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Does financial deepening matter in financial crisis? An empirical investigation of developed and emerging economies

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Abstract

This study explores the impact of financial deepening on financial crises in United State of America and Pakistan. The study uses the annual data on financial crisis and financial deepening ranging from 1997 to 2016 in order to encapsulate financial crisis in emerging and developed economies. Study applies Patel and Sarkar (1998) approach to identify and assess accurate form of financial crises. The findings suggest a positive relationship between financial deepening and financial crises in the case of USA, however, no such relationship could be established in case of Pakistan.
Keywords: Financial deepening, financial crises, Pakistani stock index, US stock index

According to Alrabadi and Kharabsheh (2016) financial deepening is expanding the provision of financial services with an extensive choice of services geared to all levels of society. In simple words it referred to as liquid money. The more liquid money available in the economy, the more chances exist for sustainable growth (Shaw, 1973). Financial deepening encourages higher investment, faster rising living standards and more rapid growth. As late as the end of the 19th century, economists alleged that financial development is a key driver of economic growth (Schumpeter, 1911; Bagehot, 1873). They provide many reasons why financial sector is so important for economic growth. As Levine (2005) argues convincingly that a well-functioning financial sector facilitates trading in markets, grooves resources to their most profitable uses, engenders information regarding investments, and diversifies and manages risks.

In line with this positive relationship in the literature, a wave of financial liberalization was evolving in developing countries in the 1990s. The obstacles to economic growth caused by the global financial crisis 2007-2008, however, on the positive linkage between financial development and economic growth, inaugural an energetic debate that if financial deepening becomes excessively large it will generate inefficient resource allocation, which in turn adversely affect economic growth (Williams, 2019). Past literature highlights the fact that economic development beyond a certain limit can be detrimental to economic growth. Arcand, Berkes, and Panizza, (2015) studies the effect of financial depth on economic growth, using a sample of 133 developed and developing countries and found that financial deepening has a negative influence on economic growth when credit to the private sector exceeds 100% of GDP. Similarly, Law and Singh (2014) examined the influence of financial development on economic growth, using sample of 87 developed and developing countries. The results of their study suggest that financial development reduces economic growth when credit to the private sector reaches in the range of 90% of GDP. Several studies demonstrate that sometimes financial development is over emphasized which triggers and enhances demand of financial sector and leads to financial crisis through automatic reaction of financial system (Robinson, 1952; Lucas, 1988; Arestis, 2005; and Shah & Bhutta, 2014).

The fact that the Global Financial Crisis (GFC) of 2008-2009 originated in a developed economy i.e. USA, triggered a debate among academicians and policy makers around the globe regarding the limits of financial development of which financial deepening is an important aspect. Several empirical as well as theoretical studies have explored a relationship among financial crises and factors such as excessive risk-taking, predatory lending, and financial innovation and complexity etc. However, no definite reasons could be found to explain financial crises and there is still a need to figure out the factors that may prompt the financial crises. For instance, Nicole, (2016) argues that there is a long history of financial crises but there is no consensus among researchers regarding factors explaining the financial crises. He highlights indebtedness and

deflation as major factors financial crises.[1] To understand and give some suitable clarification for financial crises, it is necessary to investigate those factors that related to the occurrences of financial crises. In this study, researchers empirically investigated whether financial deepening is anyway related to the occurrences of financial crises especially for Pakistan and USA market.

Our work contributes to the existing body of literature by providing further insights into the relationship of financial deepening and financial crisis. This area of research is in its initial stage, even in developed countries, while, in developing countries, little work has been done. Previous researchers examined the effect of financial deepening on financial crisis in developed countries and/or developing countries. our work is the first to directly compare whether financial deepening lead towards financial crises between developed and developing countries in such an underlying mechanism.

Studies conducted in Western contexts cannot be generalized to Asian countries and may not necessarily have any relevance to Pakistan because of the difference in contextual paradigm (i.e. individualist vs collectivist). Most studies concentrate on individualistic cultures and well-developed financial markets, and very little is known about the role of financial deepening in the financial crisis in collectivist cultures and less developed markets. This present study also helps fill this gap in the literature by considering the role of financial deepening in the financial crisis in collectivist societies, particularly in Pakistan. In developing countries, like Pakistan, market fundamentals are different from developed countries, and the thinking levels of Pakistani investors also vary from investors in developed countries; therefore, this research is going to contribute contextually as well.

Our work contributes to existing research suggesting that the role of financial deepening in the financial crisis differ from developed countries to developing countries. The findings of this study suggest that in developed country like USA financial deepening is high which lead towards financial crises, however, in case of developing county like Pakistan financial deepening is not related to the occurrences of financial crises.

The remaining article proceeds as follows: in the next section, we discuss the previous studies regarding the relationship of financial deepening, with financial crises and develop the research model of our study. In the third section, we describe the method of data collection and how we operationalized our construct measures. The results of our study are presented in the fourth section. In the fifth section, we discuss the results of our study. In the sixth section, we discuss the implications of our results, and in the seventh section, we suggest avenues for future research.

