

Medium Term Plans, Regulation Reforms and Economic Growth Performance in Iran

Esfandiar Jahangard*

and

Reza Ghazal**

Abstract

Determining the driving forces of economic growth has a paramount importance in economic studies. Early studies suggested physical capital accumulation as the main driving force of growth. However, the recent studies try to resolve the flaws of neo classical school on growth by expanding the concept of capital equipment and machinery to a wider range of human knowledge, on one hand, and institutions, rules and regulations as social capital, on the other. In fact, this strain of economics has become more prevailed recently. The present study, using Hausman, Pritchett and Rodrik (2005) methodology, aims to investigate the impact of rules and regulation reforms of developmental plans on the acceleration of Iran economic growth over 1338-1386 (1960-2008) period. The results of three econometric methods including Gombit, Logit and Probit models show that economic reforms of the developmental plans in Iran's economy has had a significant positive impact on growth.

Keywords: economic growth, acceleration, regulation, Iran

JEL Classification: K20, O40

* PhD, Assistant Professor, Allameh Tabatabaei University

Email: ejahangard@gmail.com

** PhD, Senior Economist, Economic Research and Policy Department, Chief Economic Complex, Islamic Development Bank.

Email: rghaz046@uottawa.ca

Introduction

Examining the different aspects of economic growth has two important outcomes; 1) increases the knowledge of policy makers in policy choice and adoption, and 2) makes prediction of economic growth by using models based on theoretical framework.

In economic literature a considerable number of studies paid attention to investigation of the driving factors of economic growth. Accelerating sustainable economic growth is one of the main policy concerns in economics. For many years, economists have been trying to find out why some countries grow faster than the others using various econometric approaches. The policy prescriptions derived from Barro and Sala-i-Martin (1995), and Hall et al. (2001) can be summarized under three general principles: open economy, healthy money systems and appropriate property rights.

Even though, majority of the empirical studies have consensus on the definition and how to measure the dependent variable, i.e. economic growth, but they deal differently with the definition, selection and measurement of the explanatory variables, especially institutional factors, which are believed to affect economic performance. Some of the studies put more emphasis on democracy, social capital and political stability and rights, especially in developing countries as main driving forces of economic growth (e.g. Helli, 1994). Some others examined the role of bureaucratic efficiency and corruption (Mauro, 1995) or unofficial institutions like intrapersonal trusts and civil organizations.

In this study, we focus mostly on a group of various factors such as economic environment policies, and political situations. We identify the role of rules and regulations on accelerating economic growth, in Iran using Hausman et al. (2005) methodology.

In this context, the following hypothesis will be tested:

- Development plans rules and regulation reforms have positive and significant impact on accelerating economic growth. These plans also

have significant effects alongside other factors including trade relation, economic openness, real exchange rate, investment and inflation.

The organization of this paper is as follows. First, the theoretical background of the study will be presented. In section two, the experimental strategies of the economic growth and domestic policies will be discussed. Then an overview of the development plans before and after Iran revolution will be provided. Section four reviews the empirical studies. First a review of the trend of accelerated growth will be presented in section five, and then the economic growth model will be estimated using Probit, Logit and Gombit models. Final section presents the results of the study and its policy recommendations.

1. Theoretical Framework

In economic literature, the investigation of the economic growth driving forces has attracted significant attentions from the economists. The emergence of technical economic growth models has been very important. The earliest growth model emerged was the model of Harrod-Dommar (HD) which originated from Keynes economic thoughts and was designed for the developed economies who faced with lack of enough aggregate demand at that time. This model tries to answer the question that what are the requirements for sustainable growth with full employment (Mir, 1994). This model has been recognized for years as the only model for long-term growth.

Another well-known model is the Dozenbery s growth model. Under this model, sustainable growth is attainable and in a given time, exogenous factors like population, government expenditures and taxes, and financial institutions can impact on the endogenous variables of the model. In addition, structural change, and income fluctuations are determined by capital stock adjustment process. This model just like HD model originated from the Keynes economic school (Tafazoli, 1996). However, the economic growth theories advanced more significantly by the studies of Solow and Swan.

The Neoclassical model of Solow (1956) shows that in equilibrium, output growth should be equal to the growth rate of two exogenous variables,

population and technological progress. Under this model, the government policies can affect growth temporarily and in transition from one equilibrium position to another. This model is also on the premise that if capital has free mobility, then over time a convergence trend happens between countries in such a way that rich countries grow slower than the poor countries, known as catch-up theory (Bergstrom, 1998).

