

***Pakistan Economic Growth under Markov
Switching Regimes with Endogenous Transition
Probabilities***



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MY BELOVED PARENTS

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LIST OF ABBREVIATIONS

TVTP	Time Varying Transition Probabilities
CTP	Constant Transition Probabilities
ARCH-M	ARCH-in-means
GDP	Gross Domestic Product
TV-MSM	Time Varying Markov Switching Model
DCs'	Developing Countries
ARDL	Autoregressive Distributed Lag
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
FDI	Foreign Direct Investment
EGARCH Heteroskedasticity	Exponential Generalized Autoregressive Conditional
ODA	Official Development Assistance
TOT	Terms of Trade
AIC	Akaike Information Criterion

ABSTRACT

This research aims to model the Pakistan long-run per capita growth under Markov switching regimes to explain regime changes in the economic growth for the period 1970 to 2015. The objective is attained with the help of Markov Switching Models, namely, the Hamilton (1989) Markov Switching Model and Diebold et al. (1999) Time Varying Markov Switching Model. We found the evidence of nonlinearity in the per capita economic growth, and recognized two different levels in the data related with stagnation and stable growth regimes. In particular, the probability of remaining in the stagnation regime is high as compare to the stable growth regime. Result also indicate that the probability of remaining in the stable growth regime increases with a fall in inflation and with the increment in the terms of trade and foreign direct investment. If the economy is in stagnation regime, an increase in foreign direct investment and terms of trade decreases the probability of remaining in this state, while a rise in inflation increases this probability. From the AIC value, it is found that the Markov switching model with Time Varying Transition Probabilities (TVTP) is the best fitted model then the Hamilton Markov Switching Model.

CHAPTER 1

INTRODUCTION

Economic growth contributes for economic development as root for tree (Younis *et al.* 2008). It is considered most dominant tool for raising people's incomes and reducing poverty (Ravallion, 2007). Positive and stable growth not only helps to maintain the existing quality of life, but also helps to improve it. Therefore, stable and high standard of living require for both high and stable economic growth.

Long-run economic growth is generally defined as a relatively steady pattern (single long-run trend) characterized by business cycles (short-run variations) round it. However, this growth explanation does not accommodate well the growth paths observed in developing economies (Trajkova, 2013). In fact, developing countries are victims of numerous shocks, as the result, two characteristics of growth -instability and volatility- much high in them. Usually, instability is describes as shifts in the growth trend. It can also be described as abrupt turns from positive to negative growth rates (or vice versa). As long as, volatility is describes as the deviations from the trend, therefore, typically it is measured by standard deviation from trend. Due to these peculiar characteristics, growth became a non-linear switching process instead of a smooth linear process. In general, it cannot represented well by single long- run trend.

For understanding the entire process of growth, types of shocks are very important. The sufficiently large shocks induce breaks in the long run trend of economic growth and generate instability of growth. Particularly, these breaks induce specific broken growth lines instead of a single long-run growth trend. As the result of persistent effect of shocks, growth shift from one regime/ trend to another. Although small shocks induce variations round a particular trend and create the volatility (Pritchett, 2000). Overall, path of economic growth become non-linear as the result of switching between various regimes. Regimes are the different balanced growth paths with different average growth (mean) and different growth volatility (variance) (Jerzmanowski, 2006).

Although countries visit all regimes but persistency of the regimes depend on the country's specific characteristics. In developing countries, specific characteristics such as

weak institutions, less diversified terms of trade, high inflation, less stable financial system, and less availability of risk diversification tools mainly contribute in the high frequency of peculiar characteristics and contribute to rise the persistency of lower growth regime. Therefore, once developing countries visit a high growth regimes, they have less ability to sustain it relative to developed countries and are likely to return lower growth regime and vice via.

As far as Pakistan's economy is concerned, economic growth is not always smooth but has been subject to the great fluctuations throughout the period. It is characterized by five major breaks at the years 1951, 1960, 1970, 1992, 2003, 2008. Reasons for these instabilities are major shocks such as collapse in Pakistan's terms of trade after Korean War 1950-1953, 9/11 incidence of 2001, financial crises of 2008 etc. (McCartney, 2011). Due to persistent effect of shocks, path of economic growth exhibit different deterministic trend. Duration and average growth of each regimes is different from the other specified as 1951/52 to 1958/59 , 1960/61 to 1969/70, 1970/71 to 1991/92, 1992/93 to 2002/03, 2003/04 to 2008/09 and 3.5%, 6.1%, 4.2%, 6.6%, 4.4%, 6.1% respectively (McCartney,2011). At national level, a strand of literature made it clear that shocks are responsible for volatility in growth and shifts in growth regime through drastically disturbing the stability of growth determinants. And internal situation has less ability to absorb the severity of shocks. Such as output and export structures are less diversified. In return, terms of trade are very unstable (due to droughts on agricultural production, unprecedented rise in oil and food price, political instability). Furthermore, high and volatile inflation of Pakistan is also unfavorable for economic growth (Saleem; 2008, Khan and Senhadji; 2001, Mubarik; 2005 and Ayyoub *et al.*; 2013). Pakistan heavily relies on the external finance for encouraging development and managing economic shocks. Ahmed and Zarzoso (2013) found that foreign direct investment is the more unstable source of external finance in Pakistan as compare to remittances and official development assistance .As well as its variability also leads to increase variability of receiving output.

After analyzing the literature at international and national level we may conclude that international literature explore that economic growth cannot be depicted well by single long- run trend in developing countries because of high instability and volatility. Consequently, it follows the nonlinear path and undergoes different growth regimes in which its behavior changes significantly. Growth determinants are volatile in nature, they

are not only responsible for growth fluctuations, but also influence the persistency of a particular growth regime. (Perron ;1989, Easterly *et al.*; (1993) ,Pritchett ;2000, Jerzmanowski ;2006, Misas and Ramírez ;2007; 2010). On the basis of limited knowledge, we come to know that the analysis of growth instability and volatility, exploration of nonlinear growth path by identifying growth regimes and the effect of growth determinant on the growth regime is totally ignored up till now within Pakistan. We will try to fill this gap.

1.1 Significance of the Study

Most of the studies focus on the factors that affect average growth rates across countries and ignores the fact that growth is characterized by large swings and fluctuations. This research allows to switch country among different growth regimes. In order to characterize these regimes and the transitions among them we estimate Markov-switching regressions.

1.2 Objective of the Study

Primary objective of this study are

- To analysis the instability and volatility of growth.
- To explore the growth regimes and their transition probabilities.

CHAPTER 2

LITERATURE REVIEW

This chapter is divided into two sections. Section 2.1 discuss the reviews related to international studies, while section 2.2 discuss the literature reviews with reference to Pakistan.

2.1 Reviews related to international studies

Reviews at international level is divided into three parts. First part explain the relationship between the "trend" and "cycle" movements, second part explain the relationship between trend, cycle and growth regime, third part explain the relationship between growth and its determinants.

