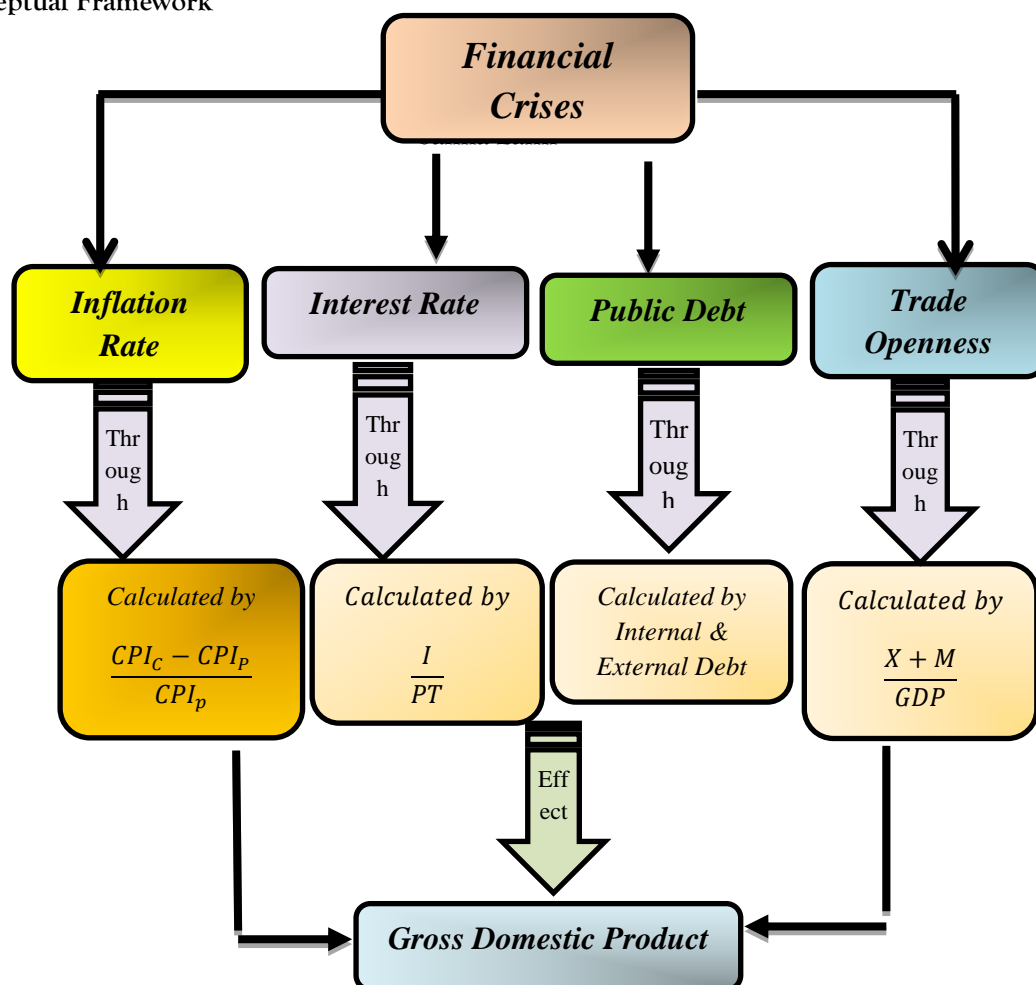
Draz, (2011) is to determine the effect of financial crises on Pakistan and China, as well as to determine which country has seen the most foreign financial blows in its more than sixty-year history. The report looked at both countries' GDP growth rates to see which one was affected by the financial crisis and which one was saved. Chow Breakpoint research is used on an individual basis to determine whether or not the years of economic and regional financial crises are reflected in the economy. Our findings revealed that China has been hit by external financial problems more than Pakistan. In years 1992 to 2009, Ahmad, & Noor, (2011) observed the viability of 78 Islamic banks in 25 countries. Profit performance is favorable and statistically important for operational expenditures against the asset, equity, high-income economies, and non-performing loans against total loans, for assessing profitability according to the Fixed Impact Model (FEM). Surprisingly, the empirical findings suggest that more profitable banks have greater functioning costs per asset, more equity per asset, and are clustered in high-income countries, showing a strong connection between monetary factors and Islamic bank profitability. The results for the Asian Financial Crisis of 1998 and the Global Financial Crisis of 2008 are unfavorable, indicating that Islamic banks' performance was unaffected by these crises.