More recently, endogenous growth models inspired by growth models of Ramsey, New-classics and new-Keynesians have emerged under which macroeconomic is built on the microeconomic basis. These models tend to be based on Arrow (1962) study. Since Schumpeter emphasized on temporary monopoly power as innovation driving force, these models sometimes are known as Neo-Schumpeterian growth models (Cheng and Dinopoulos, 1992).

These models from Jones view are classified into two groups, AK¹ and R&D. As mentioned before, the early theoretical studies mainly emphasized on the role of physical capital as factor of growth, while in new growth models, introduced by economists like Paul Romer in late 1990s, more attention is paid to the research and development as one main factor of economic growth.

In these models, the role of institutional factors in economic growth has attracted more attention. The proponents of these models believe that Neo-classical growth models ignore the role of institutions in economic growth and predict that in the long-term, equilibrium growth among countries will be equal; however, it will be different only due to labor force participation. Endogenous growth models are based on the premise that institutional factors and government policies can affect economic growth systematically.

The views of institutional economists in explaining the causes of economic growth differs among countries and can be explained by the following production function:

$$Y = IK^a(hL)^{1-a}$$

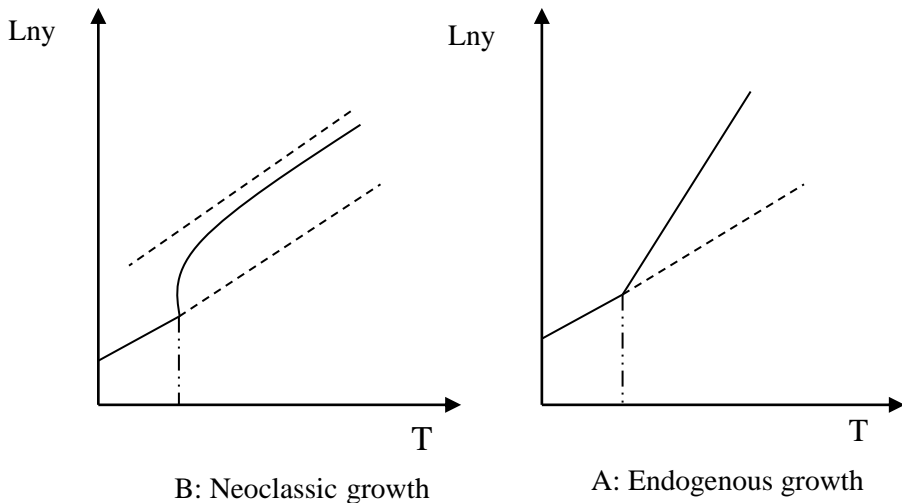
1. The AK production function model is a special case of a Cobb° Douglas production function with constant returns to scale: $Y = AK^aL^{1-a}$

in which Y represents the level of output, I represent institutions, K and L are physical capital and labor force and h is the know-how of working with the new capital by the labor force. As it is clear from this simple model, even economies with equal K , L and h might have different economic growth due to different economic institutions. Under these growth models, the economic infrastructures including government and its rules and regulations, and the institutions can be the success factors of long-term economic growth, through preparing favorable environment for the business to work.

Theoretically, the conventional exogenous and endogenous economic growth models in exploring the relationship between growth and macroeconomic variables need to explain the change in location of the growth trend (see diagram 1). In Neo-classical growth model, growth accelerates in time T , but ultimately converges to the growth rate of the previous period (unless as Jones noted that technology as a gift from the heaven exogenously advances). Therefore, in these models in order to identify the affecting variables, it needs to track the changes occurred in time T or before. In other words, identifying the turning point in growth and addressing this question that what factors led to that growth, would be quite useful. In this context, if the data and information are investigated without paying attention to those turning points, the whole analysis would be inaccurate.

Usually, regression models of economic growth are linearly presented, however, it is possible that due to changes in rules and regulations, these models be non-linear, in which they would not present an accurate understanding of the reality. The early studies in this regard are those from Pritchett (2000) and David and Papell (1998) which used statistical methods in identifying the changes, as well as studies by Jones and Olken (2005), and Jerzmanowski (2005).