2.1.1 Relationship between the "trend" and "cycle" movements

At international level, a strand of papers conform that volatility is not neutral. It put down adverse effects on average of long-term growth. The seminal paper of Ramey and Ramey (1995) established significant and negative connection between business-cycle behavior and long-run performance of economic growth (trend). It illustrated that countries with higher volatility have lower mean growth, even after controlling for other country-specific growth correlates. The negative effect of volatility seem mainly from volatility of innovations to GDP growth, which reflects uncertainty. In order to overcome the problem of heteroscedasticity (or to account varying spread of volatility), volatility further allowed to depends on exogenous variable (squared forecast residuals of the government-spending). Rafferty (2003) states that business cycle is asymmetric with longer and less steep expansions than recessions. This means that the effect of recessions may exceed then the effect of expansions or vice versa, there may be possibility that there net effect on economic growth is negative. Fatas (2001) found that asymmetric behavior of volatility can lead to a decrease in long-term growth rates. Alternatively, even without asymmetric volatilities, uncertainty related to volatility can lead to lower growth. He revealed that countries with a higher inflation rate, more uncertain monetary policy and more volatile fiscal policy have a more pronounced business cycle. He used time-invariant measure of volatility while study of Ramey and Ramey (1995) enlightened that volatility of growth vary over time. Kroft and Lloyd-Ellis (2002) decomposed the volatility into two parts include short run year to year uncertainty and long term business cycle movements. They found that negative relationship is coming from the interaction between growth and

business cycle movements by using the special case of nonlinear “ARCH-in-means” (ARCH-M) model in which heteroskedasticity is captured by variation in a country dummy. Loayza (2003) also dissected the volatility into two parts include sharp negative fluctuations (crisis volatility) and small cyclical movements (normal volatility) and in opposition of Kroft and Lloyed-Ellis (2002) study, uncovered that negative impact on growth is mostly due to large recessions rather than normal cyclical fluctuations. In their study, “Crisis” volatility is the portion of the standard deviation Gross Domestic Product (GDP) growth or output gap that is above then the defined threshold. “Normal” volatility is then defined as the portion of the standard deviation of GDP growth or output gap corresponding to deviations that fall within the threshold. Fatas and Ramey and Ramey measure of volatility revealed the effect of all movements on growth. It does not revealed contribution of the components individually in generating volatility. Wolf (2003) revealed three distinct relationships between the growth and volatility by conducting the graphical analysis. For the group of low-income countries, growth volatility and average growth are negatively associated. For the middle-income group, volatility and average growth are almost uncorrelated, while for the high-income group, there is a positive association. By plotting the standard deviation for 1961–80 against the standard deviation for 1981–2000, he also made it clear that volatility vary over time. The experience of middle-income and low-income countries is more varied then higher income. Hnatkovska and Loayza (2005) have reported evidence supporting the view that adverse effects of volatility on growth is larger in countries that are poor, institutionally underdeveloped and that such impact results mostly from crises or large recessions rather than normal cyclical fluctuations. Tochkov and Tochkov (2009) disclosed that provinces with higher volatility have lower growth, but this is largely due to common shocks across provinces while region-specific variables has no contribution in growth-volatility relationship. All above literature explain direction and significant of relationship between economic growth and business cycles through combining the volatility of growth and instability of growth. Concentrating on average growth rates provide little insight into the growth patterns of an individual country or how the growth rates evolve over time (Byrne; 2010).

2.1.2 Relationship between "trend" and "cycle and growth regime

Recently, a growth literature started to look in between two components "trend" and "cycle" that is shift in growth series. This literature explored different growth regimes, and explain causes of regimes (Perron 1989; Easterly et al., 1993; Pritchett, 2000;

Jerzmanowski, 2006; Misas and Ramírez, 2007; Kerekes, 2009; Byrne, 2010; Morier et al., 2011). In 1989, Perron found that most macroeconomic time series are not characterized by the presence of a unit root. Fluctuations are indeed stationary around a deterministic trend function. The only shocks which have had persistent effects are the 1929 crash and the 1973 oil price shock. In Pritchett (2000), six different growth patterns are examined to analyze the difference in pattern of growth among countries by conducting breaks and variations analysis. According to him, instability is the big shift that change the regime, while volatility is the frequency of the shifts around the same trend line.

In Misas and Ramírez (2007), the evidence of nonlinearity in the annual rate of growth is observed by identified stages of transition "depression and sustainable". First-order Markov Switching Regime Model (MSRM) with fixed transition probabilities is employed for this analysis. In Jerzmanowski (2006), the Markov-switching model is used with single explanatory variable of the quality of the institutions for the transition matrix. Four growth regimes and positive relationship between quality of the institutions and growth regime has been observed. This study, however, implicitly assumes a homogeneous effect of growth regressors across countries, which is quite unlikely given growth rates of developing countries are highly instable (Pritchett, 2000). Allowing parameters to vary among the different individuals (groups of countries like developing vs. developed) was required in order to tackle the issue of parameter heterogeneity. In Kerekes (2009), three group of countries are classified on the basis of same growth pattern in order to allow the parameters heterogeneity. Special attention has been paid to the estimation of the transition probabilities which shows that country specific characteristics regarding to availability of human capital and institutions are responsible for different dynamics of growth as well as direct relationship between the persistency of a regime and growth fundamentals is observed. Model specification of Kerekes (2009) is less restricted as compare to Jerzmanowski (2006) since it provides different transition probabilities for countries having same quality of institutions .Although fails to deliver separate transition matrix for each country. Common limitation of these studies is that transition probabilities remains constant over time. Constant probabilities, however, cannot capture the effect of changes over time which may arise due to various shock such as terms of trade shocks, oil prices and any other factor that changes progressively over time such as quality of institutions which changed slowly but assuming that they do not change at all is obviously quite restrictive. In

order to overcome the limitation, it was necessary to take a set determinants for the Probability vector.

In Byrne (2010), two possible regimes: stable positive average growth rate regime and a negative and volatile growth rate regime are identified by employing Time-Varying Markov Switching Model (TV-MSM). Plausible estimates of the transition probabilities are attained by considering the factors such as terms of trade, institutional quality, output composition (manufacturing, fuel, agriculture) and education. The main contribution of this study is the consideration of TV-MSM. In 2010, study of Misas and Ramírez (2007) is extended by allowing transition probabilities to vary for modeling the Colombian growth rate and it also confirmed the validity of TVTP model against the Fixed TP model. Economic variables that are responsible of variation in growth rate are incorporated as the determinants of transition probabilities. Additional information from these variables is conformed as transition probabilities are changes significantly over time.

