

# **Analysis of Growth Rates in Different Regimes of Pakistan: Distribution and Forecasting**

Anwar Hussain\* & Naila Nazir\*\*

## **Abstract**

*The present study aims to analyze the growth rate distribution pattern in different regimes of Pakistan and also forecasts the growth rates of agricultural, industrial, services and GDP growth rates in Pakistan. The study uses secondary data ranging from 1956 to 2011. The data from 1956 to 2000 has been obtained from State Bank of Pakistan and from 2001 to 2011 from Economic Survey of Pakistan. For the analysis of the regime-wise distribution of growth rates, the Gini-coefficient and Lorenz curve are used. While for forecasting the growth rates, moving average forecast and exponential smoothing method have been used. The findings revealed that the Gini-coefficients for agriculture, industrial, services and GDP growth rates were 0.161453, 0.214199, 0.147940 and 0.112955. The Lorenz curve also suggests equality between selected growth rates regime-wise. The moving average forecasts for agriculture, industrial, services sector and GDP growth rates in the year 2012 is 1.7%, 2.7%, 2.9% and 3.1% respectively for the year 2012. According to the exponential smoothing method these growth rates in the year 2012 are projected to be 1.9%, 3.1%, 3.8% and 3.3% respectively. Looking over the growth distribution pattern, there is a need to take revolutionary steps and big push to boost the macroeconomic variables performance in Pakistan. Based on the forecasting results, the services sector may decline in next year, which needs to be focused on.*

**Key words:** Growth Rates, Distribution, Lorenz Curve, Gini-coefficient, Forecasting, Moving Average, Exponential Smoothing.

## **Introduction**

Looking over the history of Pakistan, the pattern of regime seems uniform and no severe attempt was made to boost economic growth outstanding. The average GDP growth rate in Iskandar Mirza was 3.0, while the services, agriculture and industrial growth rates were 2.6, 2.1 and 7.33 respectively. The average GDP growth rate in Muhammad

---

\* Dr. Anwar Hussain Research Economist, Pakistan Institute of Development Economics (PIDE), Islamabad. Email: anwar@pide.org.pk

\*\* Dr. Naila Nazir Assistant Professor, Department of Economics, University of Peshawar

Ayub Khan was 5.79, while the services, agriculture and industrial growth rates were 6.27, 4.1 and 9.14 respectively. The average GDP growth rate in Yahya Khan regime was 5.83, while the services, agriculture and industrial growth rates were 5.066, 3.633 and 11.233 respectively. The average GDP growth rate in Zulfikar Ali Bhutto regime was 4.55, while the services, agriculture and industrial growth rates were 6.55, 2.6 and 4.4 respectively. The average GDP growth rate in Fazal Ilahi Chaudry regime was 5.04, while the services, agriculture and industrial growth rates were 6.96, 2.38 and 5.54 respectively. The average GDP growth rate in Muhammad Zia-ul-Haq regime was 6.49, while the services, agriculture and industrial growth rates were 7, 4.05 and 8.48 respectively. The average GDP growth rate in Ghulam Ishaq Khan regime was 5.0, while the services, agriculture and industrial growth rates were 4.98, 3.82 and 6.24 respectively. The average GDP growth rate in Farooq Leghari regime was 4.2, while the services, agriculture and industrial growth rates were 4.4, 5.9 and 2.4 respectively. The average GDP growth rate in Muhammad Rafiq Tarar regime was 3.86, while the services, agriculture and industrial growth rates were 3.6, 4.162.1 and 4.1 respectively (State Bank of Pakistan, 2005). The average GDP growth rate in Pervez Musharraf regime was 5.5, while the services, agriculture and industrial growth rates were 5.84, 3.04 and 7.47 respectively (Government of Pakistan, 2010-11).

Different studies about the issue under consideration have been conducted. Alesina *et al.* (1992) assessed the relationship between political instability and economic growth in one hundred and thirteen countries covering the time period 1950-82. The findings revealed that the collapse of the government significantly lowered the economic growth. Mahmood, Azid and Siddiqui (2010) studied the connection of democracy and economic growth in Pakistan. Using annual data and applying the autoregressive distributive lagged model, their findings revealed that for economic growth democracy is significant in Pakistan. Durham (1999) assessed the relation the between economic growth and political regimes, using panel on 105 countries. The findings revealed that at development levels, growth decreases as discretion increases. The study also pointed out that single-party dictatorships have higher investment ratios but do not grow faster than party-less regimes. Younis *et al* (2008) assessed various factors of political instability in connection with economic growth in 10 Asian economies covering the time period 1990-2005. Using ordinary least square, they found positive relationship between political stability and economic growth and concluded that for economic growth political stability is more crucial as compared to economic freedom. Nasir *et al* (2008) analyzed the performance of macroeconomic indicators in different regimes. His findings revealed

that the aggregate growth of the economy under the autocracy remains better as compared to democratic government. Przeworski and Limongi (1993) studied the connection of political regimes and economic growth. Their findings revealed that political government matters much in economic growth, but, the regimes do not exhibit the relevant differences. Olson (1991) studied that a dictator's commitment is not credible. The democratic regimes play very well as compared to dictatorship. But Olson does not mention the ways the democratic institutions make credible commitments. Lee and Roemer (2010) studied the political economy of inequality and growth by combining the political economy approach with an imperfect capital market assumption. In their model, there emerges a class of individuals whose members do not invest privately beyond the state-financed schooling, due to their initial wealth constraint. They show that inequality affects private investment not only through the political effect, which relates inequality to private investment negatively, but also through what they call the threshold effect, which associates inequality to private investment positively. In general, private investment and inequality do not show a monotone negative relationship. Perotti (2009) investigated the relationship between income distribution, democratic institutions, and growth. It does so by addressing three main issues: the properties and reliability of the income distribution data, the robustness of the reduced form relationships between income distribution and growth estimated so far, and the specific channels through which income distribution affect growth. The main conclusion in this regard is that there is strong empirical support for two types of explanations, linking income distribution to sociopolitical instability and to the education/fertility decision. A third channel, based on the interplay of borrowing constraints and investment in human capital, also seems to receive some support by the data, although it is probably the hardest to test with the existing data. By contrast, there appears to be less empirical support for explanations based on the effects of income distribution on fiscal policy. Barro (2000) observed that evidence from a broad panel of countries shows little overall relation between income inequality and rates of growth and investment. For growth, higher inequality tends to retard growth in poor countries and encourage growth in richer places. The Kuznets curve – whereby inequality first increases and later decreases during the process of economic development – emerges as a clear empirical regularity. However, this relation does not explain the bulk of variations in inequality across countries or over time. Barro (1991) investigated the economic growth in a cross section of countries and found that political unrest is responsible for affecting the economic growth. Lorentz, A. (n.d) analyzed sectoral specialization in connection with its effects on growth

rate. He also identified the growth differences in different economies. He also developed multi-sectoral growth model. He identified various elements which contributed to generate differences in GDP growth rates.

Holz (2008) studied the future growth outlook for China. He also assessed the key drivers of future growth. His findings revealed that China's economy will persist at the current growth rates upto 2015. Tödter (2010) assessed that the carry-over effect is useful for predicting the economic activity especially for short term forecasting. Statistical approach has been adopted to analyze the carry-over effects. He pointed out that the carry-over effect reduces the component of uncertainty from short term forecasting. Roberto, Bierens & Castelar (2005) employed the linear and non-linear diffusion index models for predicting the GDP growth rate for Brazilian economy. They observed that non-linear diffusion index models intent to explain economic cycles. Altar, Ciprian and Gabriel (2008) modeled the economic growth in Romania economy using three sector model, 3 sector regimes. The optimal tax rate was determined and the real GDP was forecasted. Rastogi (1994) made forecasts for Indian economy. He forecasted overall economic growth rate, inflation and exports. Further, he assessed that the Indian economy will be benefited from improvement in the world trade volume and low price of crude oil. Anwar (2006) focused on the challenges faced by Singaporean economy in general and particularly the problems faced by manufacturing sector. He also made forecasts for growth rates of real output, productivity and investment using time series data. Walterskirchen (1998) forecasted economic growth for Australia. He projected the economic growth in 1991 to be highest as compared to previous growth rates due to expansion of exports and investment. The GDP forecast was made in line with global economy and was revised to be 2.8%. He observed that the unemployment will be reduced in future. Barot (2004) evaluated Swedish domestic forecasters of GDP growth, inflation and unemployment during 1993-2001. For evaluation of the forecasts, he used statistical techniques including mean absolute error and root mean square error. He observed CPI-inflation and the unemployment rate to be declined in future and these techniques were helpful in predictions. Lang and Lansing (2010) forecasted economic growth over the next year with a business cycle index. They found the real GDP growth rate of United States through the first half of 2011 will remain at or below potential. Dholakia (1993) suggested a simple model to be used for short term forecast of the economy due to relevancy and reliability as compared to complex equations. He forecasted inflation and economic growth rate and compared the forecasts with official estimates for the last two years.

The present study differs from the afore mentioned studies in the sense that it analyzes not only the pattern of growth distribution of agriculture, industrial and services sector and GDP in different regimes, but also forecasts these growth rates in Pakistan.

