The Growth and Employment Impacts of the 2008 Global Financial Crisis on Pakistan

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Abstract

This study examines the impact of the 2008 global financial crisis on economic growth and employment in Pakistan. We conduct a time series analysis of quarterly data for 1997–2011, applying the autoregressive distributed lag bounds-testing approach and an unrestricted error correction model. Our analysis suggests that the impact of the crisis was transmitted primarily through two channels—the financial sector and trade—with a corresponding negative effect on economic growth and employment. Of the two channels, the magnitude of the trade effect is larger than that of the financial sector.

Keywords: Financial crisis, financial stress, economic growth, cointegration.

JEL classification: C51, C43, O4, O16.

1. Introduction

The global financial crisis of 2008, caused by a liquidity shortfall in the US banking system, permeated quickly into other advanced economies, given the increasing interdependence of global financial markets. Its ripple effect ultimately filtered through into developing countries' financial markets. The crisis also had significant effects on the real global economy, accounting for its worst economic performance since the Great Depression: world output growth declined from 5.2 percent in 2007 to –0.6 percent in 2009 (Malik & Janjua, 2011). However, the impact of this global credit crunch has varied from region to region and even from country to country, depending on the degree of financial and economic integration.

At the time of the global financial crisis in 2008, Pakistan's current account balance had deteriorated,[1] while poor law and order combined with severe energy shortages had caused a sharp decline in investment.

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[1] From –0.4 percent of GDP in 2006 to –0.8 percent of GDP in 2008 (World Bank, 2010a).

This two-pronged effect adversely inflated the terms of trade and worsened the country's overall macroeconomic balance. Pakistan attempted to overcome these challenges by adjusting domestic fuel prices, reducing development spending, and tightening its monetary policy. With the emergence of the global financial crisis, there was a significant decline in foreign capital inflows, further hindering domestic investment. This reduced stock prices as well as foreign reserves, causing the exchange rate to depreciate. Meanwhile, the crisis triggered a significant setback to the real global economy and a reduction in global demand, both of which had severe consequences for Pakistan's economy. The fall in domestic demand as well as in the demand for exports adversely affected the manufacturing, agriculture, construction, and IT sectors.

The aim of this study is to show how these proximate effects were transmitted to the economy in terms of overall economic growth and employment. Our approach differs from that of other studies in at least two respects. First, rather than examining the implications of the crisis in a comparative setting—thereby ignoring the individual characteristics of different economies—we analyze the dynamic effects of the crisis on Pakistan's economy. Second, we employ a more comprehensive approach than most other studies have done.

The rest of the study is organized as follows. Section 2 briefly reviews the literature on the recent financial crisis. We focus not only on studies that explore the implications of the crisis for Pakistan's economy, but also on those relevant to other economies. Section 3 explores the major channels of transmission through which the global financial crisis affected Pakistan. Section 4 presents the estimation methodology, constructs the relevant variables, and describes the data used. Section 5 discusses the empirical findings of the analysis and Section 6 concludes the paper.

2.   A Review of the Literature

The 2008 financial crisis has had serious implications for development goals and spurred considerable academic and policy research on the channels and consequences of the crisis. This section divides the existing literature into two categories: descriptive and empirical.

2.1. *Descriptive Analysis of the Impact of the Financial Crisis*

Characterized by high unemployment rates and the incidence of poverty, South Asia has been particularly vulnerable to international

shocks. The World Bank (2009) reports that the region's real GDP growth rate decreased from 8.7 percent in 2007 to 6 percent in 2009. The study attributes this slowdown to the reduction in South Asian exports triggered by the financial crisis. However, the overall impact of the crisis was less severe than it might have been for two reasons. First, the South Asian economies are relatively closed. [2] Second, there was a corresponding decrease in global food and fuel prices, which partly mitigated the negative effects of the crisis.

The overall impact was different for different countries, depending on the fundamentals of the individual economy. Countries that entered the crisis with large external and internal imbalances (Pakistan, Sri Lanka, the Maldives) suffered the sharpest decline in economic growth. In contrast, India, Bangladesh, and Bhutan remained relatively secure due to their stronger macroeconomic indicators at the time. Additionally, while the crisis had an adverse impact on the inflow of remittances to other developing countries (World Bank, 2009),[3] its effect on South Asia was modest: remittances to the region contracted by 1.8 percent in 2009 compared to 7.5 percent in other developing countries.

The Asian Development Bank (2010) finds that both trade and remittances were badly affected by the crisis. In particular, exports from South Asia to the G7 countries fell sharply.[4] The International Monetary Fund (IMF) (2009) concludes that 26 low-income countries (LICs) were most vulnerable to the 2008 financial crisis; in most cases, the trade channel was primarily responsible for transferring the effects of the crisis.[5] Other factors that augmented its impact were the adverse effects on remittances, foreign direct investment (FDI), and the downturn in aid flows.

In addition to regional analyses, several studies have looked at the implications of the global financial crisis for individual countries. Amjad and Din (2010) characterize the implications of the crisis for Pakistan and suggest that regional cooperation bodies such as SAARC could prove to be the most effective forums for dealing with such external shocks. In a similar study, Mukherjee and Pratap (2010) identify three channels—the financial sector, trade, and the exchange rate—through which the crisis entered the Indian economy. These adverse effects translated into higher

[2] For instance, in South Asia, the share of private capital inflow in GDP is smaller than in other economies.
[3] Remittances declined due to the fall in global economic activity and the rise in unemployment in migrant host countries.
[4] The study finds that India's exports of gems/jewelry were seriously affected by the crisis.
[5] The demand for LIC exports declined significantly as a result of the crisis.

unemployment in India: for instance, some 300,000 workers lost their jobs in the gems and jewelry industry alone. In a sector- and state-wise analysis for India, Debroy (2009) concludes that agriculture and manufacturing were badly affected by the crisis: unemployment rates rose in both sectors while states such as Andhra Pradesh, Goa, Gujarat, Haryana, Karnataka, Maharashtra, Punjab, Tamil Nadu, and Uttar Pradesh were hit hardest.