2.1.3 Relationship between Growth and its Determinants

Hausmann *et al.*, (2004) explored that a large positive terms-of-trade shock increases the probability of experiencing a growth acceleration as well as Becker and Mauro (2006) found that negative terms-of-trade shocks leads to reduction in output in developing countries. Fatima (2010) examined that long-term trend of terms of trade is highly inconsistency. It remains favorable only for few years and most of the period, it showed significant worsening behavior, and therefore net effect of terms of trade on economic growth is negative. Terms of trade effect economic growth not only negatively but also contributes to increased fluctuations in the growth of output (GDP). Mendoza (1995) concluded that changes in the terms of trade can account for half of the output volatility in developing countries. One reason for this may be the reliance of most Developing Countries (DCs') exports mainly on the commodity products. Prices of primary commodities are more volatile than those of manufactured goods (Fatima; 2010) as well as drought and crop disease often lead to large falls in crop yield. To explore the relationship between the volatility of TOT and overall GDP, Kiiza and Pederson (2013) conducted co-integration and the VECM analysis and revealed negative and strong relation between them both in short- and long-run. According to them, a large fraction of EAC states exports contains primary commodities. These commodities are prone to high terms of trade

volatility (shocks), which has a significant negative impact on GDP and export revenue as well. Blattman et al. (2003) also show less developed countries at the periphery (which exported primary products and imported manufactures) are more sensitive to terms of trade volatility and economic growth is positive associated with terms of trade while negative related with terms of trade volatility. Bilquees and Mukhtar (2012) exposed that instability of export and terms of trade cause to Indian growth both in short-run and long-run. Accordingly, both instabilities lead to macroeconomic instability and causes income instability by creating uncertainty about the expected return from investment. While, study of Jawaid and Waheed (2011), revealed that both terms of trade and volatility of terms of trade have significant positive effect on growth of India. According to the study, countries are become more liberalize and become specialization due to globalization. Specialization is contributing in enhancing economic growth while higher dependency of countries is contributing to make environment vulnerable. Countries are experiencing more shocks than before. It indicate that volatility and growth move together. Funke *et al.*, (2008) identified that improvement in government stability and the institutional environment contributed to a fast recovery in growth after persistent negative terms of trade shocks.

Duasa (2007) investigated the link between Foreign Direct Investment (FDI) and growth. For the stability analysis, first difference of log Foreign Direct Investment (FDI) is introduced in variance equation of the GARCH model. Finding explored that impact of foreign direct investment on the stability of economic growth is significant and volatility of FDI is growth-retarding. Choong *et al* (2011) shows that Foreign Direct Investment (FDI) has positive and significant effect on growth in all the countries. Although, volatility of Foreign Direct Investment (FDI) has negative effect on growth in developing countries (Indonesia, Malaysia, the Philippines and Thailand) except developed country such as Singapore, even after controlling for some country-specific growth in long run by employing ARDL model. According to the study, result is expected as both real GDP growth rate and Foreign Direct Investment (FDI) volatility was highly unstable, particularly in the period of the East Asian financial crisis. A possible explanation of differentiated effect of volatility is financial system. The financial system of Singapore is exclusive relatively, therefore it has greater the ability to stabilize the variability. Alpaslan (2011) found out that Foreign Direct Investment (FDI) volatility retards the economic growth in long-run by employing Autoregressive Distributed Lag (ARDL) co integration procedure. Lelei Ngeny and Mutuku (2014) found that magnitude of Foreign Direct Investment (FDI)

volatility is low by employing Exponential Generalized Autoregressive Conditional Heteroskedasticity (EGARCH). While persistency is higher; indicates volatility does not take a long time to clear. Moreover, the negative sign of leverage effect coefficient revealed positive shocks (good news) generate less volatility than negative shocks (bad news). Results based on the long run (ARDL approach) and short run (ECM) disclosed Foreign Direct Investment (FDI) affects positively whereas Foreign Direct Investment (FDI) volatility affects negatively to economic growth. The size of the coefficient of the error correction term suggests relatively high speed of adjustment from the short run deviation to the long run equilibrium. The study recommended that government will have to continue to attract Foreign Direct Investment (FDI) given its role in the growth process. Barugahara *et al.* (2012) revealed that both inflation level and inflation volatility reduce the economic growth while their effect on economic growth is very small then all other variables such as investment, trade openness, life expectancy and democracy.

2.2 Literature review related to Pakistan

At national level, review of growth-volatility relation comprises on two streams. One stream explore the behavior of growth process. Second stream explore the relationship between the economic growth and its determinants.

2.2.1 Economic Growth and Business Cycle

In the case of Pakistan, Farooq Arby (2001) dissected the growth of real GDP of Pakistan into three components include long-run trend, business cycles and short-run shocks. Graphical analysis of the components suggest that Pakistan's economic growth has a positive long-run trend throughout the period. Number of positive and negative shocks to the economy are also identified i.e. cotton production in Pakistan. In 2012, Mahmood and Farooq Arby decomposed the real GDP growth again. The graphical analysis of decomposition display the relationship between growth trend and business cycle. Study also describes that phases of recession are longer then recovery.

2.2.2 Relationship between Growth and its Determinants

It is demonstrated that external finance play important role in encouraging development and managing economic shocks. Unfortunately, sources of external finance are volatile themselves. Ahmed and Zarzoso (2013) conduct a study to analysis the volatility of external finance and its effect on the economy. Finding reflects foreign direct investment is the more volatile source of external finance in Pakistan as compare to remittances and Official Development Assistance (ODA) as well as its volatility also leads to increase volatility of receiving output. It indicates that FDI may be a cause of growth instability or regime switching.

Economic growth of Pakistan is also greatly affected by price instability. In Suhban and Hayat (2012); empirics suggest negative relationship between price instability and growth. According to the study price instability is the cost of terrorism war. According to the study, an increase in prices leads to reduction in purchasing power, hence further impact on the consumption. As consumption is the one component of the income identity, put negative effect on the GDP. Moreover, improper price regulation and imperfect information about aggregate price level causes inflationary situation in the economy. High and unpredictable inflation slows down the process of economic growth and hurts the economy. Among demand and supply shocks, inflation, and technological shocks etc., high inflation affects the economy adversely (Afzal *et al*; 2013). In Mallik and Chowdhury (2001) found that that inflation and economic growth causes each other in short-run while only inflation cause economic growth in long run for four South Asian countries (Bangladesh, India, Pakistan and Sri Lanka) . In Khan and Senhadji (2001); the threshold level of inflation is estimated for both the developing, including Pakistan, and developed economies. Study suggest, 1-3 percent threshold levels for developing and 7-11 percent for developed of countries. Also supported by Mubarik (2005) and Ayyoub *et al.* (2013); suggested that above seven percent inflation level is very unfavorable for economic growth.