### Data and Methodology

The present study is based on secondary data ranging from 1956 to 2007. The data has been collected on four major macroeconomic variables including GDP growth rate, agriculture growth rate, industrial sector growth rate and services sector growth rate. The data has been obtained regime-wise. The break up of the different eras is given as under:

Table-1: Regime-wise Break-up with Respect to Time in Pakistan

Group	Era/Regime	Time period
1	Iskandar Mirza	23 March 1956 to 27 October 1958
2	Muhammad Ayub Khan	27 October 1958 to 25 March 1969
3	Yahya Khan	25 March 1969 to 20 December 1971
4	Zulfikar Ali Bhutto	20 December 1971 to 13 August 1973
5	Fazal Ilahi Chaudhry	13 August 1973 to 16 September 1978
6	Muhammad Zia-ul-Haq	16 September 1978 to 17 August 1988
7	Ghulam Ishaq Khan	17 August 1988 to 18 July 1993
8	Farooq Leghari	14 November 1993 to 2 December 1997
9	Muhammad Rafiq Tarar	1 January 1998 to 20 June 2001
10	Pervez Musharraf	20 June 2001 to 18 August 2008

For each of the regime, the average growth rates for the afore-mentioned variables were calculated.

The data on these variables ranging from 1956 to 2000 has been obtained from State Bank of Pakistan while the data of the last regime was obtained from Economic Survey of Pakistan (2009-10).

For the analysis of the data the Gini-coefficient and Lorenz curve were used. For computing the Gini-Coefficient, the following formula was used:

$$G = 1 - \sum_{i=1}^N (\delta Y_{i-1} + \delta Y_i)(\delta X_{i-1} - \delta X_i)$$

Where  $\delta X$  and  $\delta Y$  are the cumulative percentages of  $X_s$  and  $Y_s$ ,  $N$  is the number of observations for which the Gini-coefficient is computed. If the value of Gini-coefficient turns out to be zero, then the growth is distributed equally. On the other hand if it turns to be 1, the growth is distributed unequally or the growth is associated with a single regime. Greater the value of the Gini-coefficient greater would be the inequality.

For analyzing the data graphically, the following Lorenz curve was used:

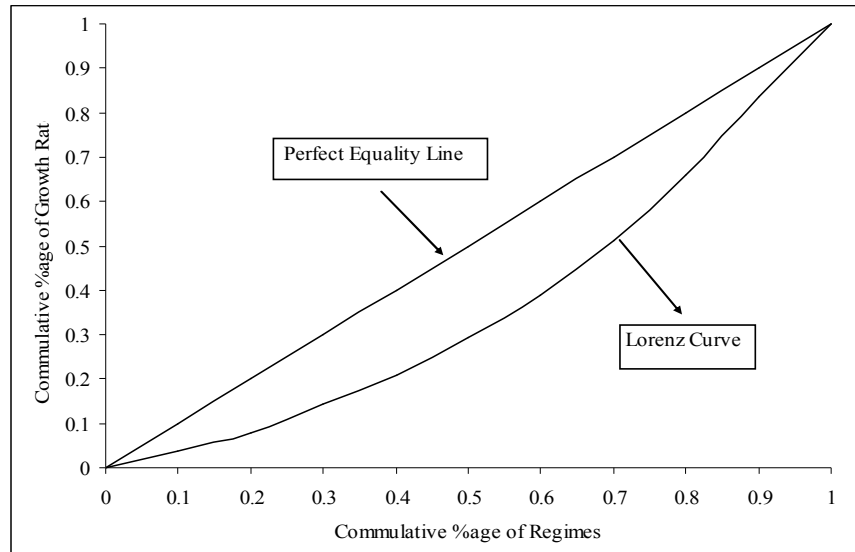


Figure 1: Typical Lorenz Curve Plot

On horizontal axis the percentage distribution of the regime was taken, while the percentage distribution of four key macroeconomic variables was taken on vertical axis.

The diagonal line represents the perfect equality line (or exact equality in growth distribution).

For forecasting the growth rates (i.e. agricultural, industrial, services and GDP) in Pakistan, the data ranging from 1978 to 2011 has been used. The time series statistical projection techniques i.e. moving average forecasts and exponential smoothing have been utilized.

According to the moving average forecast technique, the forecast for the current year is obtained by taking the average of the past observations. The average may be 2, 3 or more than it. However, the best forecast is selected through computing the root mean square error (RMSE) which is obtained by the following formula.

$$RMSE = \sqrt{\frac{\sum (Y - \hat{Y})^2}{n}}$$

Where Y is the actual value of a time series  $\hat{Y}$  is the projected value of a time series and 'n' is the total number of observations.

That moving average forecast which corresponds to minimum root mean square error is selected for forecasting. The major

disadvantage of the moving average forecast is that it assigns same weight to all observations being averaged. This defect is overcome by the exponential smoothing method, which projects variables by allocating various weights. Again the root mean square error is used to select the optimum forecast in this method. For the analysis of the data, Eviews and Microsoft Excel have been used.

### Results and Discussion

Based on the data of economic survey of Pakistan, the regime-wise average growth rates and sample statistics are given in the Table 2. Accordingly, the average growth rate of agriculture sector in the aforementioned 10 regime is 3.6 percent. The average growth rate of industrial sector, services and GDP was 6.6, 5.3 and 4.9 percent respectively. The industrial sector performance is higher as compared to other sectors. The maximum and minimum industrial growth rates were 11.4 and 2.4 percent respectively.

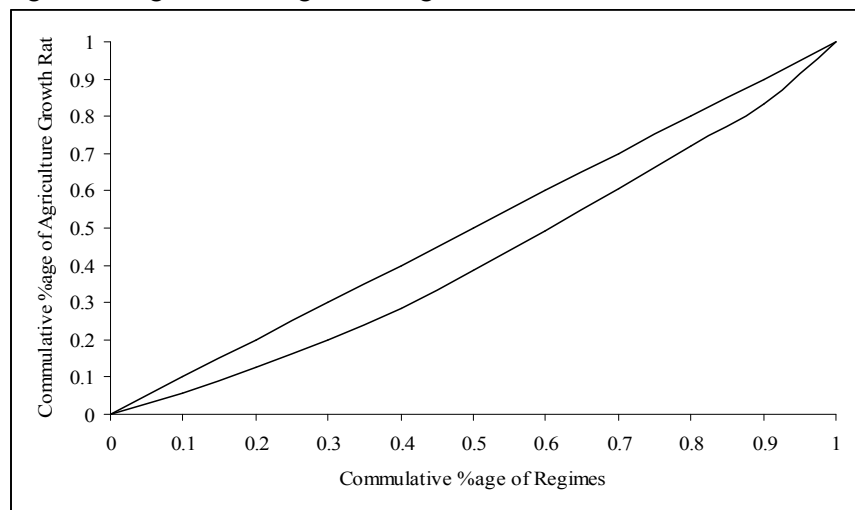
Table-2: Regime-wise Average Growth Rates and Sample Statistics in Pakistan

Regime	Agriculture	Industry	Services	GDP
1	2.1	7.3	2.6	3.0
2	4.1	9.1	6.3	5.8
3	3.6	11.2	5.1	5.8
4	2.6	4.4	6.6	4.6
5	2.4	5.5	7.0	5.0
6	4.1	8.5	7.0	6.5
7	3.8	6.2	5.0	5.0
8	5.9	2.4	4.4	4.2
9	4.2	4.1	3.6	3.9
10	3.0	7.5	5.8	5.6
Sample Statistics				
Grand Mean	3.6	6.6	5.3	4.9
Maximum	5.9	11.2	7.0	6.5
Minimum	2.1	2.4	2.6	3.0
Gini-coefficient	0.161453	0.214199	0.147940	0.112955

Further, the results show that the inequality status in growth distribution of the study variables is minimum in different regimes of Pakistan. Alternatively the growth pattern for these variables are uniform and there

are no severe ups and down in the growth distribution in different regimes of the country. Most of the values are closer to 0 as against 1. The idea can also be reflected from various Lorenz curve computed for different regimes of the country. The agriculture sector growth rate over different regimes is depicted in Figure 2, showing that the inequality is minimum as depicted by the smaller gap between the equality line and Lorenz curve.

Figure 2: Regime wise Agriculture growth rate distribution



Looking over the regime wise distribution of industrial growth rate in Pakistan, the gap between Lorenz curve and the diagonal line low and is therefore, the industrial growth rate distribution is closer to equal distribution. On similar passion, in case of the growth rate distribution of services sector, the gap is also low as compared to both agriculture growth rate and industrial growth rate distributions, depicted in Figure 4. Similarly, the growth distribution pattern is also uniform for GDP growth rate in Pakistan as compared to the distributions of agriculture growth rate, industrial growth rate and services sector growth rates. The lowest gap is represented in figure 5.