In relation to the crisis, Ghosh (2010) argues that poor and small cultivators in India were seriously affected by the associated volatility in prices of agricultural outputs, declining bank credit, and reduced government subsidies for fertilizers. Moreover, the large decline in exports of textiles and garments, gems and jewelry, and metal products limited employment opportunities and reduced the wages of migrant workers. The decline in employment opportunities, coupled with the rising cost of food items, had severe implications for the consumption of goods and services, in particular for low-income groups in India.

2.2. *Empirical Analysis of the Impact of the Financial Crisis*

Most empirical studies on the global financial crisis find that it was responsible for retarding economic performance. Cevik, Dibooglu, and Kenc (2013), for instance, conclude that Turkey's financial stress index (FSI) was negatively and significantly related to the country's GDP growth, thereby demonstrating the negative consequences of the crisis.[6] Duttagupta and Barrera (2010) use a Bayesian vector autoregressive model to analyze the crisis and find that it had a negative and significant effect on Canada's GDP growth.[7]

Draz (2011) uses a time series dataset for the period 1950–2010 to compare the impact of the financial crisis on Pakistan and China. Applying the Chow Break Point test, he finds that the effect on China was larger than that on Pakistan, given that China is relatively more integrated with the world economy. In a similar study, Otobe (2011) compares the implications of the crisis for employment vulnerability in Cambodia and Mauritius. The study concludes that workers affiliated with the export sector were severely affected by the slowdown of the global economy, while female employment in particular became more vulnerable than male employment.

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[6] The FSI measures stress in the securities market, foreign exchange sector, and banking sector.
[7] See also Estevão and Tsounta (2010) who find that the estimated decline in Canada's growth rate was about one percentage point – primarily a result of the sharp decline in capital accumulation.

Among the empirical studies that have employed panel datasets, Moriyama (2010) uses quarterly data for 2001–09 to examine the impact of the financial crisis on six countries.[8] The study finds that the crisis had an adverse impact on exports, remittances, and capital inflows in the sample countries, as a result of which their growth rates fell. Malik and Janjua (2011) analyze cross-country data for three South Asian countries— Bangladesh, India, and Pakistan—using a similar technique to Moriyama (2010) to construct the FSI. Their study finds that almost half the decline in real GDP growth in these countries was caused by the global financial crisis. Both the static and dynamic analyses show that the FSI had a negative and significant effect on real GDP growth.

3.   Channels of Transmission in Pakistan

The potential sectors through which the global financial crisis was transmitted to Pakistan's economy include trade, the financial sector, and remittances. These are discussed below.

3.1. Trade Channel

International trade has been a major contributor to economic growth in Pakistan since the mid-1980s. In the early 1980s, the country replaced its inward-looking import substitution policy with an outward-oriented export promotion strategy. With the subsequent export-led growth, the domestic economy's dependence on international demand increased significantly. Until the global financial crisis, exports accounted for around 15 percent of GDP and were a major source of foreign capital. Given its importance, trade may have been one of the channels through which the financial crisis affected the real sector. As Table 1 shows, both exports and imports declined sharply in 2009, the year after the crisis.

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[8] Egypt, Jordan, Lebanon, Morocco, Pakistan, and Tunisia.

Table 1: Export and import growth performance

Year	Exports (US$ million)	Growth rate of exports	Imports (US$ million)	Growth rate of imports
2001	9,202	7.39	10,729	4.07
2002	9,135	−0.73	10,340	−3.63
2003	11,160	22.17	12,220	18.18
2004	12,313	10.33	15,592	27.59
2005	14,391	16.88	20,598	32.11
2006	16,451	14.31	28,581	38.76
2007	16,976	3.19	30,540	6.85
2008	19,052	12.23	39,966	30.86
2009	**17,688**	**−7.16**	**34,822**	**−12.87**
2010	19,290	9.06	34,710	−0.32
2011	24,810	28.62	40,414	16.43
2012	23,641	−4.71	44,912	11.13

Source: Pakistan, Ministry of Finance (2013).

Given its trade structure, Pakistan relies heavily on advanced economies as export markets.[9] As Table 2 shows, 25 percent of Pakistan's exports were to the US in 2007. However, with the financial crisis, this share declined sharply to 19 percent in 2009. Pakistan's dependence on the US and European markets is likely to have left it more vulnerable to the financial crisis, which severely affected the latter economies. Overall, the growth of exports declined from 12.2 percent in 2008 to –7.2 percent in 2009.

Table 2: Pakistan's major export markets (% share)

Country	2005	2006	2007	2008	2009	2010	2011	2012
US	23.9	25.7	24.6	19.5	18.9	17.4	16.0	14.9
UK	6.2	5.4	5.6	5.4	4.9	5.3	4.9	5.0
Germany	4.8	4.2	4.1	4.3	4.2	4.1	5.1	4.5
Hong Kong	3.9	4.1	3.9	2.7	2.1	2.2	2.0	1.7
UAE	3.3	5.6	7.5	10.9	8.2	8.9	7.3	9.7

Source: Pakistan, Ministry of Finance (2013).

Like its exports, Pakistan's imports are highly concentrated in a few countries. The US, UK, Germany, Japan, and Saudi Arabia account for over 40 percent of Pakistan's total imports. Pakistan's imports from the US also declined sharply after the financial crisis (Table 3).

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[9] Pakistan's trade with developing countries, especially within South Asia, is very limited and the US, UK, Germany, and UAE remain major markets for Pakistani exports.

Table 3: Pakistan's major import markets (% share)

Country	2005	2006	2007	2008	2009	2010	2011	2012
US	7.6	5.8	7.5	6.1	5.4	4.6	4.5	3.3
UK	2.6	2.8	2.3	1.9	2.6	1.6	1.2	1.3
Germany	4.4	4.7	3.9	3.2	3.8	3.4	2.3	2.5
Japan	7.0	5.6	5.7	4.6	3.6	4.4	4.1	4.3
Saudi Arabia	12.0	11.2	11.4	13.4	12.3	9.7	11.3	11.2

Source: Pakistan, Ministry of Finance (2013).

