Autocorrelation in economic indicators before and after Natural Disaster

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Autocorrelation in economic indicators before and after Natural Disaster

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ABSTRACT

This study investigates the autocorrelation in economic indicators of Pakistan before and after Natural disaster in the light of variables, which includes GDP (deflator), Inflation (CPI), Money supply (M2), Remittances and Net export (X-M). This study considers the data for the period of 1989-2009. In this study, data has been divided into two sets; first having a data for the period of 1989-2005 for before earthquake and second has a data for the period of 2006-2009 for after earthquake. The findings of this paper reveal that all of the major economical players of Pakistan as stated above do follow the certain upward trend for the period before natural disasters. While, after the event of natural disasters these major players have no certain trend and they move randomly.

Keywords: Autocorrelation, economic players, natural disaster, developing countries

JEL Classification: B22, D6, P43, Q01

Introduction

For an economy to be successful, it is very essential that the government plays a key role. An economy cannot be run without government intervention; even if it is a market economy the government has limited roles to play. For example, to avoid monopolies, to reduce external costs produced by the firms, and to set certain rules and legislations. However, other agents such as consumers and producers also influence the economy of the country. A successful economy is the one where GDP (economic growth) is suppose to be high with low rate of inflation, low unemployment, stable exchange rate and interest rate along with a favorable balance of payment. There are many factors that prevent an economy to achieve all successful macroeconomic objectives, which includes instable political condition, lack of civic sense, man-made and natural disasters etc.

To determine the extent to which a natural disaster can affect a country depends on the type of disaster. Destruction caused by droughts or hurricanes are likely to have more negative effects on the economic growth as compare to climatic disasters.

This paper investigates the association of statistical observations of various economic players for pre and post natural disaster periods.

Literature Review

The instability in a certain economy is due to many factors. As discussed by various authors that various economic players at times do follow the same trends because of the presence of significant autocorrelation. Moreover, an economy also observes the possible co-movements and cross-correlations of two or more trends such as a fall in the aggregate demand would mean less consumption of goods and services, leading to laying off workers. Similarly, balance of payment deficit would mean that the debt burden of the country is increasing. A lower GDP indicates a low economic growth in the country leading to reduced supply of services and goods. When fewer services and goods are produced in the country, people would be earning less that would lead to lower income levels and further fall in the living standards. There are also external factors that influence the economic position of the country such as foreign economic policies, international trade and the restrictions associated with it, policy of dumping by local or foreign traders, environmental issues such as natural calamities, disasters etc (Freeman, 2003).

International Federation of the Red Cross and Red Crescent Societies (2002) confirms that the calamities such as earthquakes, cyclones, floods, tornadoes, droughts, hurricanes and volcanic eruptions greatly influence the economy.

The outcomes of natural disasters though never been bearable but if they are predicted earlier correctly then this may help to take necessary actions to prevent great destructions. Centre for Research on the Epidemiology of Disasters [CRED] (2004) revealed that the affects of natural disasters might not be visible in the short run but in the long run the outcomes would be apparent, thus leading to economy's downfall.

Natural disasters affect both the developing as well as developed country but the way in which both the economies are affected is different. It is observed that the developing countries usually take long to get hold of the bad consequences of natural disasters and to bring up the economy back to its condition whereas the developed nations, when facing disasters are in a better position to face the consequences and hence, boost up the economy in a short period of time (Centre for Research on the Epidemiology of Disasters [CRED], 2004).

The infrastructures of the country, the roads, buildings, homes are destructed leading to economic activities being slowed down. The disasters such as floods destroy most of the agricultural region of the economy, flood washes away the crops, rich soil and harvested inventory, which shed the economy so abruptly (Noy, 2009).

In the short run the economy suffers from poor economic growth as disasters cause many businesses and firms to collapse (Skidmore & Toya, 2002).

A natural disaster leaves many outcomes behind. An example of a cyclone that occurred in the coastal areas of gulf in the US in a major center of energy production was affected which lead to a high increase in the oil prices. The productions and repairing were disrupted and since the year 2004 the global prices of energy have been steadily increasing though it is very important for the welfare of the economy to have stable energy prices. International trade is also affected by the disasters that involve trade centers. When the outflow of money is greater and inflow of money is less, then the exchange rate falls. The exchange rate makes the imports more expensive and exports cheaper. Due to expensive imports, the economy would be switching to domestic goods and services, which may be of poor quality (Raddatz, 2007).