Review of Literature

Financial crisis is a very big issue prevails in financial system. It is an uncertain event that come suddenly and affects most of the people and organizations of the world and default most of the organizations. Financial sector is critical in economic development of a country. Gries, et al (2009) argued that usually countries encourage financial development and financial deepening by decreasing the government interference in financial sector. Schumpeter (1911), Goldsmith (1969) and Shaw (1973) have investigated this relationship theoretically as well as empirically either in specific country or in global perspective.

Schumpeter (1911) described that financial deepening and development is instrumental in driving economic growth and development through proper allocation of funds, projects evaluation, management of risks and, supervising and monitoring entrepreneurs. Gries, et al. (2009) also reported that these approaches may improve the direct investment domestically and worldwide. Schumpeter (1911), McKinnon (1973) and Shaw (1973) stated that financial integration stimulates growth of economy. So according to finance view, Bencivenga and Smith (1991) reported that financial intermediaries help injecting savings back into the economy. According to "Mckinnon-shaw" some economies are striving to improve functionality of financial intermediaries to reform their financial system in such a way to achieve the goals of financial deepening and consequently higher GDP. But in other way Robinson (1952), Lucas (1988) and Arestis (2005) reported in their studies that when the ecnomic growth through increased financial integration is over emphasized, it creates and increases demand of financial sector which leads to financial crisis. Shah, S. Z. and Bhutta, N, T. (2014) also theoretically investigated the relationship between financial integration and financial crises and suggested that financial deepening may eventually result in financial crises.
Shaw (1973) defined financial deepening as *"specialization in financial functions and organizations, and organized local organizations and markets gain link to international markets and the curb (informal)".* Demirguc and Detragiache (1998) explained financial deepening as *"a state of*

[1] Fisher (1933) explained that when credit is extended to such a degree and time that it become near to impossible to pay off, during a deflationary period, which means that debt increase in real terms in economy.

atomized financial system which is mainly free from financial repression". Financial liberalization has resulted in financial deepening and sophisticated growth in numerous countries. However, it has also caused larger occurrence of financial crises. Research explores some empirical indication on these two-folded effects of financial deepening and liberalization across various nations. Financial liberalization exhibits deregulation of local financial market and the liberalization of the capital account. The impact of financial liberalization has been in limelight since a long. According to one aspect, it reinforces financial deepening and stimulates economic growth in long term but in contrast, it also encourages extreme risk taking, creates macroeconomic instability and may cause to frequent crises.

In past research studies, researchers have exclusively focussed on the positive aspects of financial deepening on economic growth and development (e.g. Edison, et al. 2002; Beck and Levine, 2004; Rousseau and Vuthipadadorn, 2005; Bekaert et al. 2005; Mavrotas and Son, 2006; Ang, 2008; Perera and Paudal, 2009; Anwar and Nguyen, 2011 and Jalil and Feridun, 2011). However, the link with financial development delivers two diverse in traditional economic views. Robinson (1952) emphasized the first aspect and stated the demand for financial services caused by economic growth could be the main factor towards financial development. He argued that financial development does not cause economic growth. Ang (2008) further stated that it retorts only because of demand of financial services for creating the direct effect on saving and investment development. Patrick (1966) named this aspect as "demand following approach".

But on the other hand, Schumpeter (1911) and Shaw (1973) emphasized on proactive role of financial development stimulating economic growth through quality and quantity of financial services across nations. This aspect is known as "supply leading approach". The financial sector can cause economic growth by acquisitive channels. Pagano (1993) argued that this aspect focuses on finance encouraged effects of capital accumulation on economic growth and development.

According to Kibritcioglu (2005) Crisis is defined as the intolerable variation in price of goods, services or foreign exchange in a market. According to Yucel and Kalyoncu (2010) reported that financial crisis occurs due to imbalance and problems in money markets. Yay (2001) defined financial crisis as high economic problems occurs due to high fluctuation in stocks and foreign exchange or a large number non-performing loans. First-generation models, which were advocated by Krugman (1979) and re-worked by Flood & Garber (1984), signify the basic macroeconomic factors that may spark crisis and project currency crises as natural result of inconsistent policies, structural imbalances and financial deepening.

The Asian Crises of 1997-1998 influence all the emerging economies which are free and open to capital flows. The main explanations for this crisis emphasized on macroeconomic and banking issues. Wade and Veneroso (1998) and Radelet and Sachs(1998) reported that the financial crisis started with a slight panic without any actual base and only became evident through IMF's move to increase interest rates and shut down banks. Krugman (1998) argued there was pang loss equilibriuma that triggered a fizz in prices of assets. In this approach, the Asian frights had their roots in assurances offered through governments and relied upon by investors. The one main reason was the high rate of default in subprime home mortgage segment. The buildup of larger rate of default of these mortgages cause to crisis.