Iqbal and Nawaz (2009) reexamined the inflation and growth models and support the existence of a nonlinear relationship with two thresholds. Double threshold divides the inflation into three categories i.e. low inflation, moderate inflation and high inflation. Low Inflation (below 6 percent) affects economic growth positively but insignificantly; moderate rates of inflation (between 6 percent and 11 percent) have negative and significant; and inflation at high rates (above 11 percent) have marginal impact on

economic growth diminishes but it is still negative and significant. Study of Adnan *et al.*, (2011) explain that quality of institution matters to control the inflation. He explored that periods of autocratic regimes are characterized by low inflation with the good governance while periods of democratic regimes are characterized by high inflation with bad governance. However, Ahmad and Joyia (2012) have interestingly established a positive relationship between growth and inflation and suggested that inflation increase productivity and output. Different impact of inflation on growth indicate that growth is pro-cycle with growth.

CHAPTER 3

INFULENCE OF MAJOR EVENTS ON THE ECONOMIC GROWTH AND ITS DETERMINENTS; AN OVERVIEW OF PAKISTAN ECONOMY

This chapter put sight towards unstable path of economic growth of Pakistan over the last four decades. Special attention is paid on those events which contributes either in transition of the trend or generate volatility around specific trend.

Overall, Pakistan economy witnessed an impressive growth, on average it grew slightly above five percent per year during last six decades. However, it is not seem always smooth but has been subject to the great fluctuations throughout the period, and predominantly may be caused by shocks.

Over the decade of 1960s, average annual growth rate of GDP remain quite impressive that is 6.8%. Fatefully, over the 1970s, it could not remain persistent but fell about 2% per annum. A series of unfavorable events seems to be responsible of this sluggish growth, namely, Bangladesh liberation war in 1971, nationalization of the industries, sharp hick in oil prices, lower FDI and drought etc. It is well known that Bangladesh is one of the major producers of Jute, as a result of separation, Pakistan lost revenue it gained from the production of Jute. Consequently, economic growth hurts dramatically, even that economy start out close to recession. As long as, in the coming year of decade, unexpected drought considered the main contributor of pushing economy in hard ships through awfully destroying wheat crop and sugarcane. Mr. Zulafkar Ali Bhutto put all major private industries and utilities under the government ownership. In return, economy had to pay a high cost of wrong decision in terms of very low private investment flows, industrial growth halted in the absence of competition, lower production, over staffing because of political appointments.

Notably, oil price hikes are blamed of unfavorable terms of trade and higher inflation. In sum, we can say that economic growth is effected by external shocks such as war ,unexpected drought and country specific characteristics such as lower FDI (due to poor decision of government), and inflation.

Over the 1980's Pakistan's trend growth accelerated by on average 2 percent per year, averaging close to 7.1 percent. This notable growth rate was largely based on internal

situation of the country such as shift from the policies of state ownership by Ziaul Haq, political stability, and higher external capital inflow, good short-term economic management, the flexible exchange rate policy through strengthening export incentives and improving the climate for private investment, relatively stable prices. As long as no major external shock to economic growth occur in this decade.

Unfortunately, growth didn't remain sustain during nineties, but decelerated to 4.4 percent per year. As well as, it is recorded as the lowest growth in Asia. Again a string of internal shocks , namely, political instability, frequent change in government, weak governance, corruption, mismanagement at the highest levels of government, nuclear test leads to sudden freeze up in currency account etc. and box of external shocks such as adverse supply shocks, Asian financial crisis etc. is blamed to this drop.

Deeply, political instability remain very high from 1998 to 1999. The successive governments of Benazir Bhutto and Nawaz Sharif government were unable to complete their tenure. FDI effected because risk of doing business in Pakistan is increased. Secondly, due to the failure of the major crops (cotton), adverse supply shock occurred in the country which led to double digit inflation rate through encouraging the input and output cost. Economic growth rate declined sharply from 6.6 % to 1.7 % in between 1995 and 1996 caused by above two shocks, namely, political instability, adverse supply shock. Nuclear Test conducted in May 1998 led to economic isolation of Pakistan as sanctions were imposed. Many countries including US and UK stopped importing goods from Pakistan. Consequently, the Pakistan economy faced balance of trade deficit and decline FDI inflow and decreased production (MSN Encarta). In 1999-2000, decline in large scale manufacturing was the main factor to sluggish growth, however, in the following year negative agriculture sector growth due to a severe drought brought aggregate growth down to 2.6 from 3.9 percent. In this decade, weak institutions, political instability, adverse supply shock are responsible of adverse economic growth, adverse supply shock are also responsible of increasing inflation(price instability), unforeseen exogenous shock of May 1998 event and sudden freezing account are responsible of sudden stop of FDI.

During 2000s even in the presence of bunch of shocks such as war on terror 9/11, global recession, unprecedented drought of 2000, massive earthquake of 2005, Pakistan economy seems stable in terms of growth rate during 2000-2007 and GDP growth rate remained around annual average of 4.9%. However, the year 2007-2008 has been a defining

year for Pakistan economic history as it changed the direction of the economy altogether. Several political and economic events, both domestic and external front, occurred unexpectedly. Disturbed political conditions, unstable law and order situation, three-government in 2007- 2008, energy shortages at domestic front, global economic crisis of 2008 resulted oil price hicks at external front have adversely affect the economy. The financial crises begin in the USA and extended to the Europe would not seriously affected to the developing countries. However, decline in market value of commodities and reduction in global demand during financial crisis lead to reduce the export revenues of Pakistan. In 2008, raised in commodity prices and oil prices in the international market further bring challenges to Pakistan in terms of very low economic growth with double-digit inflation (stagflation) in 2007-2008. Moreover, adverse law and order situation in 2000s sudden stopped the FDI leads to a loss in the employment and income. It also allowed institutions to generate funds from external sources, privatizing more public sector enterprises and financial institutions and provide free access to foreign investors in domestic equity market. In the plain language, domestic and external shocks washed away the seven year gain. In this decade, external shock of price hick is blamed of fluctuating inflation and reducing output level, and global economic crisis is responsible of effecting growth through effecting its determinants such as trade, FDI, oil price.

3.1 Conclusion

After analyzing the growth episodes, we may come to conclude that economic growth is high instable. Shocks effect it directly or indirectly through effecting evolution of growth determinants via war, unexpected drought, poor law and order situation, price stability, trade, FDI and terms of trade. However, not all shocks are the cause of economic growth transition, most of them would be cause of temporary fluctuations around the specific trend line.

CHAPTER 4

ECONOMIC FRAMEWOK

4.1 Introduction

The literature on the sources of growth has grown since mid-1950s (Krishna, 2004). It categorized growth determinants into three groups with respect to their persistence as stable, medium persistent and volatile (Easterly *et al*, 1993). We will determine the economic growth through carefully identify those factors of economic growth which are the victims of shocks and display highly volatile nature in Pakistan. The logic is that unstable determinates of growth are able to explain instability and volatility of growth more efficiently than other factors (stable and medium persistent). As well as data on those factors is available from 1970.

In this section, our main objective is to choose information set for transition probabilities of growth regimes with explaining the possible channels of variation transmission.