Figure-3: Regime wise Industrial growth rate distribution

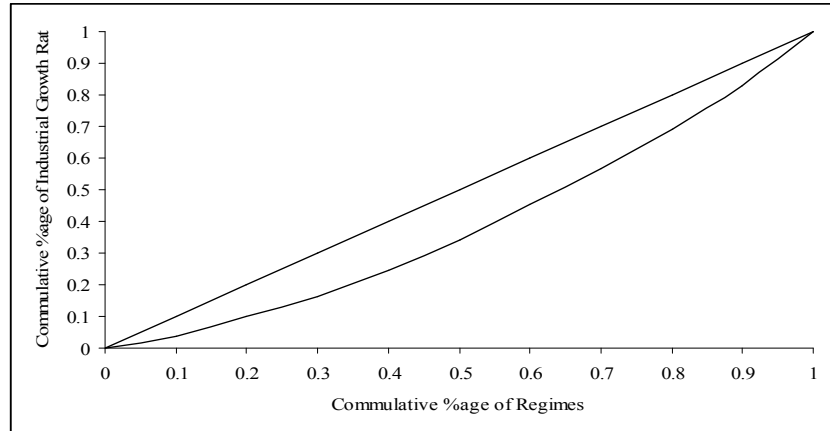


Figure-4: Regime wise Services sector growth rate distribution

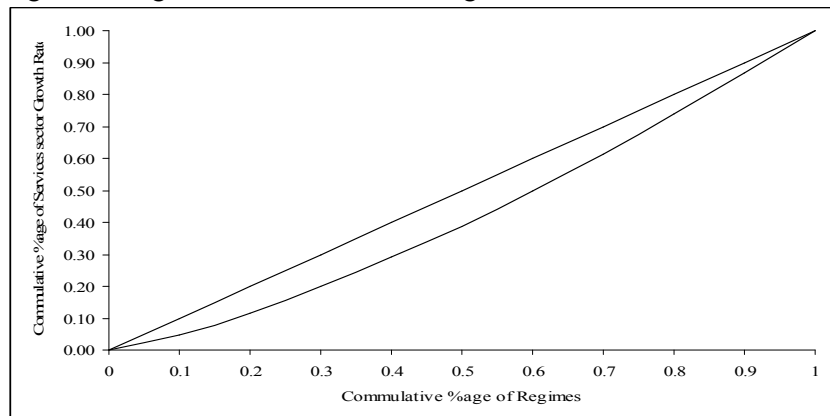
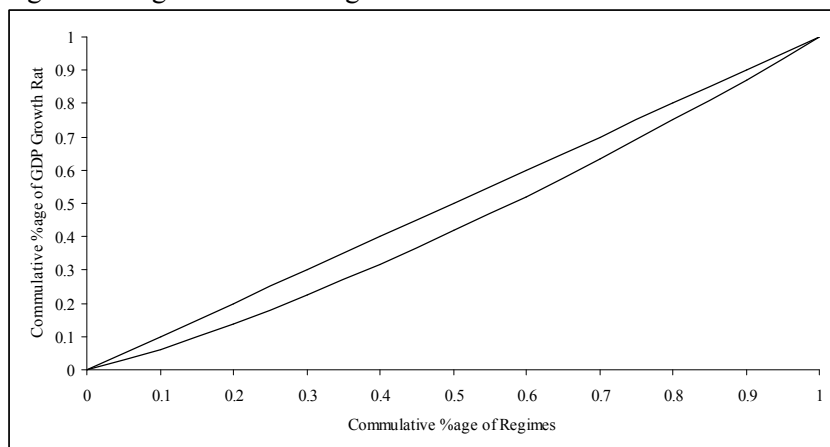


Figure-5: Regime wise GDP growth rate distribution



### Forecasting Growth Rates in Pakistan

The forecasting techniques results that based on the past information, the agriculture growth rate is expected to rise 1.7% in the year 2012, which is based on four year moving average forecast (appendix-A). The forecast is best as compared to other moving average forecast because it has a minimum root mean square error as compared to other root mean square errors (Table 3). According to the exponential moving average forecast, the agriculture growth rate is projected as 1.9% in the year 2012 (Appendix-B). This is based on allocating weight equal to 0.4 and is logical because it has comparatively minimum root mean square error (Table 4). The forecasts are higher as compared to the current growth rate of 1.2% in agriculture sector in the year 2011.

Table-3: Root Mean Square Error (RMSE) for Growth Rates using Moving Average Method

Year Moving Forecast (YMAF)	AGGR	IGR	SSGR	GDPGR
2 YMAF	4.8788	4.10925	1.72405	2.04765
3 YMAF	4.59222	3.90802	1.69458	2.06362
4 YMAF	4.31926	4.19246	1.7809	2.09514
5 YMAF	4.3936	4.19592	1.83841	2.16465

Table-4: Root Mean Square Error (RMSE) for Growth Rates using Exponential Smoothing Method

Weight (w)	AGGR	IGR	SSGR	GDPGR
0.4	4.3168484	3.795680	1.792998	1.963763
0.5	4.5056470	3.846855	1.789432	1.980433
0.6	4.7085119	3.921557	1.799678	2.011414
0.7	4.9292090	4.019941	1.821868	2.057211

The industrial growth rate is expected to rise to 2.7% in the year 2012 Appendix-C. This forecast corresponds to comparatively minimum root mean square error and is based on three year moving forecast (Table 3). According to the exponential moving average forecast, the industrial growth rate is projected as 3.1% in the year 2012 (Appendix- D). It has weight equal to 0.4, possessing comparatively minimum root mean square error (Table 4). The forecasts are encouraging because these are higher as compared to the current growth rate of industrial sector i.e. - 0.1% in the year 2011.

The growth rate of the services sector is expected to rise by 2.9% in the year 2012 based on three year moving average forecast (Appendix-E), possessing comparatively minimum root mean square error (Table 3).

According to the exponential moving average forecast, the services sector growth rate is projected as 3.8% in the year 2012 (Appendix-F). It has weight equal to 0.5, possessing comparatively minimum root mean square error (Table 4). The performance of the services sector is expected to be poor in the next year. Because the forecast are lower in both the cases as compared to its current growth rate of 4.1%.

The GDP growth rate in the year 2012 is projected to be 3.1%. This is based on the two year moving average forecast (Appendix-G) and possesses the comparatively minimum root mean square error (Table 3). According to the exponential moving average forecast, the GDP growth rate is projected as 3.3% in the year 2012 (Appendix-H). It has weight equal to 0.4, possessing comparatively minimum root mean square error (Table 4). The GDP growth performance is encouraging and the forecasts in both the cases are higher as compared to its current growth rate of 2.4%. This projected GDP growth rate is minimum as compared to the growth rates of other developing countries. For the year 2011-12, the GDP growth rate for India, Bangladesh, Sri Lanka, Indonesia and Malaysia are 7.8%, 6.6%, 6.5%, 6.5% and 5.2% respectively (Govt. of Pakistan, 2011). According to the International Monetary Fund (2011), the Pakistan real GDP growth rate is expected to be increased by 4.2% in the year 2011-12.

### **Conclusion and Recommendations**

Looking over the facts and figures, the growth rate distribution pattern of the study variables (agriculture, industrial, services and GDP growth rates) is uniform in different regimes of Pakistan. There were no severe jumps (ups and downs) and big push in these variables regime-wise. There is a need to take revolutionary steps and big push to boost the macroeconomic growth performance in Pakistan. The future growth rates are expected to increase but these rates are still low as compared to other developing countries. The services sector growth rate shows gloomy picture in the near future which needs to be sustained on priority basis. Because it is major sector of Pakistan and its contribution towards GDP is 53.3% (Govt. of Pakistan., 2010-11).

## References

- Alesina, A., S. Ozler, N. Roubini and P. Swagel (1992). *Political Instability and Economic Growth*. NBER Working Paper Series, Working Paper No. 4173. Cambridge: National Bureau of Economic Research.
- Altar, M., N. Ciprian and B. Gabriel. (2008). 'Modeling the Economic Growth in Romania. The Influence of Fiscal Regimes'. *Journal for Economic Forecasting*. Institute for Economic Forecasting. 5(4): 146-160.
- Anwar, S. (2006). 'Manufacturing Sector Growth: A Case Study of Singapore'. *Global Economic Review*, Taylor and Francis Journals. 35(4): 381-396.
- Barro, R. (1991). 'Economic Growth in a Cross Section of Countries'. *Quarterly Journal of Economics*.
- Barot, B. (2004). 'How accurate are the Swedish forecasters on GDB-Growth, CPI-inflation and unemployment? (1993 - 2001)'. *Brussels Economic Review*, Universite Libre de Bruxelles. 47(2): 249-278.
- Barro, R. J. (2000). 'Inequality and Growth in a Panel of Countries'. *Journal of Economic Growth*. 5(1): 5-32.
- Dholakia, R.H. (1993). 'Expected Inflation and Forecast of Growth Rate in India'. IIMA Working Papers WP1993-02-01\_01159, Indian Institute of Management Ahmedabad, Research and Publication Department.
- Durham, J. B. (1999). 'Economic Growth and Political Regimes'. *Journal of Economic Growth*, Vol. 4, No. 1: 81-111.
- Government of Pakistan. *Economic Survey of Pakistan 2010-11*. Islamabad: Ministry of Finance, Economic Advisory Wing.
- Holz, C. A. (2008). 'China's Economic Growth 1978-2025: What We Know Today About China's Economic Growth Tomorrow'. *Elsevier*. 36(10): 1665-1691.
- International Monetary Fund (2011). *World Economic Outlook*.
- Iqbal, N., S. J. I. Khan and M. Irfan (2008). 'Democracy, Autocracy and Macroeconomic Performance in Pakistan'. *Kashmir Economic Review*. 27(1): 61-88.
- Lang, A. and K. J. Lansing. (2010). 'Forecasting growth over the next year with a business cycle index'. FRBSF Economic Letter, Federal Reserve Bank of San Francisco.
- Lee, W. and J. E. Roemer. (2010). 'Income Distribution, Redistributive Politics, and Economic Growth'. *Journal of Economic Growth*. 3(3): 217-240.