The crises threatened the collapse of big organizations and large financial firms, which was delayed and intervened through bailing out banks by governments, but stock exchanges still crashed globally. The crisis were instrumental in the failure of crucial businesses and slump in economic activities prominent to GFC 2007 and paying European sovereign debt crisis. Bursting of America housing price bubble which had emaciated in 2004 triggered the value of securities knotted to America housing price to fall, destructive banks and financial institutions worldwide. The US Senate's Levin Coburn Report stated that financial crisis was the result of higher risk taken by the banks, undercover clashed of interest, complex and leveraged financial products, the credit rating agencies, unsatisfactorily oversight by regulators and the market itself to restraint in the extremes of Wall Street.

Boom broken phases follow financial deepening. During the boom phase, financial institutions and banks expand credit very quickly and load unnecessary credit risk, as a result financial deepening increases and economy develops financial fragile and disposes to financial crisis. Rtw (2005) investigated that negative skewness of debt growth is silent indicator that records the presence of rare, abrupt and sharp decrease in credit growth. Comparatively flat credit growth of boom phase becomes irregular in financial fragile where distribution of credit growth rate is categorized by negative outliers in a large sample. These outliers correspond to the rapid decline in credit growth that exhibits during crisis or boom busting cycle. The one key point that the financial deepening that stimulates rapid GDP growth rely upon booms and busts. The other point is that the connection between skewness of debt and growth does not prescribe that crises are

healthy and inevitable for growth. In fact, crisis is the tradeoff for achievement of faster growth amid credit market imperfections. Bonin and Huang (2001) stated financial risk enhanced the chances of occurrence of financial crisis in Bangladesh. Dooly (2010), Rose and Spiegel (2010) and Fouejien (2013) reported that critical triggers of GFC 2007-2008 were monetary policy, ineffectiveness of financial regulation and the lack in financial innovation control.

According to economist report (June, 2009), the IMF blamed poor rules and regulations instead of global imbalances for the financial crisis. Numerous policymakers and economists like Paul Krugman, New York Times columnist and economist and Hank Paulson, a former US treasury secretary, have put Worldwide imbalances the vast current account excesses track by nations like China, together with US vast shortage at the origin of the financial crisis. But IMF disagrees and claimed that the key culprit was poor rules and regulations of the financial system, along with a letdown of market discipline. The IMF chief economist contended that global imbalances only donated indirectly to the crisis.

In extensive strokes, the global imbalances view of the financial crises claim that a flood of money came from nations with higher saving rates, such as China and other oil producing nations, cause flooding in US. This kept rates of interest low and powered the credit boom and the associated boom in the prices of different assets such as equity houses, whose failure accelerated the financial crisis in US market. They further reported that there is a need investigation to find out an effective solution of these imbalances. These imbalances include money supply, providing financial service and products and other channels of credit and money flows mostly backed by financial deepening in a country. Martinez (2016) indicated that domestic credit to the private sector is the most common and critical in predicting banking crises. Martinez (2016) further argued that more data and investigation needed to ensure and strength of this relationship. After reviewing the relevant literature, the researchers concluded that financial deepening has a significant positive effect on financial crises which means that financial deepening leads toward the financial crisis. Based on the empirical literature, the following relationship is expected.

H1: Financial deepening has a significant influence on financial crisis in developed economies.
H2: Financial deepening has a significant influence financial crisis in emerging economies.
H3:As compared to developed economies like USA, emerging economies like Pakistan are relatively immune to financial crises which occurs as results of financial deepening.

Research Methodology

Sampling and data collection

The main objective of the research is to explore the mechanism by which financial deepening influences the financial crises in emerging (PSX-100 index) and developed (S&P-500 index economies. Annual data ranging from 1997 to 2016 were used, to achieve this research objective. The sample of this study includes 20 years data . Baltagi (2005) assert that a wider range of data plays an important role in enhancing the efficiency and effectiveness of statistical analysis; that is why the researchers utilized a wide range of data from 1997 to 2016 for statistical analysis. The required data has been extracted from stock exchange websites, central bank of the country and World Bank website.

Operationalization of variables

Dependent variable. The authors use financial crisis as endogenous variable and follow Patel and Sarkar (1998) in measuring financial crisis; as the IMAXi.t was used to measure the financial crisis which identify the highest value of market index during a year. This contains dividing the daily stock index by the maximum index detected during the period chosen that is to say for a year. i,t represents the daily stock index of ith country in time t. The IMAXi.t indicator can be defined as following.

$$IMAX_{i,t} = \frac{I_{i,t}}{\max\left(I_{i,t}, I_{i,t-1}, \dots, I_{i,t-n}\right)} \qquad (1)$$

Where, n= number of working days in a year

The value of the indicator ranges between 0 and 1. The indicator is equal to 1 when $I_{i,t} = \max\left(I_{i,t}, I_{i,t-1}, \dots, I_{i,t-n}\right)$ In this case the stock index reach to the extreme value during the time period. So greater is the frequency of market crash, lower is the value of indicator and tends to 0. To gauge the crises variable, a threshold level is set to detect the days where $IMAX_{i,t}$ remains

abnormally low. The threshold level is set by subtracting twice the standard deviation of $IMAX_{i,t}$ from the average value of $IMAX_{i,t}$ during the year. The daily crises variable is defined as the value of $CRIS_{i,t}$ is equal to 1 when $IMAX_{i,t}$ is less than the threshold level and 0 otherwise. Thus $CRIS_{i,t}$ is defined as

$$\begin{cases} CRIS_{i,t} = 1 \; if \; IMAX_{i,t} < \overline{IMAX_{i,t}} - 2\sigma_{\,i,t} \\ \qquad CRIS_{i,t} = 0 \; otherwise \end{cases}$$