Most of the gaps in past studies are filled by this article. Firstly, in terms of financial crises, the analysis takes certain factors to define their direct and indirect effects on economic development. Secondly, to expand the data used in earlier literature, the paper uses a much more detailed and recent dataset. Thirdly, the researchers are creating an expanded model for measuring the effect of financial crises on economic growth due to inflation, interest rates, public debt, and openness to trade. Finally, the authors are focusing how the strategy of intervention affects shifts in economic development. The significant policy conclusion in the current research is that when supporting economic development throughout a global financial crisis, policymakers should rethink prior environmental conditions because crises have negative effects on economic growth in areas with more aggressive financial policies.

Previously published research on the correlation between financial crises, and economic growth.

Study	Country & Period	Methodology	Regrassand	Regressors	Outcomes
Ksantini, M., & Boualghène, Y.	Tunisia (1998-2009)	GMM,	INV	POP, trade Openness, Inflation rate, Public Consumption, Interest	Negative
Furceri, D., & M. A. N. B. M.	30 OECD Countries	GMM	GDP	Financial crises	Negative
Azam et al. (2010)	Pakistan (1972-2010)	ARDL, Johansson co-integration	GDP	Foreign debt, interest rate,	Positive
Schnabel, I., & Seckinger, C. (2019)	European Union (2000-2012)	GMM	GDP	International Banks	Negative
Latif, A., Nazar, M. S., Shah, M. Z., & Shaikh,	Pakistan	ARDL	Agriculture sector	Global financial crises	Negative
Yakubu, Z., & Akerele, A. O. (2012)	Nigeria (2008-2011)	ARDL	Total export	Loan on export, Lending rate, GDP, exchange rate, trade	LOX, GDP,
Draz, M. U. (2011)	Pakistan & China	OLS	GDP	Trade liberalization, inflation, export, import, remittance, term of trade	TR, X, M (+) & CPI (-)
Ahmad, N. H. B., & Noor, M. A. N. B. M. (2011)	78 Islamic banks in 25 countries	OLS	Profitability of Islamic bank	Financial crises	(-)
Bordo, M. D., Meissner, C. M., and Stuckler, D. (2010)	45 Countries	Logistic Model	GDP	Foreign Currency Debt, Financial crises	(-)
Hye, Q. M. A., & Wizarat, S. (2013)	Pakistan	GDP	ARDL procedure	Financial Liberalization	(+)
Khan, A. B., Alghorbany, A., Djjihad, T., Messaouda,	Pakistan	Performance of Islamic Banks	Fixed Effect Model	Global financial crises	(-)

2.4 Conceptual Framework



Source: (Furceri, & Mourougane, 2009; Ahmad, & Noor, 2011).

3. Research Techniques & Data Analysis:

3.1 Research Design

The study aims to understand the effect of the financial crisis and what impact it would have on the financial institutions of the Pakistan economy. The methodology of the content review was used for this purpose and many academic papers and articles relating to economic growth were analyzed. Thematic analysis, like conceptual analysis, entails quantifying and counting the presence of an idea. The "effects of the global financial crisis," as well as its "contagion effect" on "financial institutions" in the "Pakistan economy," were investigated. The presence of a concept was examined in this content analysis. In this review, a series of rules regarding the nature of concepts and the relations between these notions were described. As Weber suggested, in 1990, meaningless data has since been determined. The researcher can generalize the principles and shape the findings of the study by applying the above-mentioned content analysis process.