Diagram1: The Effect of Economic Improvement on Growth under Neoclassical and Endogenous Growth Model Frameworks



In this study, an empirical method is used in a general equilibrium framework of identifying production and its dynamics. In order to overcome the difficulties of the conventional estimation models of growth, following the study by Hausman, Pritchett and Rodrick (2005) an identifying filter of accelerated growth of economy of Iran will be introduced. Then, the main characteristics of accelerated growth and the factors that are correlated with it will be discussed.

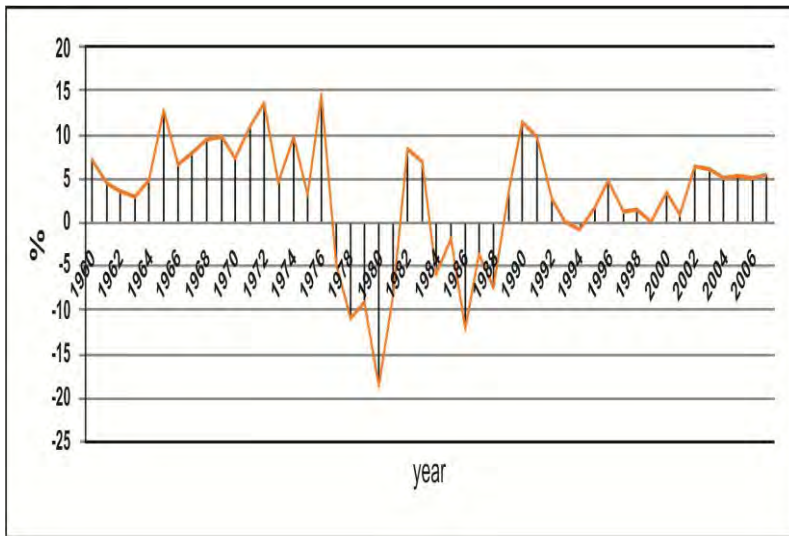
2. Experimental Strategies of Economic Growth and Iran's Domestic Policies

The growth performance of the economy of Iran for the last half a century is disappointing. Gross Domestic Product (GDP) of Iran in 1959-1976 period witnessed an increasing pattern, but decreasing after that until 1981. Then for a short period of time, it experienced an increase but again in year 1986 dropped. This decreasing pattern continued until 1988. In post-war era, GDP started to increase significantly up to 1992. After this year, the increasing

trend continued but slowed down until 1380. After 1380, the trend increased steeply. In year 2008, the growth rate sharply fell to 2.3 percent.

GDP per capita, increased significantly during 1966-1976. After that until 1988, it slowed down to reach its minimum in 1988. After 1988 the growth rate got momentum and with some fluctuations increased until 2008. In fact, GDP per capita in 2008 was well below its level in 1976. The variations of Iran economic growth has been presented in graph 2. As it can be seen from the graph, it has had noticeable fluctuations during 1960-2006. This shows that economic growth significantly depends on price of oil and oil revenue.

Diagram 2: Iran Economic Growth Trend (Percent)



In the above graph after adding a trend line, it can be seen that the trend line has a negative slope from the mid of 70s decade to early 90s. Based on this observation, the fluctuation periods can be grouped into the followings: pre-oil shock era (1959-1970), first oil shock era (1970-1976), revolution-war-sanction era (1976-1988), economic reforms era (1989-2005), and second oil shock era (2006-2009). The growth rate of per capita GDP during

first era, i.e. 1959-1970 was about 6.8 percent, followed by 8.8 percent for 1970-1976 and 4.4 percent during 1976-1988.

The growth rate during the post-war Development Plans periods, i.e. during 1989-2005, was 3.7 percent, on average. As it can be seen the economic performance during the early half of 1970s, when the oil price was high, was significant, while during first half of the 1980s, when the price of oil dropped, was very low.

Lower growth rate during the post-war development plan period compared to 1360s and 1370s is interesting and requires more detailed analyses. After 1989, even though the growth rate was increasing, was not significant. In general, the economic growth performance of Iran in post-war development plan era was disappointing (Jahangard, 2007).

From another view, the investigation of the policies and the economic environment at macro level can reveal interesting points about the overall environment in which the economic growth happened. The period that Iran has had development plans can be classified into seven periods.

Period one: during this period, 1963-1972, there is serious tendency towards industrialization. The main steps taken in this period are, land reforms, establishing modern institutions towards industrial development such as organization for industrial management, organization for expansion and renovation of industries, industrial expansion financing bank, Tehran Stock Exchange Organization, Chamber of Commerce and Mining and Industry (Nili et al. 2003).