4.2 Price Instability

The economy has price stability when the aggregate price level is changing slowly. Price stability is considered as the best contributor in growing an economy at sustainable path. Price instability exposes an unstable economy in which the values of goods depreciate with the passage of time. For example, in case of oil price hikes, producers reduce the demand of inputs because of the high prices of inputs and this act in turn effects the output and employment level as long as they also increase the selling prices of output to overcome the costs. On the demand side, consumer face lower purchasing power, resulted into lower level of consumption and hence welfare loss. As the result economy experience stagflation that is "high level of inflation with lower level of output". Moreover, improper price regulation and imperfect information about aggregate price level causes inflationary situation in the economy. High and unpredictable inflation slows down the process of economic growth and hurts the economy. In a high inflationary environment, individuals respond differently than in normal circumstances because of high inflation may generates uncertainty which can badly affects the economy. Like it may generate great uncertainty

about relative price movements (relative price of final goods and input costs), about returns earned from long-term contract. This may lead towards less efficiency and misallocation of resources, reduction in investment, therefore slower economic growth.

4.3 Terms of Trade

An improvement in terms of trade leads to higher levels of investment and thereby rapid economic growth (Blattman; 2003). But in developing countries, adverse terms of trade shocks (fluctuations in the relative prices of exports to imports) contribute to increased volatility in the growth of output. Developing countries do not have sufficient manufacturer and agricultural production, so they heavily depend on import. A large increase in world prices of imports will strongly affect their economies because they do not have domestically-produced substitutes. On the export side, these countries export few primary goods and rely heavily on their revenue. A sharp decline in world demand and prices will reduce the export revenues and make these economies more and more vulnerable; because reduction in export revenues will discourage investment by making investment unprofitable and will lead to decline the in production and employment level.

4.4 Foreign Direct Investment

It is well-known that developing countries are mostly characterized by the capital deficiency and technological backwardness. In this situation, Foreign Direct Investment (FDI) is considered as one of the effective engines of enhancing growth. The developing countries need Foreign Direct Investment (FDI) flows to transfer of advanced technology, sound business environment, rising productivity, creating more employment opportunities and to also increase the higher per capita income and growth. On the other hand, developed countries take advantages by investing in those developing countries where resources are rich and cheap to maximize their profit margins. However, this relationship has never been smooth. It is the fact that Investor like to invest (especially for long term) in those countries which exhibit macroeconomic stability, a predictable macroeconomic environment and a strong institutional framework. For example, during unreliable conditions investor will suddenly stop their capital flows. Decline in the volume of Foreign Direct Investment (FDI) inflows immediately reduce income level and, if shocks are persistent, then it tends to reduce growth. Moreover, reduction in inflow leads to capital account deficit. If country foreign reserves are not sufficient to overcome the deficit then IMF provide emergency financial

assistance. But if country fundamentals are weak, IMF financial assistance may only come in the front door and go out the back door with not reducing the impact of the incidence of the sudden stop. Such shock can also create uncertainty about the future Foreign Direct Investment (FDI) flows.

3.5 Conclusion

We observe that, all above growth determinants are unstable. It will be informative to take them as the determinants transition probabilities. So, that we can see the role of these determinants on the persistency of regimes. Problem of the Hamilton basic model is that it takes the transitions probabilities as constant. One possible solutions of this problem is the application of the Time-varying Markov regime switching model. In the case of Pakistan, it is one of the most appropriate econometric tools to reveal the growth regimes. It has the ability to explore the probabilities of switching from one regime to another that are determines by the foreign direct investment, inflation and terms of trade.

3.8 Economic framework

After discussing channel of transmission of unstable determinants, we infer following form of growth function for our empirical analysis.

$$Y_t = f(Y_{t-i}) \quad i=1, \dots, n$$

Y_t = Economic Growth

n = Total Numbers of Lags of Economic Growth

Let, economic growth follow multiple states $s_t = \in \{0, 1, 3, \dots, N\}$ then we infer following function of growth regime

$$TP(s_t/s_{t-1}) = f(TOT_{s_t}, P_{s_t}, FDI_{s_t})$$

$TP(s_t)$ = Transition Probably of Growth Regime

$TP(s_{t-1})$ = Immediate Previous Transition Probably of Growth Regime

TOT = Term of Trade

P = Price Instability

FDI = Foreign Direct Investment

CHAPTER 5

ECONOMETRIC METHODOLOGY

5.1 Introduction

Mostly, linear time series models are used to model the economic growth in literature. Recently, Markov Switching Model (MSM) has been employed by the researchers to model the economic growth. Especially in those countries, where growth is not characterized by constant parameters throughout time. In Pakistan, economic growth is very instable. It encompasses various regimes, therefore, it cannot be modeled implicitly using simple linear time series model. Markov Switching Model (MSM) seems right choice to accommodate nonlinear features of growth.

5.2 Minimum Lagrange Multiplier Unit Root Test with Two Breaks

Lee and Strazicich (2003) test is used to detect the unit root. The null hypothesis of unit root is tested against the alternative of the trend stationary. Following Lee and Strazicich (2003), unit root test is tested by following regression.

$$y_t = \delta'Z_t + X_t$$

$$X_t = \beta X_{t-1} + \varepsilon_t$$

Where X_t consist of exogenous variables. ε_t is the error term. Model C allow for two structural breaks in intercept and slope, given by, $Z_t = [1, t, D_{1t}, D_{2t}, T_{1t}, T_{2t}]$ where $D_{jt} = 1$ for $t \geq T_{Bj} + 1$, $J=1$ and zero otherwise. Where T_{Bj} is the break date and D_{jt} is the dummy variable for the mean shift occurring at the time T_B . Where T is the trend shift variable. The critical values are available in Lee and Strazicich (2003).

5.3 Single Linear Trend Model

Following Pritchett's (2000), following equation will be used to test, how much behavior of the series is "just a trend".

$$y_t = \delta_0 + \delta_1 t + \varepsilon_t$$

Where

y_t is the dependent variable, δ_0 is the constant, δ_1 is time trend and ε_t is the error term. The model has low R-square indicates that series is characterized by high instability and volatility.

5.4 Markov Switching Analysis

The first purposes of Markov Switching model is to explore non-linear path of economic growth by identifying growth regimes after taking into account breaks when switching is unobservable. Second is to explore the effect of growth determinants on the transition probabilities of growth regimes.

Regime switching models are characterized by a number of different and discrete regimes within which different parameters apply. The models will periodically shift from one regime to another and these shifts denote structural fluctuations happening in the process that is being modeled. Markov Switching (MS) analysis is based on the assumption that first difference of the observed series (growth) follows nonlinear stationary process rather than linear stationary process.

Hamilton (1989)'s original model is the pure broken trend model with no explanatory variables. Due to multiple reasons, it is not adequate to obtain our objectives. Firstly, it restrict the modeling into two regimes only. Secondly, it restricts transition probabilities to be constant over time (Maddala, 1988). The constant or fixed transition probabilities are too restrictive to explain the behavior of economic growth since economic variables are not allowed to affect transitional probabilities. Pakistan's growth determinants are the volatile in nature. Their influence on transition probabilities change over time. A model is require that also take explanatory variables as the determinants of transition probabilities in order to explore the impact of unstable determinants on the transition probability.