3.2. Financial Channel

As the region's second largest economy, Pakistan is relatively more integrated with the global financial system. This provides both opportunities and challenges: it may enhance growth but, at the same time, it also makes the domestic economy more vulnerable to external shocks. The risk to domestic financial systems can take three forms, i.e., the impact on volume, prices, and confidence levels.

3.2.1. Net Private Equity Flows

Equity flows comprise primarily portfolio investment and FDI. As Figure 1 shows, the equity market was severely affected by the financial crisis: equity inflows declined from a peak in 2007 to a low in 2008. Due to its poor market structure for corporate bonds, Pakistan relies on equity markets and bank financing for external capital. Figure 2 shows that the global financial crisis also had a severe impact on the bonds market, which declined continuously over 2008–2010 from its peak in 2007.

Figure 1: Portfolio investment (equity)
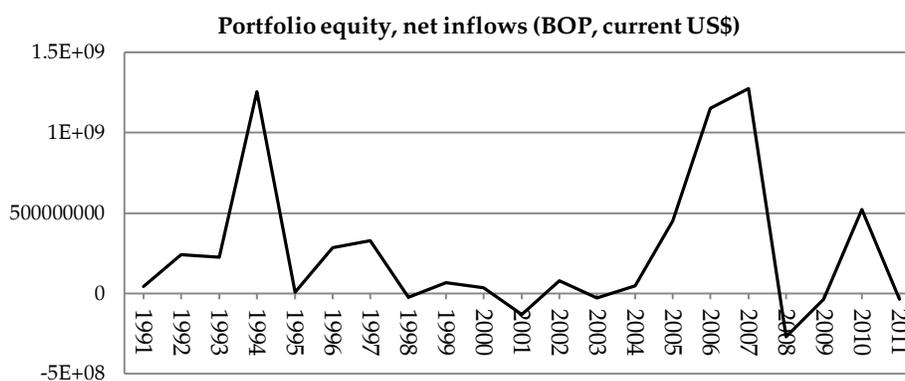
Source: World Bank, World Development Indicators.

Figure 2: Portfolio investment (bonds)

Portfolio investment, bonds (PPG + PNG), NFL (current US$)
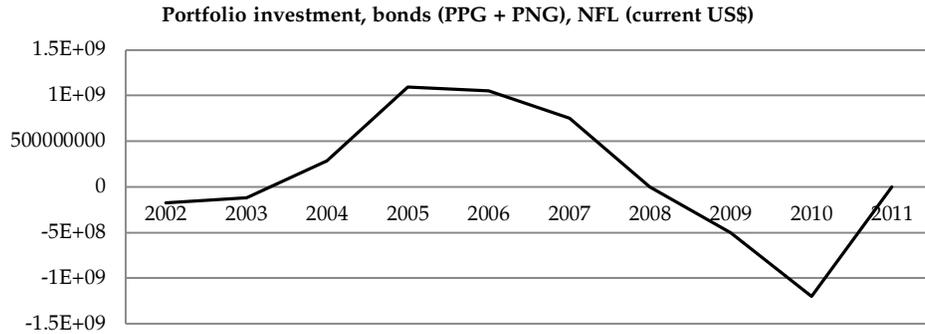
Source: World Bank, World Development Indicators.

The large withdrawal of funds by foreign portfolio investors, coupled with the higher demand for foreign exchange among Pakistani entrepreneurs, put immense pressure on the Pakistani rupee, leading to devaluation. The exchange rate appreciated from US$ 60.6 in 2007 to US$ 78.5 in 2009 (Figure 3). The rupee depreciation made external borrowing more expensive, with severe implications for Pakistan's corporate sector, which relies heavily on external capital.

Figure 3: Exchange rate to the US$ (annual average)
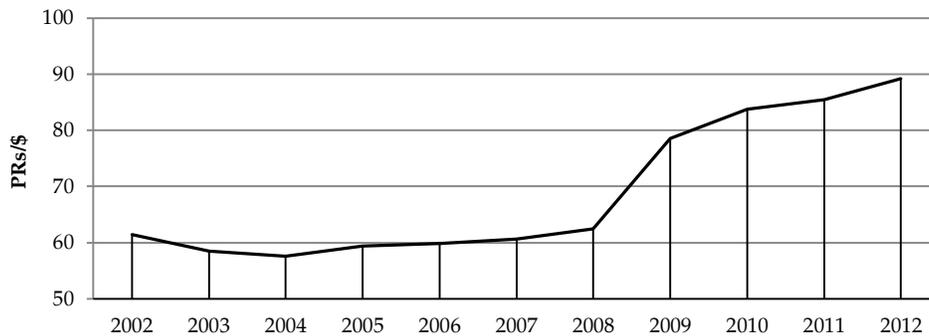
Source: Pakistan, Ministry of Finance (2013).

3.2.2.   FDI

Although FDI inflows to Pakistan increased significantly (from US$ 2,157 million in 2005 to US $5,492 million in 2007) as a result of economic liberalization and privatization, they declined in 2009 following the financial crisis and global economic slowdown. This, in turn, had severe implications for employment generation and technological diffusion.

Figure 4: Net FDI

FDI, net (BOP, current US$ million)
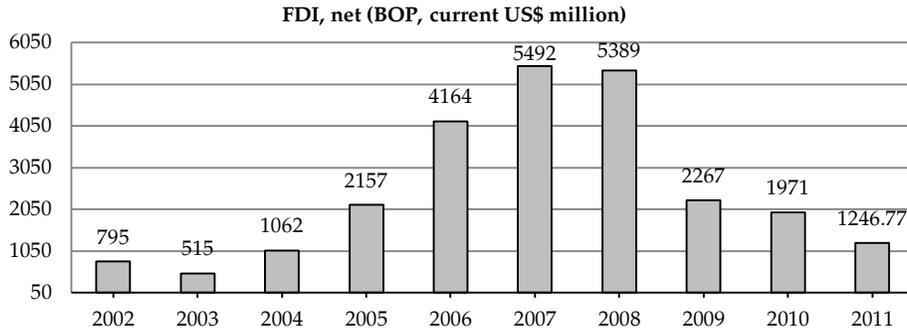
Source: World Bank, World Development Indicators.