- Lorentz, A. (n.d). 'Sectoral Specialisation and Growth Rate Differences among Integrated Economies'. *The Electronic Journal of Evolutionary Modeling and Economic Dynamics*, IFRede - Université Montesquieu Bordeaux IV.
- Loayza, N., P. Fajnzylber and C. Calderón. (2004). *Economic Growth in Latin America and the Caribbean: Stylized Facts, Explanations, and Forecasts*. Working Papers Central Bank of Chile 265, Central Bank of Chile.
- Mahmood, K., T. Azid, and M. M. Siddiqui (2010). 'Democracy and Economic Growth in Pakistan'. *Research Journal of International Studies* - Issue 15: 77-86.
- Olson, M. Jr. (1991). 'Autocracy, Democracy and Prosperity'. In Zeckhauser, Richard J.,ed., *Strategy and Choice*. Cambridge: MIT Press, 131-57.
- Perotti, R. ( 2009). 'Growth, income distribution, and democracy: What the data say'. *Journal of Economic Growth*. 1(2): 149-187.
- Przeworski, A. and F. Limongi. (1993). 'Political Regimes and Economic Growth'. *The Journal of Economic Perspectives*, Vol. 7, No. 3 pp. 51-69.
- Rastogi A B. (1994). *Indian Economic Forecast: Post Budget Analysis - April 1994*. IIMA Working Papers WP1994-04-01\_01255, Indian Institute of Management Ahmedabad, Research and Publication Department.
- Roberto, T. F., & H. Bierens & I. Castelar, (2005). *Forecasting Quarterly Brazilian GDP Growth Rate With Linear and Nonlinear Diffusion Index Models*, " *Economia*, ANPEC - Associação Nacional dos Centros de Pósgraduação em Economia [Brazilian Association of Graduate Programs in Economics]. 6(3): 261-292.
- State Bank of Pakistan (2005). *Handbook of Statistics on Pakistan Economy*.
- Tödter, K. H. (2010). 'How useful is the carry-over effect for short-term economic forecasting?' Discussion Paper Series 1: *Economic Studies*, 21, Deutsche Bundesbank, Research Centre.
- Walterskirchen, W. (1998). 'High Economic Growth in 1998, but Increasing Risks in 1999. Economic Outlook for 1998 and 1999'. *Austrian Economic Quarterly*, WIFO. 3(4): 167-175.
- Younis, M., X. X. Lin, Y. Sharahili and S. Selvarathinam (2008). 'Political Stability and Economic Growth in Asia'. *American Journal of Applied Sciences*. 5 (3): 203-208.

Appendix A: Moving Average Forecasts (MAF) for Agriculture Growth Rate in Pakistan													
YEAR	AGGR*	2YMAF**	(A-F)	(A-F)/2	3YMAF	(A-F)	(A-F)/2	4YMAF	(A-F)	(A-F)/2	5YMAF	(A-F)	(A-F)/2
1978	2.8												
1979	3.1												
1980	6.6	3.0	3.7	13.3									
1981	3.7	4.9	-1.2	1.3	4.2	-0.5	0.2						
1982	4.7	5.2	0.2	0.2	4.5	0.2	0.1	4.1	0.7	0.4			
1983	4.4	4.2	0.2	0.0	5.0	-0.6	0.4	4.5	-0.1	0.0	4.2	0.2	0.0
1984	-4.8	4.6	-9.4	87.4	4.3	-9.1	82.2	4.9	-9.7	93.1	4.5	-9.3	86.5
1985	10.9	-0.2	11.1	123.2	1.4	9.5	89.6	2.0	8.9	79.2	2.9	8.0	63.7
1986	5.9	3.1	2.9	8.1	3.5	2.4	5.8	3.8	2.1	4.4	3.8	2.1	4.5
1987	3.3	8.4	-5.1	26.0	4.0	-0.7	0.5	4.1	-0.8	0.6	4.2	-0.9	0.8
1988	2.7	4.6	-1.9	3.6	6.7	-4.0	16.0	3.8	-1.1	1.3	3.9	-1.2	1.5
1989	6.9	3.0	3.9	15.2	4.0	2.9	8.6	5.7	1.2	1.4	3.6	3.3	10.9
1990	3	4.8	-1.8	3.2	4.3	-1.3	1.7	4.7	-1.7	2.9	5.9	-2.9	8.6
1991	5	5.0	0.0	0.0	4.2	0.8	0.6	4.0	1.0	1.1	4.4	0.6	0.4
1992	9.5	4.0	5.5	30.3	5.0	4.5	20.6	4.4	5.1	26.0	4.2	5.3	28.3
1993	-5.3	7.3	-12.6	157.5	5.8	-11.1	124.0	6.1	-11.4	130.0	5.4	-10.7	114.9
1994	5.2	2.1	3.1	9.6	3.1	2.1	4.6	3.1	2.2	4.6	3.8	1.4	1.9
1995	6.6	0.0	6.7	44.2	3.1	3.5	12.0	3.6	3.0	9.0	3.5	3.1	9.7
1996	11.7	5.9	5.8	33.6	2.2	9.5	90.9	4.0	7.7	59.3	4.2	7.5	56.3
1997	0.1	9.2	-9.1	81.9	7.8	-7.7	59.8	4.6	-4.5	19.8	5.5	-5.4	29.6
1998	4.5	5.9	-1.4	2.0	6.1	-1.6	2.7	5.9	-1.4	2.0	3.7	0.8	0.7
1999	1.9	2.3	-0.4	0.2	5.4	-3.5	12.5	5.7	-3.8	14.6	5.6	-3.7	13.8
2000	6.1	3.2	2.9	8.4	2.2	3.9	15.5	4.6	1.6	2.4	5.0	1.1	1.3
2001	-2.2	4.0	-6.2	38.4	4.2	-6.4	40.5	3.2	-5.4	28.6	4.9	-7.1	49.8
2002	0.1	2.0	-1.9	3.4	1.9	-1.8	3.4	2.6	-2.5	6.1	2.1	-2.0	3.9
2003	4.1	-1.1	5.2	26.5	1.3	2.8	7.7	1.5	2.6	6.9	2.1	2.0	4.1
2004	2.4	2.1	0.3	0.1	0.7	1.7	3.0	2.0	0.4	0.1	2.0	0.4	0.2
2005	6.5	3.3	3.3	10.6	2.2	4.3	18.5	1.1	5.4	29.2	2.1	4.4	19.4
2006	6.3	4.5	1.9	3.4	4.3	2.0	3.9	3.3	3.0	9.2	2.2	4.1	17.0
2007	4.1	6.4	-2.3	5.3	5.1	-1.0	0.9	4.8	-0.7	0.5	3.9	0.2	0.0
2008	1	5.2	-4.2	17.6	5.6	-4.6	21.5	4.8	-3.8	14.6	4.7	-3.7	13.5
2009	4	2.6	1.5	2.1	3.8	0.2	0.0	4.5	-0.5	0.2	4.1	-0.1	0.0
2010	0.6	2.5	-1.9	3.6	3.0	-2.4	5.9	3.9	-3.3	10.6	4.4	-3.8	14.3
2011	1.2	2.3	-1.1	1.2	1.9	-0.7	0.4	2.4	-1.2	1.5	3.2	-2.0	4.0
TOTAL				761.7			653.7			559.7			559.8
2012		0.9			1.9			1.7			2.2		