The data have investigated time-series data from 1985-2020 using a quantitative methodology. Various variables of the financial crisis, such as inflation, interest rate, public debt, and trade openness have been considered as independent variables, while GDP has been considered a dependent variable to evaluate the effect and the causal relation between these variables in Pakistan.

3.1. Data sources and Detail of Variables

Variable	Symbol-used	Measurement/proxy used	Expected Sign	Sources
Economic Growth	GDP	GDP Per Capita	Positive	BOS & WBI
Public Debt	PDEBT	Internal & external Debt (%)	Negative	BOS & WBI
Inflation Rate	CPI	Inflation (%)	Negative	BOS & WBI
Interest Rate	INTR	Interest Rate	Negative	BOS & WBI
Trade Openness	TOP	Trade (% of GDP)	Positive	BOS & WBI

WDI- World Development Indicators

BOS- Beaur of Statistics

3.2. Model Specification

The Well-designed relationship between financial crises like inflation, interest rate, public debt, and trade openness with the gross domestic product of Pakistan is stated hence:

$$GDP = (INF, INTR, PDBT, TROP) \quad (3)$$

In a linear form, it is shown as follows

$$GDP = \beta_0 + \beta_1 INF + \beta_2 INTR + \beta_3 PDBT + \beta_4 TOP + u_i \quad (4)$$

Where

GDP = Gross Domestic Product

INF = Inflation Rate

INTR = Interest rate

PDBT = Public Debt

TOP = trade Openness

β_0 is intercepted & $\beta_1, \beta_2, \beta_3, \&\beta_4$ are sloped as well as u_i is random error

3.3. Research Techniques

The study has used several techniques like Augmented Dickey-Fuller (ADF) and Phillip Peron (PP) unit root test, Johansen co-integration test, Error Correction Model, and Granger causalities.

3.4 Research Techniques

3.4.1 Descriptive Statistics

Table: 1 Descriptive Statistics

	GDP	INF	INT	PDT	TOP
Mean	28.34103	2.064439	3.338670	3.095329	1.460750
Median	28.45037	2.033916	3.461583	3.103711	1.562820
Maximum	30.94496	3.283278	4.978807	3.415478	2.323926
Minimum	24.71332	0.931973	1.158555	2.685163	-0.206525

Std. Dev	1.927158	0.515946	1.130702	0.140275	0.524875
Skewness	-0.169806	0.073681	-0.154850	-0.240772	-1.204820
Kurtosis	1.782870	3.072265	1.864577	3.385581	4.535589
Jarque-Bera	3.326546	0.056121	2.885624	0.792827	17.00915
Probability	0.189518	0.972330	0.236262	0.672728	0.000203
Sum	1417.052	103.2220	166.9335	154.7664	73.03749
Sum Sq. Dev	181.9829	13.04384	62.64581	0.964177	13.49920
Observations	50	50	50	50	50

Source: Researcher E-view Result

The study revealed that included variables are normally distributed, as seen in the overhead table. Many of the variables have a mean-to-median value of nearly one. The standard deviations of several variables are smaller than the mean, meaning that the coefficient varies somewhat. The distinctions between maximum and minimum are much too logical and reasonable. Instead of the trade openness of changeable probabilities, the Jarque-Berra test demonstrates the recognition of H_0 of a natural distribution for each component.

3.4.2 Unit Root Test

Stationary is described as a technique of high quality in which the mathematical factors (mean and traditional deviation) do not change over time. The stationary mechanism is a relative concept, not an actual term. Stationary processes are most frequently found in long-run sample sizes of high data frequency. The unit root test was used to verify that the model was stationary. The study selects the appropriate methodology to discover the relationship among the variables constructed on the integrated order of the variables. Some tests can be used to determine the integrated order of the variables. The Augmented Dickey-Fuller (ADF) method was used in this analysis. The ADF has the following mathematical form.

$$\Delta y = \alpha + \beta_t y_{t-1} + \sum_{i=1}^n \beta_1 \Delta Y_i + \varepsilon_t \quad (5)$$