3.3. *Remittances*

Remittances are a key source of foreign exchange earnings in Pakistan and have bolstered its economic development for many years. Remittances have grown steadily since 2007 (Figure 5), given that most of Pakistan's migrant workers are based in the Middle East and were not as affected by the crisis as migrant workers in the US, European Union, and Canada.

Figure 5: Workers' remittances, receipts (BOP, current, US$ million)
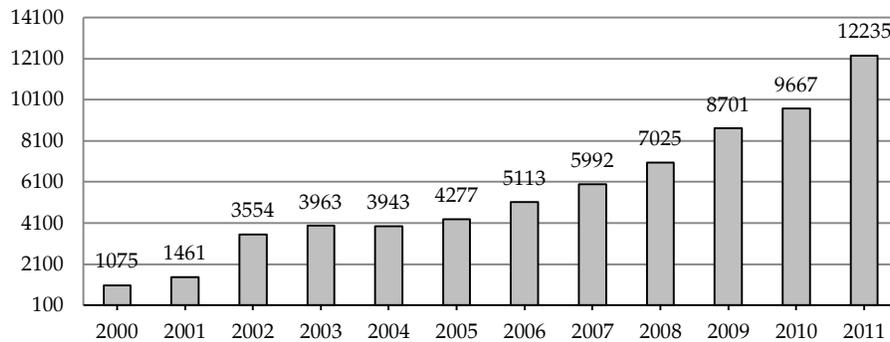
Source: World Bank, World Development Indicators.

4. Methodology

This section provides a theoretical framework for the study, describes the data used, and explains how the variables are constructed and the model estimated. As stated earlier, the 2008 global financial crisis led to a significant reduction in global aggregate demand with adverse consequences for aggregate demand in Pakistan. In order to determine the

aggregate impact on GDP, we analyze the trends in the components of aggregate demand for different years, i.e. before, during, and after the crisis. This will enable us to estimate the impact of the crisis on unemployment by estimating the employment growth elasticity.

In the standard economic theory of national income, aggregate demand is given as follows:

$$Y = C + I + G + NX \qquad (1)$$

where Y is the national income, C is consumption expenditure, I is total investment, G is government expenditure, and NX is net exports. Given its weak production base and small export volumes, Pakistan's domestic component of aggregate demand is much higher than the external component. According to the International Labour Organization (2009), household consumption in Pakistan is five times larger than its exports. Consumption expenditure decreased on two fronts as a result of the financial crisis: (i) the fall in output resulted in a reduction in employment, and (ii) Pakistan experienced a reduction in exports. Both these had adverse consequences for household purchasing power. The corresponding increase in inflation also reduced consumption. Collectively, total private consumption expenditure declined by about 11.3 percent in 2008/09 (Malik & Janjua, 2011).

The other main components of aggregate demand are gross fixed capital formation and government expenditure.[10] Growth in gross capital formation fell sharply from 36.1 percent in 2005/06 to 15.7 percent in 2006/07, rising negligibly to 0.7 percent in 2009/10. However, government final consumption expenditure rose consistently during the crisis period. Growth in external demand (net exports) declined sharply during this time and was reflected in the lower productivity of Pakistan's export-led industries in particular and overall industrial production in general.

Following the IMF (2009) and Malik and Janjua (2011), we estimate the baseline model below to investigate the impact of the financial crisis on growth and unemployment in Pakistan:

$$Y_t = \beta_0 + \beta_1 FSI_t + \beta_2 EXP_t + \beta_3 X_t + \varepsilon_t \qquad (2)$$

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[10] Gross capital formation and government expenditure account for 22 and 12 percent of aggregate demand, respectively, in Pakistan (World Bank, 2010a).

where Y_t is real GDP at time t; FSI_t captures financial stress in the foreign exchange market, stock market, and banking sector;[11] EXP_t denotes the exports-to-GDP ratio and captures the impact of the financial crisis through the trade channel; X_t is the vector of control variables; and ε_t denotes the error term. Our first step is to estimate the impact of the crisis on GDP growth and use the elasticity of growth and unemployment to predict the impact of the financial crisis on unemployment.

Although the data used is drawn from official secondary sources, we construct most of the variables (indexes) in this analysis ourselves. A detailed definition of these variables and the methodology used in constructing them is presented below. The quarterly data spans 1997–2011 and was taken from the State Bank of Pakistan, the World Bank, and the International Financial Statistics database. GDP growth remains the dependent variable throughout the analysis. In order to calculate quarterly GDP estimates, we use the techniques given by Kemal and Arby (2004).[12] We also use the consumer price index and the world price index on the basis of 2005. The FSI is measured using the methodology proposed by Malik and Janjua (2011).

In order to estimate equation 2, we use the bounds testing approach proposed by Pesaran, Shin, and Smith (2001), which is based on the unrestricted error correction model (UECM). This autoregressive distributed lag (ARDL) cointegration approach has some key advantages over those suggested by Engle and Granger (1987), Johansen (1988), and Johansen and Juselius (1990). First, it resolves the endogeneity problem associated with Engle and Granger (1987) and Johansen (1988). Second, it enables us to estimate both the long- and short-run parameters simultaneously. Third, unlike Pesaran et al. (2001), most other cointegration approaches require the variables to be integrated of the same order. Finally, this approach is also feasible when the sample size is small.[13] The long-run cointegration equation for GDP is defined as

$$LY_t = \beta_0 + \beta_1 LFSI_t + \beta_2 LEXP_t + \beta_3 LCPI_t + \beta_4 LOP_t + \varepsilon_t \qquad (3)$$

Before carrying out a formal cointegration analysis, we need to check the stationary properties of the data. Table 4 summarizes the results

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[11] See Appendix for the construction of the FSI.

[12] These estimates are derived from an annual data series, using econometric and statistical techniques that follow the basic framework of Chow and Lin (1971), Litterman (1983), and Kemal and Arby (2004).

[13] Given the small number of observations, we employ the Pesaran et al. (2000) methodology as the most relevant technique for estimation.

of the unit root test. Based on the criteria of the augmented Dickey-Fuller (ADF) test, all the variables are integrated of order 1, except for the exports-to-GDP ratio, which is integrated of order 0.