\* AGGR is the agriculture growth rate

\*\*YMAF is the year moving average forecast

Appendix B: Exponential Moving Average Forecasts for Agriculture Growth rate in Pakistan															
YEAR	AGGR*	Ft with w=0.4	(A-F)	(A-F) <sup>2</sup>	Ft with w=0.5	(A-F)	(A-F) <sup>2</sup>	Ft with w=0.6	(A-F)	(A-F) <sup>2</sup>	Ft with w=0.7	(A-F)	(A-F) <sup>2</sup>	Ft with w=0.8	(A-F)
1978	2.8	3.7	-0.9	0.9	3.7	-0.9	0.9	3.7	-0.9	0.9	3.7	-0.9	0.9	3.7	-0.9
1979	3.1	3.4	-0.3	0.1	3.3	-0.2	0.0	3.2	-0.1	0.0	3.1	0.0	0.0	3.0	0.1
1980	6.6	3.3	3.3	11.2	3.2	3.4	11.7	3.1	3.5	12.1	3.1	3.5	12.3	3.1	3.5
1981	3.7	4.6	-0.9	0.8	4.9	-1.2	1.4	5.2	-1.5	2.3	5.5	-1.8	3.4	5.9	-2.2
1982	4.7	4.2	0.5	0.2	4.3	0.4	0.2	4.3	0.4	0.2	4.3	0.4	0.2	4.1	0.6
1983	4.4	4.4	0.0	0.0	4.5	-0.1	0.0	4.5	-0.1	0.0	4.6	-0.2	0.0	4.6	-0.2
1984	-4.8	4.4	-9.2	84.9	4.4	-9.2	85.5	4.5	-9.3	85.7	4.4	-9.2	85.6	4.4	-9.2
1985	10.9	0.7	10.2	105.5	-0.2	11.1	122.7	-1.1	12.0	143.9	-2.0	12.9	167.1	-3.0	13.9
1986	5.9	4.8	1.1	1.2	5.4	0.5	0.3	6.1	-0.2	0.0	7.0	-1.1	1.3	8.1	-2.2
1987	3.3	5.2	-1.9	3.8	5.6	-2.3	5.4	6.0	-2.7	7.2	6.2	-2.9	8.6	6.3	-3.0
1988	2.7	4.5	-1.8	3.1	4.5	-1.8	3.1	4.4	-1.7	2.8	4.2	-1.5	2.2	3.9	-1.2
1989	6.9	3.8	3.1	9.9	3.6	3.3	11.0	3.4	3.5	12.5	3.1	3.8	14.1	2.9	4.0
1990	3	5.0	-2.0	4.1	5.2	-2.2	5.0	5.5	-2.5	6.2	5.8	-2.8	7.7	6.1	-3.1
1991	5	4.2	0.8	0.6	4.1	0.9	0.8	4.0	1.0	1.0	3.8	1.2	1.4	3.6	1.4
1992	9.5	4.5	5.0	24.7	4.6	4.9	24.4	4.6	4.9	24.0	4.6	4.9	23.5	4.7	4.8
1993	-5.3	6.5	-11.8	139.6	7.0	-12.3	152.0	7.5	-12.8	164.8	8.0	-13.3	178.1	8.5	-13.8
1994	5.2	1.8	3.4	11.6	0.9	4.3	18.8	-0.2	5.4	28.8	-1.3	6.5	42.2	-2.5	7.7
1995	6.6	3.2	3.4	11.9	3.0	3.6	12.7	3.1	3.5	12.6	3.3	3.3	11.2	3.7	2.9
1996	11.7	4.5	7.2	51.4	4.8	6.9	47.4	5.2	6.5	42.5	5.6	6.1	37.3	6.0	5.7
1997	0.1	7.4	-7.3	53.3	8.3	-8.2	66.6	9.1	-9.0	80.9	9.9	-9.8	95.4	10.6	-10.5
1998	4.5	4.5	0.0	0.0	4.2	0.3	0.1	3.7	0.8	0.6	3.0	1.5	2.2	2.2	2.3
1999	1.9	4.5	-2.6	6.7	4.3	-2.4	6.0	4.2	-2.3	5.2	4.1	-2.2	4.7	4.0	-2.1
2000	6.1	3.5	2.6	7.0	3.1	3.0	8.9	2.8	3.3	10.8	2.5	3.6	12.6	2.3	3.8
2001	-2.2	4.5	-6.7	45.0	4.6	-6.8	46.4	4.8	-7.0	48.8	5.0	-7.2	52.3	5.3	-7.5
2002	0.1	1.8	-1.7	3.0	1.2	-1.1	1.2	0.6	-0.5	0.2	0.0	0.1	0.0	-0.7	0.8
2003	4.1	1.1	3.0	8.8	0.7	3.4	11.9	0.3	3.8	14.5	0.1	4.0	16.3	-0.1	4.2
2004	2.4	2.3	0.1	0.0	2.4	0.0	0.0	2.6	-0.2	0.0	2.9	-0.5	0.2	3.3	-0.9
2005	6.5	2.4	4.1	17.2	2.4	4.1	16.9	2.5	4.0	16.2	2.5	4.0	15.6	2.6	3.9
2006	6.3	4.0	2.3	5.2	4.4	1.9	3.4	4.9	1.4	2.0	5.3	1.0	1.0	5.7	0.6
2007	4.1	4.9	-0.8	0.7	5.4	-1.3	1.6	5.7	-1.6	2.7	6.0	-1.9	3.6	6.2	-2.1
2008	1	4.6	-3.6	12.9	4.7	-3.7	14.0	4.8	-3.8	14.1	4.7	-3.7	13.5	4.5	-3.5
2009	4	3.2	0.8	0.7	2.9	1.1	1.3	2.5	1.5	2.2	2.1	1.9	3.6	1.7	2.3
2010	0.6	3.5	-2.9	8.4	3.4	-2.8	8.0	3.4	-2.8	7.8	3.4	-2.8	8.0	3.5	-2.9
2011	1.2	2.3	-1.1	1.3	2.0	-0.8	0.7	1.7	-0.5	0.3	1.4	-0.2	0.1	1.2	0.0
2012	126.60			633.6			690.2			753.8			826.1		
		1.9			1.6			1.4			1.3			1.2	

\* AGGR is the agriculture growth rate

Appendix C: Moving Average Forecasts (MAF) for Industrial Growth Rate in Pakistan													
YEAR	IGR*	2YMAF**	(A-F)	(A-F)²	3YMAF	(A-F)	(A-F)²	4YMAF	(A-F)	(A-F)²	5YMAF	(A-F)	(A-F)²
1978	9.5												
1979	7.6												
1980	10.8	8.6	2.3	5.1									
1981	9.4	9.2	0.2	0.0	9.3	0.1	0.0						
1982	10.7	10.1	0.6	0.4	9.3	1.4	2.1	9.3	1.4	1.9			
1983	4.9	10.1	-5.2	26.5	10.3	-5.4	29.2	9.6	-4.7	22.3	9.6	-4.7	22.1
1984	7.1	7.8	-0.7	0.5	8.3	-1.2	1.5	9.0	-1.9	3.4	8.7	-1.6	2.5
1985	7.8	6.0	1.8	3.2	7.6	0.2	0.1	8.0	-0.2	0.1	8.6	-0.8	0.6
1986	8.1	7.5	0.7	0.4	6.6	1.5	2.3	7.6	0.5	0.2	8.0	0.1	0.0
1987	8.6	8.0	0.7	0.4	7.7	0.9	0.9	7.0	1.6	2.6	7.7	0.9	0.8
1988	9.8	8.4	1.5	2.1	8.2	1.6	2.7	7.9	1.9	3.6	7.3	2.5	6.3
1989	4.7	9.2	-4.5	20.3	8.8	-4.1	17.1	8.6	-3.9	15.0	8.3	-3.6	12.8
1990	6.4	7.3	-0.9	0.7	7.7	-1.3	1.7	7.8	-1.4	2.0	7.8	-1.4	2.0
1991	6.9	5.6	1.4	1.8	7.0	-0.1	0.0	7.4	-0.5	0.2	7.5	-0.6	0.4
1992	7.7	6.7	1.1	1.1	6.0	1.7	2.9	7.0	0.8	0.6	7.3	0.4	0.2
1993	5.5	7.3	-1.8	3.2	7.0	-1.5	2.3	6.4	-0.9	0.9	7.1	-1.6	2.6
1994	4.5	6.6	-2.1	4.4	6.7	-2.2	4.8	6.6	-2.1	4.5	6.2	-1.7	3.0
1995	0.7	5.0	-4.3	18.5	5.9	-5.2	27.0	6.2	-5.5	29.7	6.2	-5.5	30.3
1996	4.7	2.6	2.1	4.4	3.6	1.1	1.3	4.6	0.1	0.0	5.1	-0.4	0.1
1997	-0.3	2.7	-3.0	9.0	3.3	-3.6	13.0	3.9	-4.2	17.2	4.6	-4.9	24.2
1998	6.1	2.2	3.9	15.2	1.7	4.4	19.4	2.4	3.7	13.7	3.0	3.1	9.5
1999	4.9	2.9	2.0	4.0	3.5	1.4	2.0	2.8	2.1	4.4	3.1	1.8	3.1
2000	1.3	5.5	-4.2	17.6	3.6	-2.3	5.1	3.9	-2.6	6.5	3.2	-1.9	3.7
2001	4.1	3.1	1.0	1.0	4.1	0.0	0.0	3.0	1.1	1.2	3.3	0.8	0.6
2002	2.7	2.7	0.0	0.0	3.4	-0.7	0.5	4.1	-1.4	2.0	3.2	-0.5	0.3
2003	4.2	3.4	0.8	0.6	2.7	1.5	2.3	3.3	1.0	0.9	3.8	0.4	0.1
2004	16.3	3.5	12.9	165.1	3.7	12.6	159.6	3.1	13.2	174.9	3.4	12.9	165.4
2005	12.1	10.3	1.9	3.4	7.7	4.4	19.1	6.8	5.3	27.8	5.7	6.4	40.7
2006	4.1	14.2	-10.1	102.0	10.9	-6.8	45.8	8.8	-4.7	22.3	7.9	-3.8	14.3
2007	8.8	8.1	0.7	0.5	10.8	-2.0	4.1	9.2	-0.4	0.1	7.9	0.9	0.8
2008	1.4	6.5	-5.1	25.5	8.3	-6.9	48.1	10.3	-8.9	79.7	9.1	-7.7	59.3
2009	-0.1	5.1	-5.2	27.0	4.8	-4.9	23.7	6.6	-6.7	44.9	8.5	-8.6	74.6
2010	8.3	0.7	7.7	58.5	3.4	4.9	24.3	3.6	4.8	22.6	5.3	3.0	9.2
2011	-0.1	4.1	-4.2	17.6	3.2	-3.3	10.9	4.6	-4.7	22.1	4.5	-4.6	21.2
<b>TOTAL</b>				<b>540.4</b>			<b>473.5</b>			<b>527.3</b>			<b>510.6</b>
<b>2012</b>		4.1			2.7			2.4			3.7		