Period two: import substitution strategy (1973-1977). During this period, along with higher oil prices in 1974, the strategy for import substitution has been intensified by the government. One of the main outcomes of this strategy was formation of dependent capitalism based on oil revenue and imported technology from developed countries. One interesting point about this period is that despite pursuance of the import substitution strategy, not only the importation of capital, intermediate and consumption goods did not decrease, but their import balance increased over time (Zonouz,

2000). During this period, due to higher oil prices, both investment and output growth was higher than period one and big industries with imported technology were created and established in Iran.

Period three: First Self-sufficiency strategy (1978-1988): this period starts with the Iran revolution in 1978 and ended with the ceasefire between Iran-Iraq in 1988. During this period, due to aggravation of political conflicts with the west, huge capital outflows, reluctance of the multinational companies for investment in Iran and huge control of the economy by the government, the import substitution strategy was abandoned and self-sufficiency strategy was pursued. Lack of importing technology for building capital equipments coupled with scarcity of foreign exchange damaged some industries capacity due to war which impacted adversely on capital accumulation in manufacturing sector. Agriculture sector was placed at the center of self-sufficiency strategy. During this period, industrial efficiency compared to the pre-revolution Fifth Development Plan dropped sharply, such that in 1988 it stood at 40% (Zonouz, 2000).

Period four: second import substitution strategy (1989-1995): at the beginning of this period, a manufacturing sector was inherited with obsolete technology, bankruptcy of significant number of firms, very low income per capita, and highly monopolized market structure. Economic liberalization and adjustment of relative prices provided the environment for economic growth.

Over-utilization of foreign funds, political conflicts with the west and therefore high risk evaluation, high inflation due to over-drawing of bank funds by the government and implementation of the expansionary policies to support the activities in the economy are the main features of this period (Nili et al. 1382). During this period, utilization rate of the industrial capacity increased. The government policy reforms gave incentives to private and public sectors for investment and as a result the capital accumulation rate started to increase.

Period five: second Self-sufficiency strategy (1996-1998): high inflation rate coupled with increasing foreign debts led to abandonment of

liberalization policy prescribed by IMF and self-sufficiency strategy adopted again by the policy makers. Constrained imports due to balance of payments deterioration and low level of working capital once again resulted in under-utilization of the capacities and therefore the level of investment decreased. In addition, stabilization of exchange rate by the government decreased the level of exports (Nili et al., 2003).

Period six: economic reforms (1999-2004): during this period, the lack of developmental institution and required mechanisms in previous plans for achieving economic growth were identified and some reforms were taken place including: preparation for national economy immunization to the oil market shocks through establishing exchange reserve account, gradual replacement of non-tariff barriers with tariffs and preparing the ground for gradual decrement of the tariffs to the level that prepare the ground and meet the requirements for engaging in WTO negotiations, establishing private banks in free economic zones and reinforcing the stock market (launching regional and commodity stock markets) and establishing non-banking financial system in order to de-monopolize the banking network and building more favorable ground for investment, establishing private insurance companies in various lines of businesses, adoption and implementation of the law supervising the foreign investments, new tax laws, abolition of collateral for commodity exports, decentralized policy implementations, and adoption of comprehensive social security system (Jahangard, 2006).

Period seven: high oil revenues (1384-1388): during this period, and despite the existence of 20 years Outlook Document ,covering 1384-1404, and fourth Development Plan, the type of the government approach in implementation of these documents has been completely different due to unprecedented fluctuations in oil prices in global markets. Over-withdrawal of exchange reserve account by the government, sharp increase in government expenditures and high dependency of government revenues on oil and gas export, sharp increase in liquidity, stabilization of the price of the some groups of oil derivatives, and rationing some of the oil derivatives,

increase in house prices, stabilization of exchange rate and high inflation, drop in stock trading in stock exchange market, and deterioration of business environment are the main characteristics of economic performance in this period.

In sum, from the trend and analyzing the recent experiences it can be observed that economy of Iran is highly dependent on exchange revenues from oil exports, which, in turn, can be interpreted as lack of having a specific strategy or not implementing (mis-implementing) the existing strategies. Observing high economic growth fluctuations in various periods is a witness to this fact.