An extension of Hamilton (1989) will be used for analysis known as Diebold et al. s(1999) Time-Varying Markov Switching Model (TVTP). It has the ability to overcome the deficiencies of Hamilton's (1989) model. It allows multiple regimes and transition

probabilities to vary with observable covariates includes strictly exogenous explanatory variables and lagged values of the dependent variable.

5.4.1 General Framework of Markov Switching Model

For simplicity, suppose that there are two state. Two state Markov Switching Model (TV-MSM) is expressed as:

$$Z_t = \alpha_{s_t} + \sum_{i=1}^l \beta_{i s_t} Z_{t-i} + \varepsilon_t, \quad \varepsilon_t \sim N(0, \sigma_{s_t}^2) \quad (5.1)$$

Where $s_t \in \{0,1\}$

$$\sigma_{s_t}^2 = \sigma_0^2 + \sigma_1^2 s_t \quad (5.2)$$

$$\alpha_{s_t} = \alpha_1 + \alpha_2 s_t \quad (5.3)$$

$$\mu_{s_t} = \mu_1 + \mu_2 s_t \quad (5.4)$$

Where, dependent variable Z_t depends on the autoregressive $AR(p)$ process, unobserved discrete variable (s_t) and identically independently distributed random variable (ε_t). Parameters and residuals are regime-specific. In certain time, existing state determine which set of parameters (coefficients) should be applied. Within each regime residuals follow a normal distribution $N(0, \sigma_{s_t}^2)$.

According to Hamilton(1989), evolution of the state variable depends on the first-order Markov chain that is only last period's state, but not the entire history of state influences transition probabilities. Symbolically

$$P(St = j | St - 1 = i) = P^{i,j} \quad i, j = 0,1$$

It denotes that probability of moving towards state j in the current period depends on the probability of previous period state i . In matrix form

$$P = \begin{bmatrix} p^{0,0} = P(St = 0 | St - 1 = 0) = p & p^{0,1} = P(St = 0 | St - 1 = 1) = q \\ p^{1,0} = P(St = 1 | St - 1 = 0) = 1 - p & p^{1,1} = P(St = 1 | St - 1 = 1) = 1 - q \end{bmatrix}$$

According to Diebold et al. (1999), evolution of the state variable depends on economic variables as well as previous state. Following Diebold, we will endogenize probabilities by incorporating vector of the variables (z_t) as their determinants. Symbolically,

$$P_k(St = j | St - 1 = i) = P^{i,j}(z_t) \quad i, j = 0,1 \quad (5.5)$$

In matrix form

$$P = \begin{bmatrix} p_t^{0,0} = P (St = 0 | St - 1 = 0) = p(z_{t-1}) & p_t^{0,1} = P (St = 0 | St - 1 = 1) = q(z_{t-1}) \\ p_t^{1,0} = P (St = 1 | St - 1 = 0) = 1 - p(z_{t-1}) & p_t^{1,1} = P (St = 1 | St - 1 = 1) = 1 - q(z_{t-1}) \end{bmatrix}$$

Where z_t vector has a constant and slope measure of each variable. As the state variable is unobserved, the parameters vector is estimated by the maximum likelihood using EM algorithm described by Hamilton (1990, 1994).

Four step procedure will be apply for estimation. In first step, Lee and Strazicich (2003) LM test will be used to test for the unit root. In second step, linear trend model will be used to detect the instability of the economic growth process. Conformation of the low R-square will allow us to proceed to the final step. That is estimation of the Markov Switching Models (MSM).

5.5 Data Description and Construction of Variables

The study is based on annual data covering the period from 1970 to 2014. The data are collected from World Bank Indicator and International Financial Statistics (IFS). The construction of and description of variables is given below.

5.5.1 Terms of Trade

The concept of terms of trade was introduced by J. S. Mill (1844). In literature, terms of trade is defined in various ways. Due to ease of calculation two concepts, namely, the net barter TOT and income TOT are applied in empirical studies. This study utilize the net barter terms of trade. Net barter terms of trade shows the relationship between the prices at which a country sells its exports and the prices it pays for its imports. In index form, it can be written as:

$$\text{Barter Terms of Trade} = \text{Unit Value Index of Exports} / \text{Unit Value Index of Imports} * 100$$

5.5.2 Price Instability

Inflation rate is used as a proxy to measure price instability. Inflation rate is the annual percentage change in a consumer price index (CPI). It is calculated by taking the

difference of the natural log of consumer price index from current year to immediate previous year. Formula can be expressed as:

$$P_t = [\log(CPI)_t - \log(CPI)_{t-1}] * 100$$

5.5.3 Foreign Direct Investment

Foreign direct investment (FDI) is mostly considered an important determinant of economic growth in the developing nations like Pakistan. It is considered as safer form of investment than any other investment because it is mainly on plant and equipment and it also brings technology with itself. Foreign direct investment (net inflows) as the percentage of Gross Domestic Product (GDP) is used for analysis.

5.5.4 Economic Growth

The GDP per capita growth rate is used as the measure of economic growth.

CHAPTER 6

DESCRIPTIVE DATA ANALYSIS

6.1 Introduction

Descriptive analysis is useful as it describes basic facts about the data. Such as it describes time series properties which does not only directs whether data require any kind of transformation but also useful to choose the econometric methodology that explain the observed features of data empirically.

In this chapter, first section presents the graphical method and second section represents numerical description of the data.

6.2 Graphical method for data description

In order to quick, visual summaries of essential data characteristics, analysis begins with graphical method known as line graph. Interpretation of the analysis is given below in detail.

6.2.1 Economic Growth

In figure 6.1: line graph of economic growth does not seem to be trended. Series tend to return to its mean (mean reversion) but fluctuations around this mean are non-equal and highly unstable over the entire time period: it depict presence of high volatility and instability. Graphs also shows that data is not fluctuating around the zero mean level: indicate that series exhibit intercept term. Thus we can expect that series to be stationary with breaks and drift. This is mainly due to the fact that, this time series was differenced when calculating the growth rate. Noticeably, if we have tried to fit single linear trend in the plot then it is clearly observed that observations are not lie near the fitted line: indicate that linear time series model will be unable to explain the variation of economic growth efficiently.

6.2.2 Terms of Trade

Figure 6.2 shows that series show downward trend and series doesn't exhibit instability over the whole time period. Thus we can expect variable to be non-stationary. It require two type of transformation. Firstly, log transformation is require to stabilize the

variance of the series by reducing the impact of outliers and secondly differencing is require to stabilize the mean of the series by removing changes in the level of a time series, and so eliminating trend. However, test which do allow break seem right choice to detect the properties of the series.