\* IGR is the industrial growth rate

\*\*YMAF is the year moving average forecast



Appendix D: Exponential Moving Average Forecasts for industrial rate in Pakistan																
YEAR	IGR*	Ft with w=0.4	(A-F)	(A-F) <sup>2</sup>	Ft with w=0.5	(A-F)	(A-F) <sup>2</sup>	Ft with w=0.6	(A-F)	(A-F) <sup>2</sup>	Ft with w=0.7	(A-F)	(A-F) <sup>2</sup>	Ft with w=0.8	(A-F)	(A-F) <sup>2</sup>
1978	9.5	6.2	3.3	11.2	6.2	3.3	11.2	6.2	3.3	11.2	6.2	3.3	11.2	6.2	3.3	11.2
1979	7.6	7.5	0.1	0.0	7.8	-0.2	0.1	8.2	-0.6	0.3	8.5	-0.9	0.8	8.8	-1.2	1.5
1980	10.8	7.5	3.3	10.7	7.7	3.1	9.5	7.8	3.0	8.9	7.9	2.9	8.6	7.8	3.0	8.7
1981	9.4	8.8	0.6	0.3	9.3	0.1	0.0	9.6	-0.2	0.0	9.9	-0.5	0.3	10.2	-0.8	0.7
1982	10.7	9.1	1.6	2.7	9.3	1.4	1.9	9.5	1.2	1.5	9.6	1.1	1.3	9.6	1.1	1.3
1983	4.9	9.7	-4.8	23.2	10.0	-5.1	26.2	10.2	-5.3	28.2	10.4	-5.5	29.8	10.5	-5.6	31.1
1984	7.1	7.8	-0.7	0.5	7.5	-0.4	0.1	7.0	0.1	0.0	6.5	0.6	0.3	6.0	1.1	1.2
1985	7.8	7.5	0.3	0.1	7.3	0.5	0.3	7.1	0.7	0.5	6.9	0.9	0.8	6.9	0.9	0.8
1986	8.1	7.6	0.5	0.2	7.5	0.6	0.3	7.5	0.6	0.4	7.5	0.6	0.3	7.6	0.5	0.2
1987	8.6	7.8	0.8	0.6	7.8	0.8	0.6	7.9	0.7	0.5	7.9	0.7	0.4	8.0	0.6	0.4
1988	9.8	8.1	1.7	2.8	8.2	1.6	2.5	8.3	1.5	2.2	8.4	1.4	2.0	8.5	1.3	1.7
1989	4.7	8.8	-4.1	16.8	9.0	-4.3	18.5	9.2	-4.5	20.3	9.4	-4.7	21.9	9.5	-4.8	23.4
1990	6.4	7.2	-0.8	0.6	6.9	-0.5	0.2	6.5	-0.1	0.0	6.1	0.3	0.1	5.7	0.7	0.5
1991	6.9	6.9	0.0	0.0	6.6	0.3	0.1	6.4	0.5	0.2	6.3	0.6	0.3	6.3	0.6	0.4
1992	7.7	6.9	0.8	0.7	6.8	0.9	0.9	6.7	1.0	1.0	6.7	1.0	1.0	6.8	0.9	0.9
1993	5.5	7.2	-1.7	2.9	7.2	-1.7	3.0	7.3	-1.8	3.3	7.4	-1.9	3.6	7.5	-2.0	4.1
1994	4.5	6.5	-2.0	4.1	6.4	-1.9	3.5	6.2	-1.7	3.0	6.1	-1.6	2.5	5.9	-1.4	2.0
1995	0.7	5.7	-5.0	25.1	5.4	-4.7	22.4	5.2	-4.5	20.2	5.0	-4.3	18.2	4.8	-4.1	16.7
1996	4.7	3.7	1.0	1.0	3.1	1.6	2.7	2.5	2.2	4.9	2.0	2.7	7.4	1.5	3.2	10.1
1997	-0.3	4.1	-4.4	19.4	3.9	-4.2	17.5	3.8	-4.1	17.0	3.9	-4.2	17.5	4.1	-4.4	19.0
1998	6.1	2.3	3.8	14.1	1.8	4.3	18.6	1.3	4.8	22.6	1.0	5.1	26.5	0.6	5.5	30.6
1999	4.9	3.8	1.1	1.1	3.9	1.0	0.9	4.2	0.7	0.5	4.6	0.3	0.1	5.0	-0.1	0.0
2000	1.3	4.3	-3.0	8.8	4.4	-3.1	9.8	4.6	-3.3	11.0	4.8	-3.5	12.2	4.9	-3.6	13.1
2001	4.1	3.1	1.0	1.0	2.9	1.2	1.5	2.6	1.5	2.2	2.3	1.8	3.1	2.0	2.1	4.3
2002	2.7	3.5	-0.8	0.6	3.5	-0.8	0.6	3.5	-0.8	0.7	3.6	-0.9	0.8	3.7	-1.0	1.0
2003	4.2	3.2	1.0	1.1	3.1	1.1	1.2	3.0	1.2	1.4	3.0	1.2	1.5	2.9	1.3	1.7
2004	16.3	3.6	12.7	161.7	3.6	12.7	160.1	3.7	12.6	158.0	3.8	12.5	155.5	3.9	12.4	152.8
2005	12.1	8.7	3.4	11.8	10.0	2.1	4.5	11.3	0.8	0.7	12.6	-0.5	0.2	13.8	-1.7	3.0
2006	4.1	10.0	-5.9	35.3	11.0	-6.9	48.1	11.8	-7.7	58.8	12.2	-8.1	66.2	12.4	-8.3	69.6
2007	8.8	7.7	1.1	1.3	7.6	1.2	1.5	7.2	1.6	2.7	6.5	2.3	5.1	5.8	3.0	9.2
2008	1.4	8.1	-6.7	45.1	8.2	-6.8	46.0	8.1	-6.7	45.5	8.1	-6.7	45.2	8.2	-6.8	46.2
2009	-0.1	5.4	-5.5	30.6	4.8	-4.9	23.9	4.1	-4.2	17.6	3.4	-3.5	12.4	2.8	-2.9	8.2
2010	8.3	3.2	5.1	25.8	2.3	6.0	35.4	1.6	6.7	45.2	1.0	7.3	53.9	0.5	7.8	61.3
2011	-0.1	5.3	-5.4	28.6	5.3	-5.4	29.4	5.6	-5.7	32.6	6.1	-6.2	38.4	6.7	-6.8	46.7
209/20																
2012		3.1			2.6			503.1			1.8		522.9			583.4
2012								2.2						1.3		
IGR is the industrial growth rate																

\* IGR is the industrial growth rate

Appendix E: Moving Average Forecasts (MAF) for Services Sector Growth Rate in Pakistan													
YEAR	SSGR*	2YMAF**	(A-F)	(A-F) <sup>2</sup>	3YMAF	(A-F)	(A-F) <sup>2</sup>	4YMAF	(A-F)	(A-F) <sup>2</sup>	5YMAF	(A-F)	(A-F) <sup>2</sup>
1978	10.5												
1979	6.1												
1980	5.9	8.3	-2.4	5.8									
1981	6.6	6.0	0.6	0.4	7.5	-0.9	0.8						
1982	7.9	6.3	1.7	2.7	6.2	1.7	2.9	7.3	0.6	0.4			
1983	9.2	7.3	2.0	3.8	6.8	2.4	5.8	6.6	2.6	6.6	7.4	1.8	3.2
1984	7.9	8.6	-0.7	0.4	7.9	0.0	0.0	7.4	0.5	0.3	7.1	0.8	0.6
1985	7.9	8.6	-0.7	0.4	8.3	-0.4	0.2	7.9	0.0	0.0	7.5	0.4	0.2
1986	5.8	7.9	-2.1	4.4	8.3	-2.5	6.4	8.2	-2.4	5.9	7.9	-2.1	4.4
1987	5.9	6.9	-0.9	0.9	7.2	-1.3	1.7	7.7	-1.8	3.2	7.7	-1.8	3.4
1988	6.8	5.9	1.0	0.9	6.5	0.3	0.1	6.9	-0.1	0.0	7.3	-0.5	0.3
1989	3.8	6.4	-2.6	6.5	6.2	-2.4	5.6	6.6	-2.8	7.8	6.9	-3.1	9.4
1990	4.5	5.3	-0.8	0.6	5.5	-1.0	1.0	5.6	-1.1	1.2	6.0	-1.5	2.4
1991	5.2	4.2	1.1	1.1	5.0	0.2	0.0	5.3	0.0	0.0	5.4	-0.2	0.0
1992	6.8	4.9	2.0	3.8	4.5	2.3	5.3	5.1	1.7	3.0	5.2	1.6	2.4
1993	4.6	6.0	-1.4	2.0	5.5	-0.9	0.8	5.1	-0.5	0.2	5.4	-0.8	0.7
1994	4.2	5.7	-1.5	2.3	5.5	-1.3	1.8	5.3	-1.1	1.2	5.0	-0.8	0.6
1995	4.8	4.4	0.4	0.2	5.2	-0.4	0.2	5.2	-0.4	0.2	5.1	-0.3	0.1
1996	5	4.5	0.5	0.3	4.5	0.5	0.2	5.1	-0.1	0.0	5.1	-0.1	0.0
1997	3.6	4.9	-1.3	1.7	4.7	-1.1	1.1	4.7	-1.1	1.1	5.1	-1.5	2.2
1998	1.6	4.3	-2.7	7.3	4.5	-2.9	8.2	4.4	-2.8	7.8	4.4	-2.8	8.1
1999	5	2.6	2.4	5.8	3.4	1.6	2.6	3.8	1.3	1.6	3.8	1.2	1.3
2000	4.2	3.3	0.9	0.8	3.4	0.8	0.6	3.8	0.4	0.2	4.0	0.2	0.0
2001	3.1	4.6	-1.5	2.3	3.6	-0.5	0.3	3.6	-0.5	0.3	3.9	-0.8	0.6
2002	4.8	3.7	1.2	1.3	4.1	0.7	0.5	3.5	1.3	1.8	3.5	1.3	1.7
2003	5.2	4.0	1.3	1.6	4.0	1.2	1.4	4.3	0.9	0.9	3.7	1.5	2.1
2004	5.8	5.0	0.8	0.6	4.4	1.4	2.1	4.3	1.5	2.2	4.5	1.3	1.8
2005	8.5	5.5	3.0	9.0	5.3	3.2	10.5	4.7	3.8	14.3	4.6	3.9	15.1
2006	6.5	7.2	-0.7	0.4	6.5	0.0	0.0	6.1	0.4	0.2	5.5	1.0	1.0
2007	7	7.5	-0.5	0.3	6.9	0.1	0.0	6.5	0.5	0.3	6.2	0.8	0.7
2008	6	6.8	-0.8	0.6	7.3	-1.3	1.8	7.0	-1.0	0.9	6.6	-0.6	0.4
2009	1.7	6.5	-4.8	23.0	6.5	-4.8	23.0	7.0	-5.3	28.1	6.8	-5.1	25.6
2010	2.9	3.9	-1.0	0.9	4.9	-2.0	4.0	5.3	-2.4	5.8	5.9	-3.0	9.2
2011	4.1	2.3	1.8	3.2	3.5	0.6	0.3	4.4	-0.3	0.1	4.8	-0.7	0.5
TOTAL				95.1			89.0			95.1			98.0
2012		3.5			2.9			3.7			4.3		