The irreparable impact of natural disaster is loss of lives of many people i.e. man power. In the year 1976, around 255,000 people were killed in China when earthquake struck. A volcanic eruption in Colombia in the year 1985 caused massive destruction and mudflow which lead to the death of 23,000 people. In the year 1991, Bangladesh faced flood which was followed by a cyclone causing deaths of 130,000 people. Similarly in Honduras and Nicaragua, a hurricane caused a devastating effect leading to 2 million people becoming homeless and around 10, 000 dead. Later, on in the year 2004 tsunami (a tidal wave) killed almost 120,000 people in India, Indonesia, Sri Lanka and Thailand. The loss of manpower is not the only consequence of the stated calamities but it is attributed with the various eventualities such as massive destructions of infrastructures, good markets and money markets etc, which is adhered with less number of foreign and local investments resulting in the utter failures (Tol & Leek, 1999).

Fearon (2003) confirmed that the calamities of all kinds have similar aftermaths, which is the destruction and deterioration of human being along with their well beings.

Although Skidmore and Toya (2002) believed that the natural disasters paves the way for the long run growth of an economy. In contrast, Rasmussen (2004) accentuated that these natural calamities do not affect the long run growth of the economy; however, in 2004 the same author noticed that there had been a drastic fall in the economy due to destruction of natural resources. The conclusion was that there could be no accurate predictions regarding the long run consequences of natural disaster because the forecasts of growth depends how the activities of reconstruction are progressed (Tol & Leek, 1999).

Research Method

Description of Data

This study considers the data for the period of 1989-2009 for investigating the objective of the study the data is split into two series, first series contains the data for period for 1989-2005(before earthquake) and second series is confined for the period for 2006-2009(after earthquake). These two samples consisted of major economic of Pakistan, which includes GDP (deflator), Inflation (CPI), Money supply (M2), Remittances and Net export. The sample data was collected from State Bank of Pakistan and World Bank.

Econometrical test

Since the objective of the study is to find out the trends of stated economic players or whether or not the various economic players of Pakistan follow the certain trend therefore, the autocorrelation is checked through deploying the Box-Ljung Statistic to investigate the presence/absence of possible trends of stated players.

Findings and Results

Table 1:

Auto correlations For all possible lags	Box-Ljung Statistic for GDP deflator		Box-Ljung Statistic for CPI		Box-Ljung Statistic for X-M		Box-Ljung Statistic for Remittances		Box-Ljung Statistic for M2	
	Value	Sig	Value	Sig	Value	Sig	Value	Sig	Value	Sig
Before Natural Disaster	39.427	.000	21.170	.000	31.159	.000	5.836	.016	34.759	.000
	72.131	.000	24.950	.000	54.504	.000	7.482	.024	61.042	.000
	98.518	.000	25.048	.000	72.424	.000	9.806	.020	81.176	.000
	118.687	.000	25.133	.000	85.689	.000	10.334	.035	96.853	.000
	133.511	.000	26.303	.000	95.783	.000	11.624	.040	108.904	.000
	144.974	.000	26.471	.000	103.385	.000	13.812	.032	118.053	.000
	153.430	.000	26.471	.000	108.519	.000	13.858	.054	124.428	.000
	159.365	.000	26.792	.001	111.764	.000	15.181	.056	128.422	.000
	163.431	.000	29.124	.001	113.517	.000	16.309	.061	130.828	.000
	166.002	.000	32.675	.000	114.283	.000	16.311	.091	132.201	.000
After Natural Disaster	1.016	.313	.032	.859	.428	.513	.484	.487	-.010	.577
	1.145	.564	.797	.671	.452	.798	1.485	.476	-.013	.570
	3.276	.351	1.978	.577	1.486	.686	2.511	.473	-.019	.504

The findings of this paper as shown in table 1, reveal that all of the major economical players of Pakistan which include GDP deflator, CPI, Net export, Remittances and Money supply (M2) have significant autocorrelations for all first 10 lags (periods) which implies that all of the stated players do follow the certain upward trend with consistency for the period of before natural disasters. While, there is no significant autocorrelation found for all these stated players for the periods after the natural disasters implies that for after the event of natural disasters these major players have no certain trend and they move randomly.

Discussion and Conclusion

Natural disasters occurrence in Pakistan has been investigated and found dominant through one aspect. There is a positive shift of the economic indicators before the natural disasters but when the calamity takes place then there is no specific movement of these players. It is extremely important for a country like Pakistan, which is undergoing political, religious, environmental, technological and economical conflicts to decipher the pros and cons of past calamities and prepare for the future ones.

Indeed, a natural disaster event at a glance disrupts all the major socio-economic players, which directly and indirectly absurd the life of the common man and the society as the whole.

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