The average and standard deviation of the $IMAX_{i,t}$ indicator are calculated for the period of study. In this approach, $(\overline{IMAX_{i,t}} - 2\sigma_{\,i,t})$ is the minimum threshold level under which there exists acute fall in the stock market index and the inception of crises. The annual variable of financial crises represented by$CRIS_{i,N}$ which is equal to the number of working days in N year where the financial market is undergoing crisis. It can be defined as below;

$$CRIS_{i,N} = \sum_{t=1}^{t=k} (1)$$

$$Wher: \begin{cases} CRIS_{i,N} : \text{Measure of crisis in country i in year N.} \\ K \quad : \text{Number of days where 1 in year N.} \end{cases}$$

This operationalization of financial crisis approach is consistent with Ksantini, and Boujelbène, (2014), as they were used the same method for measuring financial crisis.

Independent variable. The authors use financial deepening as predictor variable. There are many proxy that are used for the measurement of financial deepening in literature, such as the ratios M1/GDP, M2/GDP, M3/GDP or market capitalization/ GDP etc. have been deployed to denote the quantum of financial sector (King and Levine, 1993). Degree of activity of financial system has also been used as an indicator of financial deepening in many studies, for example, credit to the private sector/GDP and /or value traded ratio etc. Moreover, there are studies in literature which have used efficiency of the financial system as proxy of financial deepening such as turnover ratio, banks overhead costs or net interest margins (Antzoulatos et al, 2008).

The authors use follow King and Levine (1993) in measuring financial deepening, as the different indicators were used to measure the financial deepening such as M1 (narrow money) refers to notes and coins that are in circulation and highly liquid money equivalents. M2 comprises M1 and in addition, medium term time accounts in banks and certain money market funds. M3 includes M2 and long term deposits in banks. Thus the present study used Broad money growth rate (annual percentage), Broad money to total reserve ratio, Domestic credit provided by financial sector (percentage of GDP), Domestic credit provided by banks (percentage of GDP), Bank non-performing loans to total gross loans (in percentage) variables in order to measure the financial deepening.

Control variables. The authors use Inflation and GDP growth as control variables. GDP growth and Inflation were measured by follow the Buvanendra et al. (2016); as the GDP growth measured by the change in GDP in current market prices from one period to the next and inflation, measured by annual inflation rate of growth in the consumer price index (CPI).

Econometric Model

The general form of the regression model can be stated as:

$$\boldsymbol{Y_{it} = \beta_o + \beta_1 CV_{i,t} + \beta_2 FD_{it} + \mu_{it}} \qquad (2)$$

where i and t represent the country and time, respectively. Y is the dependent variable which is a measure of financial crisis FC. $\boldsymbol{\beta_o}$ is a scalar, $\boldsymbol{\beta_1}$ is the coefficients of the control variables $\boldsymbol{\beta_2}$ is the coefficients of the financial deepening, CV is control variables and FD is financial deepening. Here, μ_{it} is a random term expressed as $\mu_{it} = ai + \mathcal{E}it$ where ai is individual-specific effect and $\mathcal{E}it$ is the remaining combined cross-section and time series error component. The expanded model for this study is stated as follows.

$$\boldsymbol{FC_{it} = \beta_o + \beta_{1INF_{i,t}} + \beta_2 GDPG_{i,t} + \beta_{3BM2_{it}} + \beta_{4BM3_{it}} + \beta_{5_{BM4_{it}}} + \beta_{6BM5_{it}} + \beta_7 BM6_{it}} + \mu_{it} \quad (3)$$

where β_o is the constant term, $\beta_{1\text{ to }2}$ are the coefficients of the control variables (inflation and GDP Growth), $\beta_{3\text{ to}7}$ are the coefficients of the financial deepening (Broad money growth rate, broad money to total reserve ratio, domestic credit contributed by financial sector and domestic credit contributed by banks) The authors used different proxies of FD in order to examine the impact of FD on FC. The different proxies were applied in order to enhance the robustness of the results. This method is consistent with King and Levine (1993) they also used different proxies in order to measure the financial deepening. The subscript "i" represents the country, while subscript "t" is the time in years, FC is financial crisis ith country in time t, INF is the inflation of ith country in time t, GDPG is the GDP growth of ith country in time t, $BM_2$is the broad money growth rate (annual percentage) of ith country in time t, BM_3 is the Broad money to total reserve ratio of ith country in time t, BM_4 is the Domestic credit contributed by financial sector (% of GDP) of ith country in time t, BM_5 is the Domestic credit contributed by banks (% of GDP) of ith country in time t, and μit the error term.