6.2.3 Inflation

Figure 6.3: shows that inflation exhibit mean reversion behavior. It does not only kept non-equal variance over the entire time period but it depicts presence of high volatility and instability. Graphs also show that data is not fluctuating around the zero mean level: indicate that series exhibit intercept term. Thus we can expect that series to be stationary with breaks and its fluctuations will be help to explain the part of variation of economic growth.

6.2.4 Foreign Direct Investment (FDI) inflow

Figure 6.5: shows Foreign Direct Investment (FDI) inflow shows mean reversion behavior. It does not only kept non-equal variance around long run mean over the entire time period but it depicts high volatility and instability. Graphs also show that data is not fluctuating around the zero mean level: indicate that series exhibit intercept term. Thus we can expect that series to be stationary with breaks and its fluctuations will be helpful to explain big part of growth variation.

6.3 Numerical Description of the Data

We have followed Easterly *et al.*, (1993) methodology to detect the basic facts of economic growth. According to the Easterly *et al.*, (1993) methodology, firstly, economic growth series is divided into four parts include 1970-1979 1980-1989, 1990-1999 and 2000-2010. The correlation coefficient is employed to find the strength of linear relationship across decades. The low correlation value implies that low persistency of economic growth and high value of correlation indicates that path of economic growth is stable. Secondly, we regress the current growth rate on the previous decade's growth in order to find whether current decade growth have the ability to explain the variation of the previous decade's growth. The coefficient of determination is used to determine the proportion of variation in

current decade which is explained by variations in previous decade. One main drawback of this methodology is that if variables have strong time trend, then it shows a close relation between variables. We already observed that economic growth do not show trend. The second major drawback of this methodology is that it shows relation across decades if and only if they are linearly correlated and it indicate no relation between the decades if they are strongly connected with the non-linear relationship.

6.3.1 Economic Growth

Table 6.1: shows the simple correlations of growth across decades. We found out that correlation of growth across decades within countries is very low that is around 0.1. It is a reasonable hypothesis that series exhibit structural breaks. According to the Easterly *et al.*, (1993) study, possible explanation for the low persistence of growth rates (unstable) is the role of shocks in growth shifts. Table 6.2: provides the coefficient of determination obtained by regressing the current growth rate on the previous decade growth. We have found out that correlation of growth is very low. It indicate that little of the variation of growth rates is explained by past growth. It conform that economic growth is unstable. Future value of the economic growth is unpredictable. We can expect that previous decade growth is connected with current decade growth in nonlinear fashion.

6.4 Conclusion of Descriptive Analysis

Information from descriptive analysis made it clear that economic growth is highly instable and volatile and cannot be fitted accurately by single linear trend. Possible explanation for the low persistence of growth rates is the role of shocks in growth shifts.

Figure:6.1

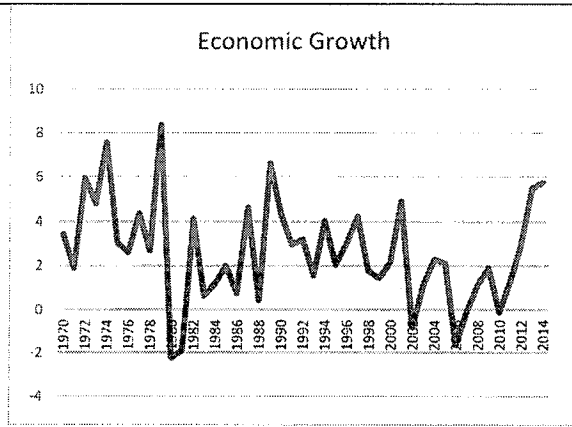


Figure: 6.2

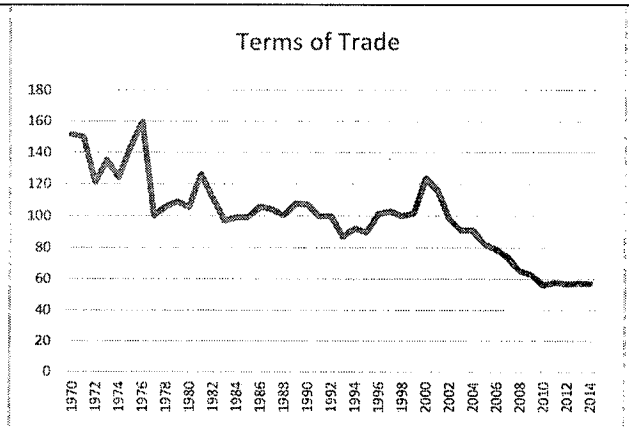


Figure: 6.3

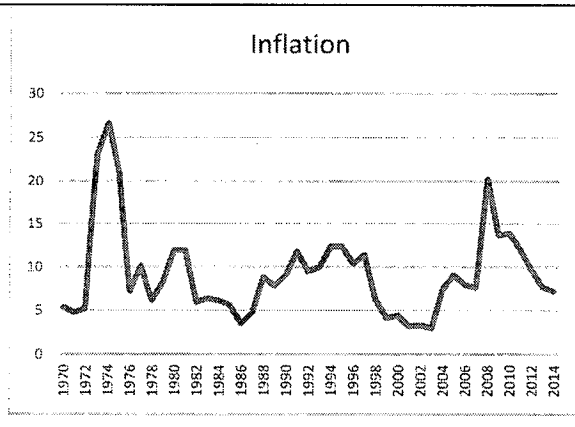


Figure: 6.4

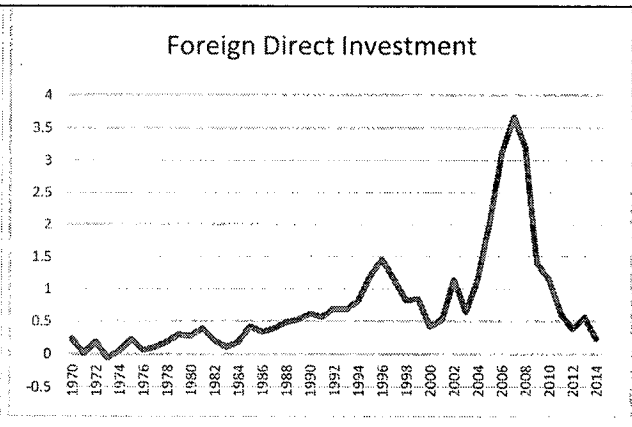


Table 6.1: Basic statistics

Table 6.1: Simple correlations of economic growth across periods	Correlation Coefficient(r)
	$r = Cov(Y_t^P Y_t^C) / (SD(Y_t^P) SD(Y_t^C))$
70's with 80's correlation coefficient:	0.05
80's with 90's correlation coefficient:	0.009
90's with 20's correlation coefficient:	-0.02

Table 6.2: Linear Regression analysis

Regression of 90's on 80's growth rates.		Regression of 90's on 80's growth rates.		Regression of 20's on 90's growth rates.	
Constant	3.02	Constant	0.98	Constant	2.6
Growth rates of 80's	-0.006	Growth rates of 90's	0.1	Growth rates of 20's	-0.03
R-square	0.0004	R-square	0.003	R-square	0.0006

CHAPTER 7

RESULT AND DISCUSSION

7.1 Introduction

As objective of thesis is to explore the growth regime by allowing transition probabilities of growth regimes to depend on growth. To obtain the objective we will use unit root test, linear trend and Markov Switching Models. This chapter provides result of unit root test, linear trend and Markov Switching Models.