Table 4: Results of ADF test

Variable	Level	First difference
GDP_t	0.224	−3.123
	(0.971)	(0.030)
CPI_t	4.077	4.077
	(1.000)	(0.000)
OP_t	1.758	−7.127
	(0.084)	(0.000)
EXP_t	−2.963	−
	(0.044)	
FSI_t	−1.579	−6.793
	(0.199)	(0.000)

Source: Authors' calculations.

The next step is to estimate the coefficients of the long-run cointegrating association and the UECM. The cointegration relationship for the aggregate demand function is estimated using the UECM as follows:

$$\Delta LY_t = \beta_0 + \sum_{i=0}^{n} \beta_{1i}\, \Delta LFSI_{t-i} + \sum_{i=0}^{n} \beta_{2i}\, \Delta LEXP_{t-i} + \sum_{i=0}^{n} \beta_{3i}\, \Delta LCPI_{t-i}$$

$$+ \sum_{i=0}^{n} \beta_{4-i}\, \Delta LOP_{t-i} + \sum_{i=0}^{n} \beta_{5i}\, \Delta LY_{t-i} + \beta_6 LY_{t-1} + \beta_7 LFSI_{t-1}$$

$$+ \beta_8 LEXP_{t-1} + \beta_9 LCPI_{t-1} + \beta_{10} LOP_{t-1} + \varepsilon_t \quad 4(4)$$

where Δ denotes the first difference, L is the natural log of the corresponding variables, $t-1$ denotes the corresponding lag length, β_i represents the parameters, and ε_t is the error term.

5.   Empirical Findings

The selection of lag length is important in the ARDL cointegration approach. We use three criteria to do so: the Akaike information criterion (AIC), the Schwarz Bayesian criterion (SBC), and the Hannan-Quinn criterion (HQC). The results are shown in Table 5. The AIC recommends a lag length of four while the SBC and HQC recommend a lag length of two. Based on the latter's results, we use two lags in our error correction model (ECM).

Table 5: Selection of lag length criteria

Lag	AIC	SBC	HQC
0	–2.74	–2.56	–2.67
1	–16.63	–15.54	–16.21
2	–17.54	–15.55*	–16.77*
3	–17.58	–14.68	–16.46
4	–17.98*	–14.18	–16.51

Source: Authors' calculations.

The bounds testing approach uses the Wald test for inferences: the values of the F-statistic are compared with the lower and upper bound critical values calculated by Pesaran et al. (2001). These values are given in Table 6 for a level of significance of 1 and 5 percent. As the results indicate, the value of the F-statistic is greater than that of the critical upper limit at both 1 and 5 percent. Hence, we reject the null hypothesis of no cointegration. Alternatively, there may exist a long-run relationship among the variables under analysis.

Table 6: Bounds test for cointegration analysis

Computed F-statistic = 16.7150		
Critical bound	**Lower bound**	**Upper bound**
Critical bound value at 1%	4.08	5.26
Critical bound value at 5%	2.97	3.92

Note: Computed, critical bound values obtained from Narayan (2005).

Having selected the prescribed lag length, we then estimate equation 4, applying the criterion of the general to specific method to determine if there is a significant relationship between the dependent variable and the explanatory variables. To check the model's goodness of fit, we employ the relevant diagnostic tests: the Lagrange Multiplier (LM) test for autocorrelation, the White heteroskedasticity test for heteroskedasticity, the Jarque-Bera test for normality, the cumulative sum (CUSUM) and cumulative sum-squared (CUSUMSQ) tests for structural stability, and the Ramsey RESET for model misspecification. The results of these tests indicate that our estimated models fit well (see Appendix). In addition, the CUSUM and CUSUMSQ tests rule out the possibility of structural instability (see Appendix). Table 7 gives the results of the ARDL UECM.

Table 7: Results of ARDL UECM

Variable	Coefficient	P-value for t
LY_{t-1}	0.008*	0.000
$LFSI_{t-1}$	0.005*	0.004
$LEXP_{t-1}$	−0.030*	0.000
$LCPI_{t-1}$	−0.034*	0.000
LOP_{t-1}	−0.003**	0.056
R^2	0.68	
DW statistic	2.07	
Log likelihood	252.89	
F-statistic	9.89	
	(0.000)	

Source: Authors' calculations.

The following equation shows the estimated coefficients of the determinants of real GDP:

$$\hat{L}Y_t = 0.63 * LFSI_t + 3.75 * LEXP_t + 4.25 * LCPI_t + 0.38 * LOP_t \qquad (5)$$

The variable of interest, the FSI (FSI_t), has a negative coefficient (−0.63) and is statistically significant. Alternatively, this implies that an increase in financial stress has negative implications for GDP in the case of Pakistan. The transmission mechanism for this effect is that increases in the interest rate caused by financial stress decrease investment spending and, therefore, reduce aggregate demand. The relatively strong and significant growth elasticity of exports (3.75) implies that the financial crisis has affected the country's economy adversely through the exports channel. Inflation (CPI_t) also has a positive growth elasticity, which indicates that, in the long run, economic growth and inflation move in the same direction. Oil prices (OP_t) have an unexpected positive coefficient (0.38) that is statistically significant.

Overall, these findings suggest that the financial sector and trade (exports) are the main channels through which the 2008 global financial crisis was transmitted to Pakistan's economy. The long-run relationship between GDP and financial stress and exports is in accordance with the theory that an increase in financial stress and a reduction in exports will have a negative effect on GDP.

In addition to the long-run relationship, we employ an ECM to analyze the short-run dynamics (Table 8). As is evident from the table, the coefficient of error correction (ECT_{t-1}) is negative and significant,

confirming the existence of a short-run relationship between the variables under consideration. As in the long-run model, FSI_t enters the short-run model with a negative sign and is significant. In the same manner, exports have a positive and significant sign. Both these variables are in accordance with our expectation. However, unlike in the long run, the coefficient of inflation is negative and statistically significant, indicating that, in the short run, inflation has a negative impact on GDP in the case of Pakistan.