Empirical results

The study utilizes time series data of developed country (S&P-500 index) and emerging economy (PSE-100 index) covers 20 years data from 1997 to 2016 to incorporate the effects of AFC and GFC periods in Pakistani Stock market (PSE-100 index) and USA (S&P-500 index).
First of all, Patel and Sarkar (1998) approach has been used which compute an indicator of financial crises (CRISi,N) during a year. Ksantini and Boujelbene (2014) also applied this approach to assess financial crises variable. The research has been conducted various statistical techniques like descriptive statistics, correlation analysis, diagnostics tests and regression analysis for US and Pakistani markets to explore how financial crisis behaves with financial deepening.

Descriptive analysis of US market

The Table-01 shows the descriptive statistics of variables with respect to financial deepening an crisis in the US market (S&P-500 index). The Jarque-Bera test in Table-01 reported insignificant results for all variables except GDP growth which means that data of S&P-500 index is normally distributed.

Table 1. *Descriptive Statistics of USA*

	SP_FC	BM2_US	BM3_US	BM4_US	BM5_US	BM6_US	GDPGROWTH_US	INF_US
Mean	4.8000	6.2838	41.235	218.7682	51.6728	1.1771	2.3204	92.7620
Median	4.0000	6.2082	41.839	221.5435	50.698	0.0000	2.4511	93.7683
Maximum	16.000	11.713	58.277	251.0985	59.754	4.9599	4.6852	110.067
Minimum	0.0000	-2.7411	24.883	179.4216	46.413	0.0000	-2.7755	73.6127
Std. Dev.	4.4556	3.1216	9.3334	21.37240	3.7651	1.6982	1.7509	12.3505
Skewness	0.9892	-0.9254	-0.2498	-0.2663	0.7887	1.0751	-1.1152	-0.1009
Kurtosis	3.3314	3.6617	2.4173	1.8442	2.8865	2.6901	4.8011	1.6196
Jarque-Bera	3.3535	5.1562	0.4910	1.3495	2.0842	3.9333	6.8493	1.6218
Probability	0.1869	0.0759	0.78229	0.50926	0.35270	0.13992	0.032560	0.44445
Observations	20	20	20	20	20	20	20	20

Descriptive analysis of Pakistani market

The Table-02 shows the description of financial deepening variables and financial crises variable data in the Pakistani market (PSE-100 index). The Jarque-Bera test in Table-02 reported insignificant results for all variables except BM2_Pk which means that data of PSE-100 index is also normally distributed.

Table 2. *Descriptive Statistics of Pak*

	PSE_FC	BM2_PK	BM3_PK	BM4_PK	BM5_PK	BM6_PK	GDPGROWTH_PK	INF_PK
Mean	3.4500	15.4852	8.5811	45.7396	22.3891	6.8545	3.9752	79.9178
Median	3.0000	14.0909	6.9623	46.3536	22.478	8.2099	3.9601	61.9668
Maximum	13.000	45.5320	18.037	52.1164	28.736	16.2071	7.6673	150.7535
Minimum	0.0000	4.31422	3.2746	37.2155	15.277	0.0000	1.0143	37.2879
Std. Dev.	3.8726	8.26896	4.5255	4.67037	4.7165	6.1532	1.8516	40.4406
Skewness	0.9822	2.34855	0.8688	-0.4216	-0.2059	-0.0327	0.3574	0.5809
Kurtosis	3.0671	3.98176	2.4552	2.1201	1.7187	1.3983	2.4160	1.7709
Jarque-Bera	3.2199	59.0065	2.7633	1.2376	1.5094	2.1413	0.7099	2.3838
Probability	0.1998	0.0000	0.2511	0.5385	0.4701	0.3427	0.7011	0.3036
Observations	20	20	20	20	20	20	20	20

Heteroskedasticity test for Pakistan and USA

The Table-03 presents the Heteroskedasticity analysis of residuals of regression model applied on financial deepening variables and financial crises in PSX-100 index and S&P-500 index. The F-statistic and p-value reported. The result indicated that value of F-statistic for USA is 2.310982 which is insignificant at p = 0.0968 and the value of F-statistic for Pakistan is 1.281309 which is also insignificant at p = 0.3365. The findings suggested that there is no heteroskedasticity in a series of residual and the variance of error term is constant.

Table 03: Heteroskedasticity Test: Breusch-Pagan-Godfrey

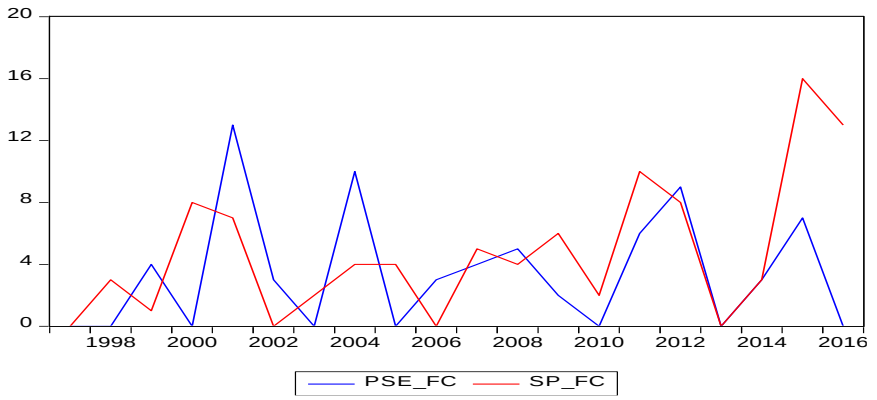
Heteroskedasticity test for USA		Heteroskedasticity test for Pakistan	
F-statistic	Prob. F(7,12)	F-statistic	Prob. F(7,12)
2.310982	0.0968	1.281309	0.3365