Where: Y is a time series with a linear time pattern, Δ is the first difference operator, α is a constant, n is the optimal number of lags in the dependent variable, and ε is the random error term; the coefficients α , β , and β_1 are approximate. As a consequence, the Phillip-Perron equation

$$Y_t = \alpha + \beta Y_{t-1} + \varepsilon_t \quad (6)$$

As developed by Nelson and Plosser, several macroeconomic time series contain unit roots dominated by stochastic patterns (1982). Since a non-stationary repressor invalidates certain traditional analytical findings, unit-roots are critical when analyzing the stationary of a time series. The existence of unit roots in time series data is used to assess if a stochastic pattern occurs. Kwiatkowski *et al.* (1979) and Augmented Dickey-Fuller (ADF) (1979) is used to perform a unit root test (1992).

Table: 2 ADF test at level

Variables	Level to intercept				Order of Integration	level with trend and Intercept				Order of Integration
	ADF Statistics	1%	5%	10%		ADF Statistics	1%	5%	10%	
GDP	-2.5021	-3.5744	-2.9237	-2.5999	Not Integrated	0.3830	-4.1611	-2.9237	-3.1830	Integrated
INF	-3.4346	-3.5713	-2.9224	-2.5992	Integrated	-3.6264	-4.1567	-3.5043	-3.1818	Integrated
INTR	-3.3358	-3.5744	-2.9237	-2.5999	Integrated	-2.3547	-4.1611	-3.5063	-3.1830	Not Integrated
PDEBT	-3.6040	-3.5713	-2.9224	-2.5992	Integrated	-3.5527	-4.1567	-3.5043	-3.1818	Integrated
TOP	-3.4352	-3.5713	-2.9224	-2.5992	Integrated	-3.4371	-4.1567	-3.5043	-3.1818	Integrated

Source: Researcher E-view Result

Table: 3 ADF test at first Difference

	First Difference with Intercept				Order of Integration	First Difference with trend and intercept				Order of integration
	ADF Statistics	1%	5%	10%		ADF Statistics	1%	5%	10%	
GDP	-3.5216	-3.5744	-2.9237	-2.5999	Integrated	-4.5162	-4.1611	-3.5063	-3.1830	Integrated
INF	-8.5336	-3.5744	-2.9237	-2.5999	Integrated	-8.4311	-4.1611	-3.5063	-3.1830	Integrated
INTR	-5.4964	-3.5744	-2.9237	-2.5999	Integrated	-6.5716	-4.1611	-3.5063	-3.1830	Integrated
PDEBT	-8.6305	-3.5744	-2.9237	-2.5999	Integrated	-8.5712	-4.1611	-3.5063	-3.1830	Integrated
TOP	-8.6586	-3.5744	-2.9237	-2.5999	Integrated	-8.5663	-4.1611	-3.5063	-3.1830	Integrated

Source: Researcher E-view Result

The findings of the unit root checks are shown under the ADF test. The results of the unit root tests show that the GDP, INF, PDEBT & TOP is stationary at level series by using the ADF measure. The variables INF are nevertheless not stationary at the level form. Furthermore, all the variables become stationary at the first difference.

Table: 4Phillip curve at level

	Level with intercept				Order of Integration	Level with trend and intercept				Order of integration
	ADF Statistics	1%	5%	10%		ADF Statistics	1%	5%	10%	
GDP	-3.0962	-3.5713	-2.9224	-2.5992	Not integrated	0.2776	-4.1567	-3.5043	-3.1818	Not Integrated
INF	-3.5359	-3.5713	-2.9224	-2.5992	Integrated	-3.5359	-3.5713	-2.9224	-2.5992	Not Integrated
INTR	-1.7580	-3.5713	-2.9224	-2.5992	Not Integrated	-3.5043	-4.1567	-4.1567	-3.1818	Not Integrated

PDEBT	-3.5449	-3.5713	-2.9224	-2.5992	Integrated	-3.4889	-4.1567	-3.5043	-3.1818	Integrated
TOP	-3.3555	-3.5713	-2.9224	-2.5992	Integrated	-3.4383	-4.1567	-3.5043	-3.1818	Integrated