Table 8: Short-run dynamics ECM

Dependent variable = real GDP

Variable	Coefficient	P-value for t
DLY_{t-1}	1.034*	0.000
$DLFSI_{t-1}$	−0.003*	0.009
$DLEXP_{t-1}$	0.004*	0.005
$DLCPI_t$	−0.006**	0.015
$DLOP_t$	−0.008**	0.021
ECT_{t-1}	−0.801*	0.000
R^2	0.64	
DW statistic	1.88	
Log likelihood	248.18	
F-statistic	14.80	
	(0.000)	

Source: Authors' calculations.

Thus far, we have analyzed the impact of the crisis on per capita GDP growth. To investigate its effects on unemployment in Pakistan, we compute the per capita growth elasticities of the FSI and export growth. The marginal effects of the FSI and export growth are –0.475 and 0.227, respectively, and their mean values are 0.151 and 3.27, respectively. Using the marginal effects and mean values, we compute the elasticity of per capita GDP growth with respect to FSI and export growth (Table 9).

Table 9: Elasticity of per capita GDP growth with respect to FSI and export growth

	Marginal impact	Mean value (FSI)	Elasticity
FSI	−0.475	0.151	−0.072
		Mean value (export growth)	
Exports-to-GDP ratio	0.227	3.270	0.742

Source: Authors' calculations.

Next, we compute the growth elasticity of unemployment, which measures the responsiveness of unemployment to economic growth. More precisely, it is the percentage change in unemployment that results from a 1 percent change in economic growth, and is computed by dividing the average growth of real GDP per capita by the average growth rate of unemployment for the corresponding period (1997–2011). Table 10 gives the growth elasticity of unemployment with respect to per capita GDP growth. In Pakistan, a 1 percent increase in per capita GDP growth reduces unemployment growth by 0.63 percent.

Table 10: Elasticity of unemployment with respect to GDP growth

Growth rate of unemployment	Average growth of real GDP	Growth elasticity of unemployment
–6.25	3.93	–0.63

Source: Authors' calculations.

Next, we use the elasticity measures of GDP growth with respect to the FSI and export growth and the percentage change in the FSI and export growth during 2007–11 to compute the change in GDP growth that resulted from changes in the FSI and export growth during this period. Table 11 shows that, in Pakistan, the FSI increased by 31.72 percent between 2007 and 2011. Using the estimated elasticity of growth with respect to the FSI, we find that this change in the FSI reduced GDP growth by 2.22 percent. Using the estimated growth elasticity of unemployment (–0.63), we estimate that unemployment increased by 1.39 percent due to the reduction in GDP growth. Hence, the financial stress brought about by the 2008 global financial crisis increased unemployment by about 1.4 percent during 2007–11.

Table 11: Impact of financial stress on unemployment

Percentage increase in FSI between 2007 and 2011	31.72
Elasticity of per capita GDP growth with respect to FSI	–0.07
Percent reduction in per capita GDP growth due to given change in FSI	2.22
Growth elasticity of unemployment	–0.63
Percentage increase in unemployment due to predicted reduction in growth	1.39

Source: Authors' calculations.

Similarly, we compute the impact of the crisis on unemployment through the trade channel. As Table 12 shows, growth in exports declined by 9 percent during 2009–11. Using the elasticity of per capita GDP growth with respect to the growth in exports (0.74) and the percentage reduction in export growth between 2007 and 2011 (0.09), we compute the change in growth of per capita GDP resulting from the change in export growth during this period (6.6 percent). Next, by employing the value of the growth elasticity of unemployment (–0.63), we find that a reduction in per capita GDP growth increases unemployment by 4.19 percent This increase in unemployment is estimated to occur solely as a result of the reduction in export growth.

The predicted impact of the trade channel on unemployment is twice as large as the impact of the financial sector. This implies that the impact of the global financial crisis was transmitted to Pakistan's economy primarily through international trade (exports), in turn affecting growth and unemployment.

Table 12: Impact of reduction in export growth on unemployment

Percentage reduction in export growth between 2007 and 2011	9.00
Elasticity of per capita GDP growth with respect to export growth	0.74
Percent reduction in growth of per capita GDP due to estimated reduction in export growth	6.60
Growth elasticity of unemployment	–0.63
Percentage increase in unemployment due to estimated reduction in growth of GDP	4.19

Source: Authors' calculations.

Both the financial sector and trade are the key channels through which the crisis affected Pakistan's economy. The percentage reduction in per capita GDP growth with respect to given changes in the FSI and export growth is 2.2 and 6.6, respectively. Similarly, the aggregate impact on unemployment resulting from these two channels is 5.58 percent during 2007–11. This indicates that around 6 percent of the increase in unemployment during 2007–11 was a consequence of the global financial crisis.

6. Conclusion

This study was motivated by the recent literature on the impact of the 2008 global financial crisis. We have assessed the impact of the crisis on

economic growth and unemployment in Pakistan, using the ARDL bounds testing approach and UECM with real GDP as the dependent variable. Along with other control variables, the FSI and exports-to-GDP ratio were used to assess the impact of the crisis on GDP growth and employment through the financial and trade channels, respectively.

Our findings show that both the FSI and exports-to-GDP ratio have a significant impact on GDP in Pakistan, but that the magnitude of the trade effect is larger than that of the financial sector. Alternatively, one can argue that the financial crisis had a greater impact on the economy through exports compared with the financial sector. This is confirmed by our estimations, which suggest that both the GDP growth and unemployment elasticities are much higher in the case of the exports-to-GDP ratio than in the case of the FSI. The study finds that GDP growth declined by 8.8 percent while unemployment increased by 6 percent during 2007–11 as a consequence of the 2008 global financial crisis.

References

Alcorta, L., & Nixson, F. (2011). *The global financial crisis and the developing world: Impact on and implications for the manufacturing sector*. Vienna: United Nations Industrial Development Organization.

Ali, M. M. (2009, July). *Global financial crisis: Impact on Pakistan and policy response*. Paper presented at the Regional High-Level Workshop on Strengthening the Response to the Global Financial Crisis in Asia-Pacific, United Nations Economic and Social Commission for Asia and the Pacific, Dhaka.

Amba, D. A. (2011). An evaluation of the impact of the global financial crisis on Nigerian fiscal federalism. *International Research Journal of Finance and Economics*, *66*, 8–21.