Serial Correlation LM test for Pakistan and USA

The Table-04 shows the serial correlation analysis of residuals of regression model applied on financial deepening variables and financial crises in PSx-100 index and S&P-500 index. The results indicate that value of F-statistic for USA is 2.235073 which is insignificant at p = 0.1576 and the value of F-statistic for Pakistan is 1.295883 which is also insignificant at p = 0.3255. these results shows that there is no serial correlation in the series of residual of a model and the error terms are not correlated to each other.

Table 04: Breusch-Godfrey Serial Correlation LM Test

Serial Correlation LM test for USA		Serial Correlation LM test for Pakistan	
F-statistic	Prob. F(2,10)	F-statistic	Prob. F(2,10)
2.235073	0.1576	1.295883	0.3255



Graph 01: USA and Pak Financial Crises from 1997-2016

Correlation Analysis

The Table-05 stated the correlation analysis of financial deepening and financial crises variables of US market used in the study. The results show that Broad money growth rate (BM2) and Broad money to total reserve ratio (BM3) have inverse relationship with financial crises which are against our expectations. GDP growth (annual percentage) reported negative relationship with financial crises in US market. However Domestic credit contributed by financial sector (BM4), Domestic credit contributed by banks (BM5), Bank non-performing loans (NPL) to total gross loans (BM6) and Inflation reported direct relationship with financial crises in US market which are according to our expectations.

Table 05: Correlation Analysis for USA

	SP_FC	BM2_US	BM3_US	BM4_US	BM5_US	BM6_US	GDPGROWTH_US
SP_FC	1.0000						
BM2_US	-0.1400	1.0000					
BM3_US	-0.0895	0.4607	1.0000				
BM4_US	0.3379	-0.3720	-0.5805	1.0000			
BM5_US	0.0810	0.1654	0.0774	0.3955	1.0000		

BM6_US	0.2516	-0.6062	-0.8348	0.6044	-0.1128	1.0000	
GDPGROWTH_US	-0.2120	0.1700	0.2693	-0.4637	-0.4549	-0.5203	1.00000
INF_US	0.4776	-0.4817	-0.6088	0.9440	0.3533	0.6288	-0.50419

The Table-06 reported the correlation analysis of financial deepening and financial crises variables I Pakistani market. The results show that all variables except inflation have inverse relationship with financial crises, which are also against out hypotheses.

Table 6. *Correlation Analysis for Pakistan*

	PSE_FC	BM2_PK	BM3_PK	BM4_PK	BM5_PK	BM6_PK	GDPGROWTH_PK
PSE_FC	1.000000						
BM2_PK	-0.02729	1.000000					
BM3_PK	-0.31239	-0.34208	1.000000				
BM4_PK	-0.31758	-0.31559	0.61827	1.000000			
BM5_PK	-0.04273	0.22275	-0.06878	-0.10449	1.00000		
BM6_PK	-0.01671	0.02248	-0.21235	0.30392	-0.52766	1.000000	
GDPGROWTH_PK	-0.02508	0.38045	-0.38638	-0.15286	0.14048	-0.00211	1.00000
INF_PK	0.03000	-0.12756	-0.10208	0.362611	-0.81216	0.82763	0.09413

Granger Causality Analysis:

The Table-07 stated the Granger Causality Analysis between financial deepening and financial crises variables in USA and Pakistan market. The results suggested that broad money growth rate (BM2) does not granger cause to financial crises and is rejected at 10 percent level of significance. domestic credit contributed by financial sector (BM4) does not granger cause to financial crises and is rejected at 01 percent level of significance. bank non-performing loans to total gross loans (BM6) does not granger cause to financial crises in US market which is reject at 10 percent significance level. Inflation does not granger cause to financial crises in US market which is also rejected at 10 percent level of significance. However, all other null hypotheses of no granger causality are accepted for USA market.

In case of Pakistan, the results also suggested that all variables do not granger causes to each other, except the domestic credit provided by financial sector (BM4). Domestic credit provided by financial sector (BM4) does not granger cause to financial crises which is rejected at 06 percent significance level. So the overall granger causality analysis indicates that there is no lead lag relationship found between financial deepening and financial crises in case of Pakistan.