Source: Researcher E-view Result

Table: 5 Phillip curve at first difference

	First Difference with intercept					First Difference with trend and intercept				
	ADF Statistics	1%	5%	10%	Order of Integration	ADF Statistics	1%	5%	10%	Order of integration
GDP	-3.0962	-3.5713	-2.9224	-2.5992	Not integrated	-3.3794	-3.5744	-2.9237	-2.5999	Integrated
INF	-8.6334	-3.5744	-2.9237	-2.5999	Integrated	-8.6903	-4.1611	-3.5063	-3.1830	Integrated
INTR	-5.7238	-3.5744	-2.9237	-2.5999	Integrated	-6.4567	-4.1611	-3.5063	-3.1830	Integrated
PDEBT	-8.8299	-3.5744	-2.9237	-2.5999	Integrated	-8.8383	-4.1611	-3.5063	-3.1830	Integrated
TOP	-8.8719	-3.5744	-2.9237	-2.5999	Integrated	-8.7729	-4.1611	-3.5063	-3.1830	Integrated

Source: Researcher E-view Result

Except for TOP, which is stationary at a level by using the PP unit root measure, all variables are stationary after the first difference. The PP test is preferred over ADF tests, according to Brooks (2008), for a variety of reasons. As a result, the stricter PP test indicates that variables of orders 0 and 1 are integrated into this research.

3.4.3 Lag selection criteria

Table: 6 Lag Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-52.0203	NA	8.21e-06	2.479144	2.677909	2.553602
1	163.836	375.4027	2.06e-09*	-5.818967	-4.626374*	-5.372214*
2	184.9322	32.10260	2.54e-09	-5.649227	-3.462808	-4.830182
3	201.4291	21.51765	4.08e-09	-5.279526	-2.099280	-4.088187
4	240.0546	41.98424*	2.79e-09	-5.871939*	-1.697866	-4.308306

Source: Researcher E-view Result

The optimal lag length selection is shown in Table 6 below. The FPE, SC, and HQ tests selected 1 lag, respectively, while the LR and AIC tests selected 4 lags. According to Brooks (2008), by using information criteria to choose the optimal number of lags, the number of lags chosen minimizes the significance of the specified information criterion.

3.4.4 Johansen co-integration test

Having checked the stationarity of the variables at I (1), we continue to analyze the existence or no presence of co-integration among the variables. When there is a co-integration relationship, it ensures the GDP, INF, INTR, PDEBT, & TOP have a general pattern and long-run equilibrium, as theorized. We use the maximum-likelihood test protocol developed by Johansen and Juselius (1990) and the multivariate co-integration test developed by Johansen (1991). The process entails determining their rank of them by matrix using the following specification:

$$\Delta X_t = \delta \sum_{i=1}^{k-1} \Gamma_i \Delta X_{t-i} + \Pi \Delta X_{t-k} + u_i \quad (7)$$

Where Γ_i & Π represents coefficient matrices, Δ is a difference operator, k denotes the lag time, δ is a constant and ΔX_t for a column vector of m variables. Using maximum probability, Johansen and Juselius (1990) developed two statistics to measure the null of no co-integration. The Trace statistic and the maximum eigenvalue statistic (Max-L) are computed as follows: where r is the number of co-integration vectors and $\lambda_1 - \lambda_N$ are the N square canonical correlations between X_{t-p} & X_t , the sequence being ranged in descending order such that $\lambda_i > \lambda_j$ for $i > j$. Critical values are in Osterwald-Lenum (1992). The null hypothesis of no co-integration will be rejected if the computed statistics were less than the critical value.