Amjad, R., & Din, M. (2010). *Economic and social impact of global financial crisis: Implications for macroeconomic and development policies in South Asia* (Monograph Series 2010: 2). Islamabad: Pakistan Institute of Development Economics.

Andrews, D. W. K. (1993). Tests for parameter instability and structural change with unknown change point. *Econometrica*, *61*(4), 821–856.

Angeloni, I., Kashyap, A., & Mojon, B. (Eds.). (2003). *Monetary policy transmission in the euro area*. Cambridge: Cambridge University Press.

Anyanwu, O. J. (2011). The impact of the global financial crisis on sub-Saharan Africa. *Pepperdine Policy Review*, *4*, 55–63.

Artis, M. J., & Zhang, W. (2001). Core and periphery in EMU: A cluster analysis. *Economic Issues*, *6*(2), 39–59.

Ashraf, M., Kayani, J., & Rafiq, K. (2012). An investigation into the global financial crisis factors and a snapshot of their impact on different segments of economy in a developing country: A case of Pakistan. *International Journal of Academic Research in Business and Social Sciences*, *2*(9), 384–391.

Asian Development Bank. (2010). *Asian development outlook 2010: Macroeconomic management beyond the crisis*. Manila: Author.

Azam, M. (2011). Exports and economic growth in Pakistan: An empirical analysis. *Journal of Managerial Sciences*, *5*(2), 159–166.

Battistella, G., & Asis, M. M. B. (1998). *The crisis and migration in Asia*. Quezon City: Scalabrini Migration Center.

Bernal-Verdugo, L. E., Furceri, D., & Guillaume, D. M. (2012). *Crises, labor market policy, and unemployment* (Working Paper No. 12/65). Washington, DC: International Monetary Fund.

Betcherman, G., & Islam, R. (Eds.). (2001). *East Asian labor markets and the economic crisis: Impacts, responses and lessons*. Washington, DC: World Bank.

Bordo, M., Cavallo, A., & Meissner, C. M. (2007). *Sudden stops: Determinants and output effects in the first era of globalization, 1880–1913* (Working Paper No. 13489). Cambridge, MA: National Bureau of Economic Research.

Bordo, M., Eichengreen, B., Klingebiel, D., & Martinez-Peria, M. S. (2001). Is the crisis problem growing more severe? *Economic Policy*, *32*, 51–75.

Cazes, S., Verick, S., & Al Hussami, F. (2011). *Diverging trends in unemployment in the United States and Europe: Evidence from Okun's law and the global financial crisis* (Employment Working Paper No. 106). Geneva: International Labour Office.

Cerra, V., & Saxena, S. (2008). Growth dynamics: The myth of economic recovery. *American Economic Review*, *98*(1), 439–457.

Cevik, E. I., Dibooglu, S., & Kenc, T. (2013). Measuring financial stress in Turkey. *Journal of Policy Modeling*, *35*(2), 370–383.

Choudhry, M. T., Marelli, E., & Signorelli, M. (2010, March). *Financial crises and labor market performance*. Paper presented at the 69th International Atlantic Economic Conference, Prague.

Chow, G. C., & Lin, A. (1971). Best linear unbiased interpolation, distribution, and extrapolation of time series by related series. *Review of Economics and Statistics*, *53*(4), 372–375.

Dang, H.-A., Knack, S., & Rogers, H. (2009). *International aid and financial crises in donor countries* (Policy Research Working Paper No. 5162). Washington, DC: World Bank.

Debroy, B. (2009). Growth downturn and its effects. In R. Kumar, B. Debroy, J. Ghosh, V. Mahajan, & K. S. Prabhu (Eds.), *Global financial crisis: Impact on India's poor* (pp. 14–24). New Delhi: United Nations Development Programme.

Draz, U. M. (2011). Impact of financial crises on Pakistan and China: A comparative study of six decades. *Journal of Global Business and Economics*, *3*(1), 174–186.

Duttagupta, R., & Barrera, N. (2010). *The impact of the global crisis on Canada: What do macro-financial linkages tell us?* (Working Paper No. 10/5). Washington, DC: International Monetary Fund.

Engle, R. F., & Granger, C. W. J. (1987). Co-integration and error correction: Representation, estimation, and testing. *Econometrica*, *55*(2), 251–276.

Estevão, M., & Tsounta, E. (2010). *Canada's potential growth: Another victim of the crisis?* (Working Paper No. 10/13). Washington, DC: International Monetary Fund.

Foxley, A. (2009). *Recovery: The global financial crisis and middle-income countries*. Washington, DC: Carnegie Endowment for International Peace.

Ghosh, J. (2010). *Poverty reduction in China and India: Policy implications of recent trends* (Working Paper No. 92). New York, NY: United Nations Department of Economic and Social Affairs.

Goldstein, M., & Xie, D. (2009). *The impact of the financial crisis on emerging Asia* (Working Paper No. 09/11). Washington, DC: Peterson Institute for International Economics.

Green, D., King, R., & Miller-Dawkins, M. (2010). *The global economic crisis and developing countries: Impact and response*. Oxford: Oxfam International.

Hui, W.-T. (1998). The regional economic crisis and Singapore: Implications for labor migration. *Asian and Pacific Migration Journal*, *7*(3), 187–218.

International Labour Organization. (2009). *The fallout in Asia: Assessing labor market impacts and national policy responses to the global financial crisis*. Bangkok: ILO Regional Office for Asia and the Pacific.

International Monetary Fund. (2009). *World economic outlook: Crisis and recovery*. Washington, DC: Author.

Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of Economic Dynamics and Control*, *12*(2–3), 231–254.

Johansen, S., & Juselius, K. (1990). The maximum likelihood estimation and inference on co-integration – with applications to the demand for money. *Oxford Bulletin of Economics and Statistics*, *52*(2), 169–210.

Jones, G. W., Hull, T. H., & Ahlburg, D. (2000). The social and demographic impact of the Southeast Asian crisis of 1997–99. *Journal of Population Research*, *17*(1), 39–62.

Junankar, P. N. R. (2011). *The global economic crisis: Long-term unemployment in the OECD* (Discussion Paper No. 6057). Bonn: Institute for the Study of Labor.