Table 07: Pairwise Granger Causality Test for USA and Pakistan

Granger Causality Test for USA			Granger Causality Test for Pakistan		
Null Hypothesis:	F-Static	Prob.	Null Hypothesis:	F-Static	Prob.
BM2_US does not Granger Cause SP_FC	2.76882	0.0996	BM2_PK does not Granger Cause PSE_FC	0.00533	0.9947
SP_FC does not Granger Cause BM2_US	1.15993	0.3439	PSE_FC does not Granger Cause BM2_PK	1.45330	0.2694
BM3_US does not Granger Cause SP_FC	1.37759	0.2867	BM3_PK does not Granger Cause PSE_FC	0.25760	0.7768
SP_FC does not Granger Cause BM3_US	2.08557	0.1638	PSE_FC does not Granger Cause BM3_PK	0.38614	0.6872
BM4_US does not Granger Cause SP_FC	6.90289	0.0091	BM4_PK does not Granger Cause PSE_FC	3.53866	0.0593
SP_FC does not Granger Cause BM4_US	1.16959	0.3411	PSE_FC does not Granger Cause BM4_PK	0.90267	0.4294
BM5_US does not Granger Cause SP_FC	0.04637	0.9549	BM5_PK does not Granger Cause PSE_FC	0.27148	0.7665
SP_FC does not Granger Cause BM5_US	0.49187	0.6224	PSE_FC does not Granger Cause BM5_PK	0.21787	0.8071
BM6_US does not Granger Cause SP_FC	3.08579	0.0800	BM6_PK does not Granger Cause PSE_FC	0.01845	0.9817
SP_FC does not Granger Cause BM6_US	0.12882	0.8802	PSE_FC does not Granger Cause BM6_PK	0.75294	0.4904
GDPgrowth_US does not Granger Cause SP_FC	2.21053	0.1492	GDPgrowth_PKdoes not Granger Cause PSE_FC	0.04165	0.9593
SP_FCdoes not Granger Cause GDP growth_US	0.29109	0.7522	PSE_FCdoes not Granger Cause GDpgrowth_PK	0.58575	0.5707
INF_US does not Granger Cause SP_FC	3.02626	0.0834	INF_PK does not Granger Cause PSE_FC	0.01428	0.9858
SP_FC does not Granger Cause INF_US	0.11795	0.8897	PSE_FC does not Granger Cause INF_PK	0.04884	0.9525

Regression Analysis

We performed regression analysis to test the hypotheses formally. Firstly we run the regression analysis for USA. The hypotheses predicted that the financial deepening has a significant influence on financial crisis in developed economies (United State of America). To test these

predictions, we regressed financial deepening measures (such as BM2_US, BM3_US, BM4_US, BM5_US and BM6_US), inflation (as control variable) and GDP growth (as control variable) on financial crisis in USA market. The values of their R2, change in R2 and beta ($\boldsymbol{\beta}$) are reported. The value of R2 = 0.62 that shows about 62 per cent of the variation in financial crisis is caused by financial deepening in USA but the remaining 38 per cent is not captured in this model and needs to be explored. The value of the F-statistic is significant and indicates that the model is fit. In the second stage. A detailed discussion of the results is presented below.

The results presented in Table 08 show that broad money growth rate (BM2) (β= 0.0423, p=0.0527) has a significant positive influence on financial crisis in United State of America. This means that, as broad money growth rate (BM2 increases, financial crisis also increases in United State of America. Statistically it can be interpreted that one percent increase in broad money growth rate can bring 0.823170 unit increase in financial crises in US market while other things remain constant. Similarly, a significant positive relationship with corporate FF was found for broad money to total reserve ratio (BM3) (β=0.499936, p=0.0215), which means that broad money to total reserve ratio has a direct significant relationship with financial crises at 05% significance level in US market. It can be said that one percent increase in broad money to total reserve ratio can bring 0.499936 unit increase in financial crises in US market while other things remain unchanged. A significant negative relationship was found between domestic credit contributed by financial sector (BM4) (β=-0.349342, p=0.0208) and financial crisis. Psychologically this means that, due to domestic credit contributed by financial sector, financial crisis decreases in US market. Domestic credit contributed by banks (BM5 (β=0.134577, p=0.6965) is an insignificant predictor of financial crisis. A significant positive relationship with financial crisis was found for the bank non-performing loans to total gross loans (BM6) (β=−3.839, p=0.0443).

The GDP growth rate registers insignificant positive relationship with financial crises in US market. Coefficient of inflation rate conveys positive impact and registers value 0.872381, p-value 0.0031 which suggests that inflation significantly affects financial crisis at 5% level of significance in US market. Statistically it can be argued that one percent increase in inflation rate can bring 0.872381 unit increase in financial crises in US market while other things remain constant. So increasing inflation can also lead to financial crises. The overall results indicate that financial deepening has significantly contributes in financial crises in US market. Thus, these findings lend
support to H1: Financial deepening has a significant influence on financial crisis in developed economies.