Table: 7 Unrestricted Co-integration Rank Test (Trace)

Hypothesized No	Eigenvalue	Trace Value	5% Critical level	Probability**
None *	0.756969	152.4133	69.81889	0.0000
At most 1 *	0.557667	88.75790	47.85613	0.0000
At most 2 *	0.447027	52.05178	29.79707	0.0000
At most 3 *	0.355604	25.39167	15.49471	0.0012
At most 4 *	0.117342	5.616777	3.841465	0.0178

Source: Researcher E-view Result

Table: 8 Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized No	Eigenvalue	Maximum Eigenvalue Statistics	5% Critical level	Probability**
None *	0.756969	152.4133	69.81889	0.0000
At most 1 *	0.557667	88.75790	47.85613	0.0000
At most 2 *	0.447027	26.66011	21.13162	0.0075
At most 3 *	0.355604	19.77490	14.26460	0.0061
At most 4 *	0.117342	5.616777	3.841465	0.0178

Source: Researcher E-view Result

The findings of the trace test and the maximum eigenvalue for the unrestricted co-integration rank test are shown in Tables 7 and 8, respectively. At the 5% significance level, the Johansen co-integration trace and maximum test indicates that all the variables specify the co-integrating equation. Since the trace and maximum eigenvalue (test) statistic values are higher than the critical value at the 5% significance level, the null hypothesis of no co-integrating vectors is rejected. According to both tests, the analysis is based on all 4 co-integrating equations.

Normalized Co-integrating coefficients (standard error in parentheses) in the Long run

GDP	INF	INT	PDT	TOP
1.000000	0.321379	-1.750249	-1.104710	0.135676
(0.03593)	(0.02499)	(0.24540)	(0.04892)	

The INF coefficient is 0.321379, indicating a long-term positive and statistically relationship between INF and GDP. GDP will increase by 0.321379 units with every unit increase in INF.

INT has a coefficient of -1.750249. The coefficient is negative, indicating that INT and GDP are inversely but statistically related in the long run. If INT rises by one unit, GDP will fall by 1.750249 units in the long run.

The coefficient for PDT is -1.104710 it can be calculated that if PDT increases by one unit, GDP will decrease by 1.10410 units in the long run as well an insignificant relationship exists.

The TOP coefficient is 0.135676. The positive sign indicates that TOP and GDP have a long-run positive and significant relationship. GDP would increase by 0.135676 units with every unit increase in TOP. Because of the positive sign applied to its coefficient,

In the long run, all of the variables except PDT correspond to the a priori expectation. Furthermore, all variables had a long-term relationship with GDP that was polar in favor of what the regression equation predicted in the short run.

3.4.5 Error Correction Model Test

The error correction mechanism is the pace at which the dependent variable adapts to changes in the independent variables. The next step is to measure the speed of change using the short-run dynamism of the error correction system, now that a long-run equilibrium relationship has been formed (ECM).

Table: 9 Error Correction Model Test

	Coefficient	Std. Error	T-Statistic	Prob.
ECM (-1) C (1)	-0.212425	0.050141	-4.236556	0.0002
C (2)D(GDP (-1)	-0.048360	0.162556	-0.297498	0.7678
C (3)D(GDP (-2)	-0.106613	0.177427	-0.600883	0.5518
C (4)D(INF (-1)	0.051488	0.018946	2.717556	0.0102
C (5)D(INF (-2)	0.008226	0.020965	0.392354	0.6972
C (6)D(INT(-1)	0.234721	0.172446	1.361132	0.1822
C (7)D(INT(-2)	0.386685	0.146009	2.648359	0.0121
C (8) D (PDEBTT(-1)	-0.104870	0.063917	-1.640712	0.1098
C (9) (PDEBT(-2))	-0.119197	0.059258	-2.011501	0.0520
C (10) D (TOP (-1))	0.83143	0.022812	3.644670	0.0009
C (11) D (TOP (-2))	0.068126	0.016547	4.116989	0.0002
C (12)	0.095225	0.022137	4.301553	0.0001

R-squared 0.690084 Adjusted R-squared 0.592682
 F-statistic 7.084903 Prob (F-statistic) 0.000004
 Durbin-Watson stat 2.003987

Source: Researcher E-view Result

The coefficient of ECM (-1) is -0.212425 in the dynamic short-run results, which is extremely statistically significant. It means that the shock-induced disequilibrium will be fully corrected in the following year at a rate of around 21%. The findings show that interest rate, inflation, and trade openness have a statistically optimistic and substantial impression on economic development in the short term, whereas public debt interventions have a negligible effect.