\* SSGR is the services sector growth rate

\*\*YMAF is the year moving average forecast

Appendix F: Exponential Moving Average Forecasts for Services Sector rate in Pakistan													
YEAR	SSGR*	Ft with w=0.4	(A-F)	(A-F) <sup>2</sup>	Ft with w=0.5	(A-F)	(A-F) <sup>2</sup>	Ft with w=0.6	(A-F)	(A-F) <sup>2</sup>	Ft with w=0.7	(A-F)	(A-F) <sup>2</sup>
1978	10.5	5.6	4.9	24.3	5.6	4.9	24.3	5.6	4.9	24.3	5.6	4.9	24.3
1979	6.1	7.5	-1.4	2.1	8.0	-1.9	3.7	8.5	-2.4	5.9	9.0	-2.9	8.5
1980	5.9	7.0	-1.1	1.1	7.1	-1.2	1.4	7.1	-1.2	1.4	7.0	-1.1	1.2
1981	6.6	6.5	0.1	0.0	6.5	0.1	0.0	6.4	0.2	0.1	6.2	0.4	0.1
1982	7.9	6.6	1.3	1.8	6.5	1.4	1.8	6.5	1.4	1.9	6.5	1.4	2.0
1983	9.2	7.1	2.1	4.4	7.2	2.0	3.9	7.3	1.9	3.4	7.5	1.7	3.0
1984	7.9	7.9	0.0	0.0	8.2	-0.3	0.1	8.5	-0.6	0.3	8.7	-0.8	0.6
1985	7.9	7.9	0.0	0.0	8.1	-0.2	0.0	8.1	-0.2	0.0	8.1	-0.2	0.1
1986	5.8	7.9	-2.1	4.5	8.0	-2.2	4.7	8.0	-2.2	4.8	8.0	-2.2	4.7
1987	5.9	7.1	-1.2	1.4	6.9	-1.0	1.0	6.7	-0.8	0.6	6.5	-0.6	0.3
1988	6.8	6.6	0.2	0.0	6.4	0.4	0.2	6.2	0.6	0.3	6.1	0.7	0.5
1989	3.8	6.7	-2.9	8.3	6.6	-2.8	7.8	6.6	-2.8	7.6	6.6	-2.8	7.7
1990	4.5	5.5	-1.0	1.1	5.2	-0.7	0.5	4.9	-0.4	0.2	4.6	-0.1	0.0
1991	5.2	5.1	0.1	0.0	4.8	0.4	0.1	4.7	0.5	0.3	4.5	0.7	0.5
1992	6.8	5.2	1.6	2.7	5.0	1.8	3.2	5.0	1.8	3.3	5.0	1.8	3.2
1993	4.6	5.8	-1.2	1.5	5.9	-1.3	1.7	6.1	-1.5	2.2	6.3	-1.7	2.8
1994	4.2	5.3	-1.1	1.3	5.3	-1.1	1.1	5.2	-1.0	1.0	5.1	-0.9	0.8
1995	4.8	4.9	-0.1	0.0	4.7	0.1	0.0	4.6	0.2	0.0	4.5	0.3	0.1
1996	5	4.8	0.2	0.0	4.8	0.2	0.1	4.7	0.3	0.1	4.7	0.3	0.1
1997	3.6	4.9	-1.3	1.7	4.9	-1.3	1.6	4.9	-1.3	1.7	4.9	-1.3	1.7
1998	1.6	4.4	-2.8	7.8	4.2	-2.6	7.0	4.1	-2.5	6.3	4.0	-2.4	5.7
1999	5	3.3	1.7	3.0	2.9	2.1	4.3	2.6	2.4	5.7	2.3	2.7	7.2
2000	4.2	4.0	0.2	0.1	4.0	0.2	0.1	4.0	0.2	0.0	4.2	0.0	0.4
2001	3.1	4.1	-1.0	0.9	4.1	-1.0	1.0	4.1	-1.0	1.1	4.2	-1.1	1.2
2002	4.8	3.7	1.1	1.3	3.6	1.2	1.5	3.5	1.3	1.7	3.4	1.4	1.9
2003	5.2	4.1	1.1	1.2	4.2	1.0	1.0	4.3	0.9	0.8	4.4	0.8	0.7
2004	5.8	4.6	1.2	1.6	4.7	1.1	1.2	4.8	1.0	0.9	5.0	0.8	0.7
2005	8.5	5.1	3.4	11.9	5.2	3.3	10.6	5.4	3.1	9.5	5.5	3.0	8.7
2006	6.5	6.4	0.1	0.0	6.9	-0.4	0.1	7.3	-0.8	0.6	7.6	-1.1	1.2
2007	7	6.5	0.5	0.3	6.7	0.3	0.1	6.8	0.2	0.0	6.8	0.2	0.0
2008	6	6.7	-0.7	0.5	6.8	-0.8	0.7	6.9	-0.9	0.9	7.0	-1.0	0.9
2009	1.7	6.4	-4.7	22.1	6.4	-4.7	22.3	6.4	-4.7	21.8	6.3	-4.6	21.0
2010	2.9	4.5	-1.6	2.6	4.1	-1.2	1.3	3.6	-0.7	0.4	3.1	-0.2	0.0
2011	4.1	3.9	0.2	0.1	3.5	0.6	0.4	3.2	0.9	0.9	3.0	1.1	1.3
18940				109.3			108.9			110.1			112.9
2012		4.0			3.8			3.7			3.8		3.8