The hypotheses predicted that financial deepening would also be significantly associated with financial crisis in emerging economies like Pakistan. To test these predictions, the regression analysis also applied in Pakistani market to explore that how financial crisis reacts to financial deepening in Pakistani market. The Table-08 shows that R squared 26.67.53%, The value of the F-statistic is significant that indicates the model is fit. The model just explains 26.67% variation in financial crises in Pakistani market which is very low value. The output of the analysis shows in Pakistani market all financial deepening variables have an insignificant relationship with financial crises which means that financial deepening variables do not correctly predicted financial crises in Pakistan. Based on these findings we reject H2; Financial deepening has a significant influence financial crisis in emerging economies. The hypotheses also predicted that developed economies are more severely affected by financial crises as compared to the emerging economies. The output of the analysis shows a positive relationship between financial deepening and financial crises in the case of USA, however, no such relationship could be established in case of Pakistan. These findings support H3; As compared to developed economies like USA, emerging economies like Pakistan are relatively immune to financial crises which occurs as results of financial deepening.

Table 08. *Regression Analysis for USA and Pakistan*

Regression Analysis for USA Financial crisis			Regression Analysis for Pakistan Financial crisis		
Variable Name	Coefficient	Prob.	Variable Name	Coefficient	Prob.
BM2_US	0.823170	0.0527	BM2_PK	0.006321	0.9641
BM3_US	0.499936	0.0215	BM3_PK	-0.469853	0.2992
BM4_US	-0.349342	0.0208	BM4_PK	0.447330	0.4216
BM5_US	0.134577	0.6965	BM5_PK	-0.082391	0.9202
BM6_US	3.343449	0.0443	BM6_PK	-0.501004	0.3243
GDPGROWTH_US	1.436892	0.1136	GDPGROWTH_PK	-0.582450	0.5004
INF_US	0.872381	0.0031	INF_PK,2	-0.138437	0.7963
C	-39.71101	0.0962	C	3.818735	0.1786
R-squared	0.624396			0.266742	
Adjusted R-squared	0.405293			0.246538	
Durbin-Watson stat	2.127520			2.202595	
F-statistic	2.849787			0.519681	

Prob (F-statistic)	0.043470	0.031264

Discussion

The origination of the GFC 2008-09 from a developed economy brought the attention of the researcher community towards the limits of financial development of which financial deepening is an important aspect. Several studies, both empirical and theoretical, have strived to study a relationship among financial crisis and factors such as excessive risk-taking, predatory lending, and financial innovation and complexity etc. However, no definite reasons could be found to explain financial crises and there is still a need to figure out the factors that may prompt the financial crises. Thus, this study empirically tests whether financial deepening is anyway related to the occurrences of financial crises especially for Pakistan and USA.

The findings of this study confirm that financial deepening have a significant influence on financial crises in case of USA, however, no such relationship could be established for of Pakistan. The results of the study indicate that financial deepening has a significant positive impact on financial crises in context of USA, meaning that, in developed country financial deepening is high which lead towards financial crises. These findings are consistent with Williams, (2019), who argue convincingly, when financial deepening becomes excessively large it will generate inefficient resource allocation, which in turn adversely affect economic growth, as a results financial crises exist in the economy. According to Shah and Bhutta (2014) when financial development is over emphasized which triggers and enhances demand of financial sector and leads to financial crisis through automatic reaction of financial system (Robinson, 1952).

The results of the study also indicate that financial deepening has a insignificant impact on financial crises in context of Pakistan, meaning that, in developing country financial deepening is not related to the occurrences of financial crises. These findings are consistent with research By Alrabadi and Kharabsheh, (2016), who assert that financial deepening encourages higher investment, and faster growth. For developing countries where the level of financial deepening is lower, it has a positive effect on financial development. Over all the results of suggested that as compared to developed economies like USA, emerging economies like Pakistan are relatively immune to financial crises which occur as results of financial deepening.

Conclusion

The purpose of this article is to explore the causal linkages between financial deepening and financial crisis in the context of developed and developing economies. To achieve this research objective, annual data ranging from 1997 to 2016 were used in this study for analysis purpose. The collected data were analyzed using E-Views software and the hypotheses were tested using the regression model. The results register a positive relationship between financial deepening and financial crises in the case of USA, however, no such relationship could be established for of Pakistan. Empirical testing of the idea that too much financial deepening is detrimental for economic growth and ultimately triggers financial crisis is the significant contribution of the study. These findings imply that there could be a limit to the level of financial deepening. The countries where financial deepening is high may experience financial crisis. However, for developing countries where the level of financial deepening is lower, it has a positive effect on financial development. The results of the analysis suggested that as compared to developed economies like USA, emerging economies like Pakistan are relatively immune to financial crises which occurs as results of financial deepening. This study provides awareness and understanding regarding the relationship among financial deepening and financial crisis in context of developing (Pakistan) and developed (United State of America) economies, which could be very useful for regulators, scholars, financial planner, a financial advisor in an investment firm, and corporate finance managers. Financial deepening leads to economic growth, however, excessively high financial deepening may leads to financial crises. Moreover, it provides policy reforms for developed and developing economies, in order to achieve sustainable development.

Directions for Future Research

Further study can be conducted by including corporate governance as a moderating variable. It may also be helpful if a study were carried out that covers data from three different markets, such as one from a developed country, a second from a developing country and the third from not so developed an economy. Such a comparative study could prove to be a meaningful addition to the body of knowledge on financial crises.

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