3.4.6 Granger causality test

Table: 10 Granger Causality Test

Null Hypothesis	Observation	F-Statistics	Probability
INF does not Granger cause GDP	48	6.31708	0.0039
GDP does not Granger Cause INF		0.2029	0.8136
INTR does Granger cause GDP	48	2.18301	0.0350
GDP does Granger cause INTR		17.7973	0.0421

PDEBT does not Granger cause GDP GDP does Granger cause PDEBT	48	034744 0.04270	0.7085 0.0421
TOP does not Granger cause GDP GDP does Granger cause TOP	48	1.22051 3.73586	0.3051 0.0319
INTR does not Granger cause INF INF does not Granger cause INTR	48	0.38526 15.6672	0.6826 8.E-06
PDEBT does not Granger cause INF INF does Granger cause PDEBT	48	0.54311 3.20547	0.5849 0.0504
TROP does not Granger cause INF INF does not Granger cause TROP	48	0.39992 1.76792	0.6728 0.1829
PDEBT does not Granger cause INT INT does not Granger cause PDEBT	48	2.25813 0.47206	0.1168 0.6269
TOP does not Granger cause INTR INTR does not Granger cause TOP	48	3.64414 1.70374	0.0345 0.1914
TOP does not Granger cause PDEBT PDEBT does Granger cause TOP	48	1.73083 3.33215	0.0292 0.0451

Source: Researcher E-view Result

The Granger causality test findings for Pakistan show that inflation rate and economic growth have a one-way relationship in Pakistan. And the bi-causal chain exists between INTR and GDP as well as TOP and PDEBT. It means that PDEBT does not Granger causes economic development while GDP does cause PDEBT in Pakistan, while there is unidirectional causality between TOP and GDP as well as between PDEBT and INF. Furthermore, no causality between TOP, PDEBT, and INTR, and no significant effects exist.

3.4.7 Breusch-Godfrey Serial Correlation LM Test

H_0 = No serial correlation.

H_1 = Serial correlation exists.

If the likelihood value is less than 0.05, reject H_0 Otherwise, accept H_0 .

Table: 11 Breusch-Godfrey Serial Correlation LM Test

F-Statistics 0.459741	Prob. F(2,33)	0.6354
Obs*R-squared 1.274066	Prob. Chi-Square(2)	0.5289

Source: Researcher E-view Result

The serial correlation result indicates a probability value of 0.5289, which is greater than 0.05, suggesting that H_0 is accepted. However, we conclude that the model has free from serial correlation.

3.4.8 Heteroscedasticity Test: Glejser

H_0 = Homoscedasticity

H_1 = Heteroscedasticity

Table: 11 Heteroscedasticity Test: Glejser

F-statistic 0.557800	Prob. F(15,31)	0.8842
Obs*R-squared 9.989308	Prob. Chi-Square(15)	0.8204

Source: Researcher E-view Result

The outcome of the heteroscedasticity test is 0.8204, which is greater than 0.05, suggesting that H_0 is accepted. As a result, the model is homoscedastic and no heteroscedasticity exists. We conclude that the model is best for describing the relationship between the variables.

3.5.9 Normality Test

To see if the regression model is the correct one for explaining the relationship between the variables, we performed a normality test with the following null and alternative hypotheses:

H_0 : denotes a normally distributed residual.

H_1 : denotes not a normally distributed residual

If the probability value is less than 0.05, reject H_0 ; if the probability value is greater than 0.05, accept H_0 .