Kemal, A. R., & Arby, M. F. (2004). *Quarterization of annual GDP of Pakistan* (Statistical Paper No. 5). Islamabad: Pakistan Institute of Development Economics.

Litterman, R. B. (1983). A random walk, Markov model for the distribution of time series. *Journal of Business and Economic Statistics*, *1*(2), 169–173.

Malik. S. M., & Janjua, Y. (2011). *Growth, employment and poverty in current financial crisis in India, Pakistan and Bangladesh* (Working Paper No. 11-07). Dhaka: South Asia Network of Economic Research Institutes.

Moriyama, K. (2010). *The spillover effects of the global crisis on economic activity in MENA emerging market countries: An analysis using the financial stress index* (Working Paper No. 10/8). Washington, DC: International Monetary Fund.

Mukherjee, M., & Pratap, K. V. (Eds.). (2010). *The impact of the global financial crisis on investments in the electric power sector: The experience of India, Pakistan, and Bangladesh*. Washington, DC: World Bank and Energy Sector Management Assistance Program.

Murshid, K. A. S., Zohir, S. C., Ahmed, M., Zabid, I., & Mehdi, A. T. M. S. (2009). *The global financial crisis implications for Bangladesh* (Working Paper No. 1). Dhaka: Bangladesh Institute of Development Studies.

Narayan, P. K. (2005). The saving and investment nexus for China: Evidence from cointegration tests. *Applied Economics*, *37*, 1979–1990.

Narayan, S., & Narayan, P. K. (2005). An empirical analysis of Fiji's import demand function. *Journal of Economic Studies*, *32*(2), 158–168.

Ng, S.-H., & Lee, G. O. M. (1998). Hong Kong labor market in the aftermath of the crisis: Implications for foreign workers. *Asian and Pacific Migration Journal*, *7*(2–3), 171–186.

Ngowi, H. P. (2010). The current global economic crisis and its impacts in Tanzania. *African Journal of Business Management*, *4*(8), 1468–1474.

Otobe, N. (2011). *Global economic crisis, gender and employment: The impact and policy response* (Employment Working Paper No. 74). Geneva: International Labour Office.

Oyinlola, M. A., & Babatunde, M. A. (2009). A bound testing analysis of exchange rate pass-through to aggregate import prices in Nigeria: 1980–2006. *Journal of Economic Development*, *34*(2), 97–109.

Pakistan, Ministry of Finance. (2013). *Pakistan economic survey 2012–13*. Islamabad: Author.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, *16*(3), 289–326.

Rahman, M., Moazzem, K. G., & Hossain, S. S. (2009). *Impact of the global financial and economic crisis on Bangladesh: A rapid assessment*. Dhaka: Centre for Policy Dialogue.

Signorelli, M., Choudhry, M., & Marelli, E. (2012). The impact of financial crises on female labor. *European Journal of Development Research*, 24, 413–433.

Soludo, C. C. (2009, January). *Global financial and economic crisis: How vulnerable is Nigeria?* [Presentation]. Retrieved from http://www.cenbank.org/out/speeches/2009/govadd-21-1-09.pdf

United Nations Economic and Social Council, United Nations Economic Commission for Africa, and African Union Commission. (2009). *The global financial crisis: Impact, responses and way forward*. Cairo: Authors.

Usman, M. (2010). Global financial crisis: An overview. *IPRI Journal*, *10*(1), 93–118.

Verick, S. (2009). *Who is hit hardest during a financial crisis? The vulnerability of young men and women to unemployment in an economic downturn* (Discussion Paper No. 4359). Bonn: Institute for the Study of Labor.

World Bank. (2009). *Impact of global financial crisis on South Asia*. Retrieved from http://siteresources.worldbank.org/SOUTHASIAEXT/Resources/223546-1171488994713/3455847-1232124140958/gfcsouthasiafeb172009.pdf.

World Bank. (2010a). *Global economic prospects 2010: Crisis, finance and growth*. Washington, DC: World Bank.

World Bank. (2010b). *The MDGs after the crisis: Global monitoring report 2010*. Washington, DC: Author.

World Bank. (2014). *World development indicators*. Available from http://data.worldbank.org/data-catalog/world-development-indicators

Appendix

Construction of FSI

FSI = EMPI + stock returns + stock returns volatility + banking stability

where FSI is the financial stress index and EMPI is the exchange market pressure index.

$$EMPI_t = \frac{\Delta e_t - \mu_{\Delta e}}{\sigma_{\Delta e}} - \frac{(\Delta RES_t - \mu_{\Delta RES})}{\sigma_{RES}}$$

where Δe_t is the quarter over quarter change in the nominal exchange rate relative to the US\$, ΔRES_t is the quarter over quarter change in total reserves minus gold, and μ and σ are the corresponding mean and standard deviation of the respective series.

Table A1: Diagnostic tests for long- and short-run estimates

Long-run estimates		Short-run estimates	
LM test	1.849	LM test	1.090
	(0.139)		(0.373)
Jarque-Bera test	25.408	Jarque-Bera test	15.970
	(0.251)		(0.162)
White test	0.919	White test	0.546
	(0.919)		(0.868)
Ramsey RESET	1.785	Ramsey RESET	1.561
	(0.188)		(0.217)

Note: Values in parentheses are probabilities.

Figure A1: CUSUM for UECM (stability test)
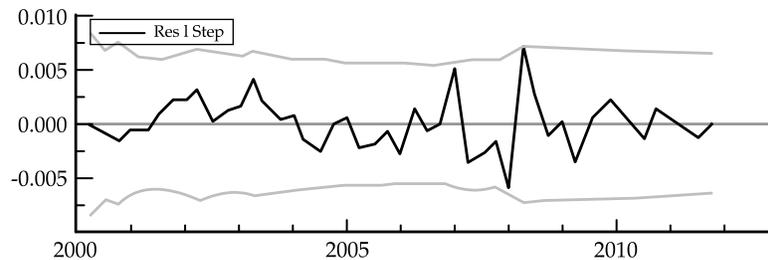
Figure A2: CUSUM of squares for UECM