\* SSGR is the Services sector growth rate

Appendix G: Moving Average Forecasts (MAF) for GDP Growth Rate in Pakistan												
YEAR	GDPGR*	2YMAF**	(A-F)	(A-F) <sup>2</sup>	3YMAF	(A-F)	(A-F) <sup>2</sup>	4YMAF	(A-F)	(A-F) <sup>2</sup>	5YMAF	(A-F) <sup>2</sup>
1978	7.7											
1979	5.5											
1980	7.3	6.6	0.7	0.5								
1981	6.4	6.4	0.0	0.0	6.8	-0.4	0.2					
1982	7.6	6.9	0.8	0.6	6.4	1.2	1.4	6.7	0.9	0.8		
1983	6.8	7.0	-0.2	0.0	7.1	-0.3	0.1	6.7	0.1	0.0	6.9	-0.1
1984	4	7.2	-3.2	10.2	6.9	-2.9	8.6	7.0	-3.0	9.2	6.7	-2.7
1985	8.7	5.4	3.3	10.9	6.1	2.6	6.6	6.2	2.5	6.3	6.4	2.3
1986	6.4	6.4	0.1	0.0	6.5	-0.1	0.0	6.8	-0.4	0.1	6.7	-0.3
1987	5.8	7.6	-1.8	3.1	6.4	-0.6	0.3	6.5	-0.7	0.5	6.7	-0.9
1988	6.4	6.1	0.3	0.1	7.0	-0.6	0.3	6.2	0.2	0.0	6.3	0.1
1989	4.8	6.1	-1.3	1.7	6.2	-1.4	2.0	6.8	-2.0	4.1	6.3	-1.5
1990	4.6	5.6	-1.0	1.0	5.7	-1.1	1.1	5.9	-1.3	1.6	6.4	-1.8
1991	5.6	4.7	0.9	0.8	5.3	0.3	0.1	5.4	0.2	0.0	5.6	0.0
1992	7.7	5.1	2.6	6.8	5.0	2.7	7.3	5.4	2.4	5.5	5.4	2.3
1993	2.3	6.7	-4.4	18.9	6.0	-3.7	13.4	5.7	-3.4	11.4	5.8	-3.5
1994	4.5	5.0	-0.5	0.3	5.2	-0.7	0.5	5.1	-0.6	0.3	5.0	-0.5
1995	4.1	3.4	0.7	0.5	4.8	-0.7	0.5	5.0	-0.9	0.9	4.9	-0.8
1996	6.6	4.3	2.3	5.3	3.6	3.0	8.8	4.7	2.0	3.8	4.8	1.8
1997	1.7	5.4	-3.7	13.3	5.1	-3.4	11.3	4.4	-2.7	7.2	5.0	-3.3
1998	3.5	4.2	-0.6	0.4	4.1	-0.6	0.4	4.2	-0.7	0.5	3.8	-0.3
1999	4.2	2.6	1.6	2.6	3.9	0.3	0.1	4.0	0.2	0.1	4.1	0.1
2000	3.9	3.9	0.0	0.0	3.1	0.8	0.6	4.0	-0.1	0.0	4.0	-0.1
2001	2	4.1	-2.1	4.2	3.9	-1.9	3.5	3.3	-1.3	1.8	4.0	-2.0
2002	3.1	3.0	0.2	0.0	3.4	-0.3	0.1	3.4	-0.3	0.1	3.1	0.0
2003	4.7	2.6	2.2	4.6	3.0	1.7	2.9	3.3	1.4	2.0	3.3	1.4
2004	7.5	3.9	3.6	13.0	3.3	4.2	17.9	3.4	4.1	16.6	3.6	3.9
2005	9	6.1	2.9	8.4	5.1	3.9	15.2	4.3	4.7	21.9	4.2	4.8
2006	5.8	8.3	-2.5	6.0	7.1	-1.3	1.6	6.1	-0.3	0.1	5.3	0.5
2007	6.8	7.4	-0.6	0.4	7.4	-0.6	0.4	6.8	0.0	0.0	6.0	0.8
2008	3.7	6.3	-2.6	6.8	7.2	-3.5	12.3	7.3	-3.6	12.8	6.8	-3.1
2009	1.7	5.3	-3.6	12.6	5.4	-3.7	13.9	6.3	-4.6	21.4	6.6	-4.9
2010	3.8	2.7	1.1	1.2	4.1	-0.3	0.1	4.5	-0.7	0.5	5.4	-1.6
2011	2.4	2.8	-0.4	0.1	3.1	-0.7	0.4	4.0	-1.6	2.6	4.4	-2.0
TOTAL				134.2			132.0			131.7		135.9
2012		3.1			2.6			2.9			3.7	

\* GDPGR is the Gross Domestic Product Growth rate

\*\*YMAF is the year moving average forecast

Appendix H: Exponential Moving Average Forecasts for GDP Growth rate in Pakistan															
YEAR	GDGR*	Ft with w=0.4	(A-F)	(A-F) <sup>2</sup>	Ft with w=0.5	(A-F)	(A-F) <sup>2</sup>	Ft with w=0.6	(A-F)	(A-F) <sup>2</sup>	Ft with w=0.7	(A-F)	(A-F) <sup>2</sup>	Ft with w=0.8	(A-F)
1978	7.7	5.2	2.5	6.3	5.2	2.5	6.3	5.2	2.5	6.3	5.2	2.5	6.3	5.2	2.5
1979	5.5	6.2	-0.7	0.5	6.4	-0.9	0.9	6.7	-1.2	1.4	6.9	-1.4	2.1	7.2	-1.7
1980	7.3	5.9	1.4	1.9	6.0	1.3	1.8	6.0	1.3	1.7	5.9	1.4	1.9	5.8	1.5
1981	6.4	6.5	-0.1	0.0	6.6	-0.2	0.1	6.8	-0.4	0.1	6.9	-0.5	0.2	7.0	-0.6
1982	7.6	6.4	1.2	1.3	6.5	1.1	1.2	6.5	1.1	1.1	6.5	1.1	1.1	6.5	1.1
1983	6.8	6.9	-0.1	0.0	7.1	-0.3	0.1	7.2	-0.4	0.1	7.3	-0.5	0.2	7.4	-0.6
1984	4	6.9	-2.9	8.2	6.9	-2.9	8.6	7.0	-3.0	8.7	6.9	-2.9	8.7	6.9	-2.9
1985	8.7	5.7	3.0	8.9	5.5	3.2	10.5	5.2	3.5	12.4	4.9	3.8	14.6	4.6	4.1
1986	6.4	6.9	-0.5	0.3	7.1	-0.7	0.5	7.3	-0.9	0.8	7.6	-1.2	1.3	7.9	-1.5
1987	5.8	6.7	-0.9	0.8	6.7	-0.9	0.9	6.8	-1.0	0.9	6.7	-0.9	0.9	6.7	-0.9
1988	6.4	6.3	0.1	0.0	6.3	0.1	0.0	6.2	0.2	0.0	6.1	0.3	0.1	6.0	0.4
1989	4.8	6.4	-1.6	2.5	6.3	-1.5	2.4	6.3	-1.5	2.3	6.3	-1.5	2.3	6.3	-1.5
1990	4.6	5.7	-1.1	1.3	5.6	-1.0	0.9	5.4	-0.8	0.6	5.3	-0.7	0.4	5.1	-0.5
1991	5.6	5.3	0.3	0.1	5.1	0.5	0.3	4.9	0.7	0.5	4.8	0.8	0.6	4.7	0.9
1992	7.7	5.4	2.3	5.2	5.3	2.4	5.6	5.3	2.4	5.6	5.4	2.3	5.5	5.4	2.3
1993	2.3	6.3	-4.0	16.2	6.5	-4.2	17.8	6.8	-4.5	19.8	7.0	-4.7	22.1	7.2	-4.9
1994	4.5	4.7	-0.2	0.0	4.4	0.1	0.0	4.1	0.4	0.2	3.7	0.8	0.6	3.3	1.2
1995	4.1	4.6	-0.5	0.3	4.5	-0.4	0.1	4.3	-0.2	0.1	4.3	-0.2	0.0	4.3	-0.2
1996	6.6	4.4	2.2	4.8	4.3	2.3	5.4	4.2	2.4	5.8	4.1	2.5	6.0	4.1	2.5
1997	1.7	5.3	-3.6	12.9	5.4	-3.7	14.0	5.6	-3.9	15.5	5.9	-4.2	17.3	6.1	-4.4
1998	3.5	3.9	-0.4	0.1	3.6	-0.1	0.0	3.3	0.2	0.1	2.9	0.6	0.3	2.6	0.9
1999	4.2	3.7	0.5	0.2	3.5	0.7	0.4	3.4	0.8	0.6	3.3	0.9	0.7	3.3	0.9
2000	3.9	3.9	0.0	0.0	3.9	0.0	0.0	3.9	0.0	0.0	3.9	0.0	0.0	4.0	-0.1
2001	2	3.9	-1.9	3.6	3.9	-1.9	3.5	3.9	-1.9	3.6	3.9	-1.9	3.7	3.9	-1.9
2002	3.1	3.1	0.0	0.0	2.9	0.2	0.0	2.8	0.3	0.1	2.6	0.5	0.3	2.4	0.7
2003	4.7	3.1	1.6	2.5	3.0	1.7	2.8	3.0	1.7	3.0	2.9	1.8	3.1	3.0	1.7
2004	7.5	3.8	3.7	14.0	3.9	3.6	13.2	4.0	3.5	12.2	4.2	3.3	11.1	4.4	3.1
2005	9	5.3	3.7	14.0	5.7	3.3	11.0	6.1	2.9	8.4	6.5	2.5	6.2	6.9	2.1
2006	5.8	6.8	-1.0	0.9	7.3	-1.5	2.4	7.8	-2.0	4.2	8.3	-2.5	6.0	8.6	-2.8
2007	6.8	6.4	0.4	0.2	6.6	0.2	0.1	6.6	0.2	0.0	6.5	0.3	0.1	6.4	0.4
2008	3.7	6.5	-2.8	8.1	6.7	-3.0	8.9	6.7	-3.0	9.2	6.7	-3.0	9.1	6.7	-3.0
2009	1.7	5.4	-3.7	13.7	5.2	-3.5	12.2	4.9	-3.2	10.3	4.6	-2.9	8.4	4.3	-2.6
2010	3.8	3.9	-0.1	0.0	3.4	0.4	0.1	3.0	0.8	0.7	2.6	1.2	1.5	2.2	1.6
2011	2.4	3.9	-1.5	2.2	3.6	-1.2	1.5	3.5	-1.1	1.2	3.4	-1.0	1.1	3.5	-1.1
2012	176.60			131.1			133.4			137.6			143.9		152.5
		3.3			3.0			2.8			2.7			2.6	

\* GDGR is the GDP growth rate