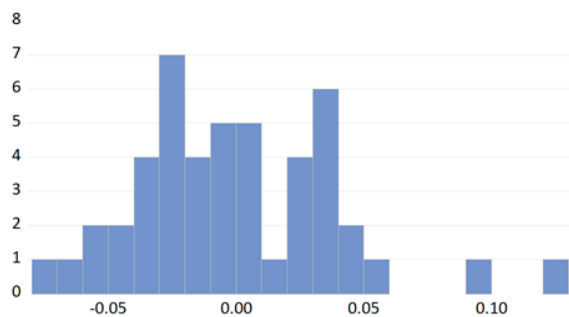


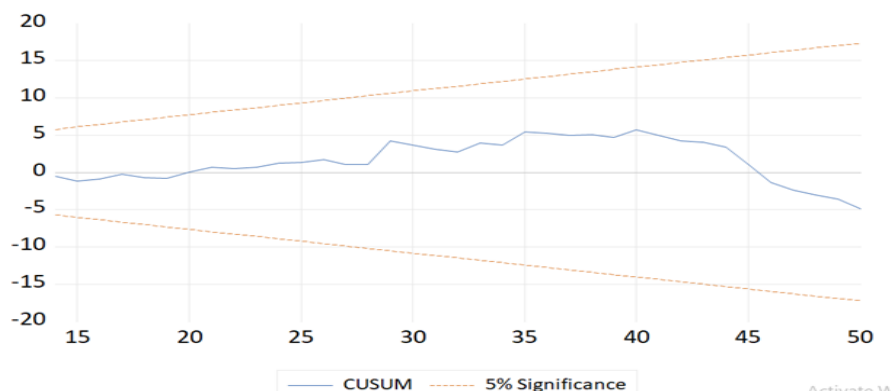
Table: 12 Normality Test

Jarque - Bera 7.158378	Probability 0.027898
------------------------	----------------------

Source: Researcher E-view Result

The normality test yielded a probability of 0.027898, which is less than 0.05. On this basis, we reject H_0 and accept H_1 . As a consequence, the residual does not assume a normal distribution.

3.5.10 Cusum Test



Source: Researcher E-view Result

3.6 Conclusion

Using time-series annual data from 1985 to 2020, the scrutiny examined the short- and long-run effects of the inflation rate, interest rate, public debt, and trade openness on Pakistan's economic growth. To do this, we first presented a theoretical review that drew on previous research on the impact of financial crises on development and investment. The majority of these studies discovered a negative link between crises and economic development. These studies have revealed that the length and depth of crises vary depending on the type of the crisis as well as between countries (developed, emerging, and developing countries). The drop in foreign trade (imports and exports) slowed economic growth in all regions of the world, particularly in emerging and developed economies. We also identified banks, reduced consumption, investment costs, risk aversion, exchange rates, and optimism as potential sources of crisis transfer from the financial system to the economic sector. The analytical paper delves into the evolution of the variables used in the analysis, the presentation of adaptive time series techniques, the presentation of outcomes, and the explanations of model estimates for the impact of financial crises on economic development. We provided descriptive statistics on the crisis, GDP growth, and control variables after describing the measure of the financial crisis as a significant drop in the stock market.

3.7 Recommendation

This analysis aims to see how financial crises impact economic variables such as GDP. Following are some recommendations for stakeholders and the government in the Pakistani capital market, as well as suggestions for future research in this field, based on the study's findings and conclusions. The State Bank of Pakistan (SBP) controls and regulates interest in Pakistan as part of the country's monetary policy framework. The increase in interest rates in the economy has an adverse impression on GDP. As a result, the SBP should keep a close eye on the interest rate to get the most out of this monetary instrument. As a result, the government should retain an acceptable interest rate in the region, which will assist and inspire investors to take advantage of investment opportunities. Inflationary pressures in the world are having a negative impact on the economy, as well as causing individuals to spend more and save less.

This paper also covers the following ideas, which are hoped to be a panacea for the crisis at hand. The regulatory authority must devise new methods for detecting early warning signals of financial instability in the banking sector. The regulatory authority should improve its remedial programs to address the root causes of the banking industry's crisis. Improvement, expansion, and full application of risk-based banking regulation by international best practices. To improve both on-site and off-site inspection and oversight of banks, a complete review of legislation and regulatory system is urgently needed. There is a need for enhanced and expanded consumer safety provisions.

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