7.2 Unit Root Test

Initially, Foreign Direct Investment (FDI) and Terms of Trade (TOT) are transformed into natural log in order to smooth the variance of the time series (Maddala, 1992). From Table 7.1 we observe that the null hypothesis of a unit root given two breaks that change path of the variables (level or slope or both) can be rejected at 5 percent critical values for all of the variables. It indicates that all variables under consideration are stationary.

Table 7.1: Lee and Strazicich (2003) LM Unit Root Test					
Series	Break Year	Lags	λ value=TB/T	Decision rule	Result
				If Test Statistic > Critical value Reject null	
EG	1985,2006	0	$\lambda_1 = \frac{16}{45} = 0.4$ $\lambda_2 = \frac{37}{45} = 0.8$	-7.43 < -5.71 Reject null	Series is trend stationary with two breaks
TOT	1996,2005	5	$\lambda_1 = 0.4$ $\lambda_2 = 0.8$	-5.78 < -5.71 Reject null	Series is trend stationary with two breaks
FDI	1997,2004	4	$\lambda_1 = 0.4$ $\lambda_2 = 0.6$	-7.03 < -5.59 Reject null	Series is trend stationary with two breaks
Inf	1987,1996	0	$\lambda_1 = 0.4$ $\lambda_2 = 0.6$	-6.2 < -5.71 Reject null	Series is trend stationary with two breaks

7.3 Linear trend method

From table 7.2 we observe that single trend model unable to fit the data as R-square is very low: indicate that economic growth is highly instable. It cannot be depicted well by single long run trend. It indicate to move towards the markov switching model.

7.4 Markov Switching Model with Fixed Transition Probabilities (FTP)

In table 3, first-order two-state Markov switching AR (1) model with fixed transition probabilities was estimated. AR term was found insignificant. Therefore we exclude it from the model and estimate the first-order two-state Markov switching model again. The maximum likelihood estimates of parameters are significant at 5 or 10 per cent. Results shows that economic growth exhibit two regime. Regime with 1.18 average growth rate is called stagnation growth regime while regime with 3.84 average growth rate is called

stable growth regime. Terms such as stagnation and stable growth regimes are borrowed from the study Jerzmanowski (2006). The probability of stagnation growth regime at time t , given that economy was in stagnation growth regime at time $t-1$, is 0.84. While probability of stable growth regime at time t , given that economy was in stable growth regime at $t-1$, is 0.11. Result indicate that probability of staying in stagnation regime is high as compare to stable regime.

7.4 Markov Switching Model with Time Varying Transition Probabilities (TVTP)

After that first-order two-state Markov switching model with time varying transition probabilities was estimated. Regime with 0.87 average growth rate is called stagnation growth regime while regime with 3.87 average growth rate is called stable growth regime. The probability of moving toward stagnation growth regime at time t , given that economy was in stagnation growth regime at time $t-1$, is 0.76. While probability of stable growth regime at time t , given that economy was in stable growth regime at $t-1$, is 0.19. Result indicate that probability of stagnation regime is high as compare to stable regime. In fact, the probability of remaining in the stable growth regime increases with a fall in inflation and with increment in the terms of trade and foreign direct investment. If the economy is in stagnation regime, an increase in foreign direct investment and terms of trade decreases the probability of remaining in this state, while a rise in inflation increases this probability. On the basis of AIC criteria we can say that markov switching model with time varying transition probabilities is superior then the markov switching model with constant transition probabilities.

7.5 Conclusion

Result shows that variables under consideration are stationary. Like the graphical analysis, result shows that economic growth is very unstable. It cannot be depicted well by smooth linear trend. Following Easterly *et al.*, (1993), possible explanation for the low persistence of growth rate (unstable) is the role of shocks. Economic growth undergoes in two regime over time known as stable growth regime and stagnation growth regime. Most of the time Pakistan economy remains in stagnation growth regime. The probability of remaining in the stable growth period increases with a fall in inflation and with increment in the terms of trade and foreign direct investment.

Table 7.3		
1. Linear Trend Method		
Explanatory variables	Coefficients	
Constant	3.51*	
Trend	-0.04**	
R-square= 0.001<0.5		
2. Regime Switching Method with the Constant Transition Probabilities(CTP)		
Regime 1		
Explanatory variables	Coefficients	P-value
Constant	1.18	0.1
Variance	0.65	0.0
Regime 2		
Explanatory variables	Coefficients	P-value
Constant	3.84	0.0
Variance	0.65	0.0
P11	0.86	0.01
P21	0.11	0.03
AIC	4.69	
3. Regime Switching Method with the Time Varying Transition Probabilities(TVTP)		
Regime 1		
Explanatory variables	Coefficients	P-value
Constant	0.87	0.1
Variance	0.6	0.0
Probabilities		
Constant	0.39	0.0
Inflation	0.09	0.02
Terms of Trade	2.25	0.03
Foreign Direct Investment	0.27	0.01
Regime 2		
Explanatory variables	Coefficients	P-value
Constant	3.87	0.00
Variance	0.6	0.00

Probabilities		
Constant	1.28	0.0
Inflation	-0.39	0.1
Terms of Trade	3.64	0.0
Foreign Direct Investment	0.35	0.04
AIC=4.67		

CHAPTER 8

CONCLUSION

Pakistan economic growth cannot be depicted well by a single smooth linear trend. It is very instable and volatile. Instability is defined as the shift in growth while volatility is defined as the fluctuations around a specific trend. Following Easterly *et al.*, (1993), series of events seems to be responsible for the growth shift and volatility, namely, Bangladesh liberation war in 1971, nationalization of the industries, sharp hike in oil prices, unexpected drought, political instability, weak governance, corruption, nuclear test leads to sudden freeze up in currency account, adverse supply shocks, Asian financial crisis etc.

Markov Switching Model with the Time Varying Transition Probabilities (TVTP) and Markov Switching Model with the Constant Transition Probabilities (CTP) are used in order to explore the nonlinear path of economic growth. Results show that Pakistan economic growth undergoes in two regimes over time known as stable growth regime and stagnation regime. However, probability of staying in stagnation regime is higher as compared to the stable growth regime. Moreover, the probability of remaining in the stable growth regime increases with a fall in inflation and with increment in the terms of trade and Foreign Direct Investment (FDI). From the AIC value, it is found that the Markov switching model with Time Varying Transition Probabilities (TVTP) is superior for the economic growth series than the Markov Switching Model with the Constant Transition Probabilities. This research indicates linear time series models cannot be used to model the economic growth.

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