3. Analyses of the Objectives and Policies of Developmental Plans in Iran

The first thought on planning in Iran goes back to the establishing of Economic Council in 1937. The first meeting of this council was held in 1937 and the 10th and the last meeting held in the same year. After 6 years, in year 1944 government established Economic Supreme Council. In 1945, a commission was formed to provide a general planning scheme in Melli Bank of Iran. In 1946, the Board of Ministers adopted forming a board for providing development map of Iran in order to prepare a multi-year plan. This board handed in its first report known as first draft of first 7-year development plan to the Prime Minister in that year. In 1948, Planning Bureau Division was established to prepare a detailed 7-year plan for the government. This office later on was renamed as Temporary Planning Organization. Finally, in 1948, the official bill of implementing the 7-year plan with the amount of 21 billion Rials has been adopted by the National Council Parliament. Due to nationalization of oil in 1951 and stoppage of the oil exports revenues, major part of the plan's funds was spent by the government. After Coup D'etat in 1953, and following resuming oil exports, there was a need to implement a new development plan. As a result, in 1955, this plan was implemented.

The second development plan (1955-1962) adopted by National Council Parliament in 1955. The available budget for this plan amounted to 84 billion Rials. In 1960 and after adopting the banking and monetary law, the Central Bank was established and the monetary policy of the country was separated from the commercial banking of Melli Bank Iran. This plan, like the first one, did not have any quantitative objectives. However, the third development plan was prepared integrally and comprehensively. Its duration decreased from 7 to 5 years and its budget amounted to 222.4 billion Rials. In this plan, the actual growth rate of GDP was 8.8 percent compared to 6 percent as set in the plan. By taking into account the population growth, the rate was 6 percent.

Along with the implementation of the third plan, the land reforms were put in place in year 1963 that prepared the ground for industrial development of the economy. The fourth development plan (1968-1972) was a 5-year plan with a budget amounted to 568 billion Rials. During this plan, the actual growth rate of GDP stood at 13.1 percent compared to 9.4 percent target in the plan. Both third and fourth development plans implemented during the years when there was determined intention for industrialization.

The fifth development plan was a five-year plan spanning 1973-1977 period with a budget of 3369 billion Rials. In the first three years of the plan, the GDP growth rate remained high at 16.6, 16.7 and 18.6 percent, respectively; however, they remained well below the plan's target of 25%.

After the revolution, the growth rate of GDP of the fifth development plan on average was 15% excluding oil sector and was 8.3% including oil sector. The fifth development plan was concurrent to the first import substitution strategy. Overall, the period after revolution can be divided into two distinguished periods: 1978-1988 and post-1988. In the first decade after the revolution, the GDP growth rate was negative at -1.95 percent, mainly driven by reduction in output and exports of oil, and the inflation rate stood at 18.9%. Also, due to high population growth rate of 3.9%, the GDP per capita growth rate dropped significantly. . During this period which also the first

self-sufficiency strategy adopted, two major laws have been adopted on banking industry including nationalization of banks in year 1979 and implementation of the Islamic banking in year 1983.

For post-1988 (post-war) period, the first comprehensive cultural, social and economic development plan was adopted by the Islamic Consultation Parliament in 1989 spanning 5-year period of 1989-1993, which was later extended one more year to 1994. Developmental budget of the plan was 8189 billion Rials, its current budget was 20776.5 billion Rials, and the budget for government incorporations and entities was 5666.8 billion Rials. Overall, during this plan, GDP at 1988 constant prices grew 7.3% annually on average which was lower than the target rate of 8.1%. The major policies implemented during this period were: privatization of the government companies, importation of some basic need items without transferring foreign exchange, gradual abolition of tariff and non-tariff barriers in importing most of the capital goods, increasing the list of the allowed imported items vis-à-vis exported items, establishing exchange support fund for non-oil exports, and abolition and decreasing the exchange certificate of deposits. This period was concurrent to the fourth economic policy making of the second import substitution strategy. In last year of the plan, i.e. 1993, along with the continuation of economic adjustment and structural changes towards market-based economy, the single-rate policy for dollar implemented. In addition, in 1990, the Labor law has been adopted.

The second cultural, social and economic development plan started in 1995 and ended at 1989. The current and development budget amounted to 114483 and 75837 billion Rials, respectively. The projected growth rate was 5.1%, while the actual figure was 3.8%. During this plan, some efforts have been made towards improvement of tax system performance such as expanding the tax base and preparing the draft of the Value added tax (VAT).

In 1994 and early 1995, stabilization and control of foreign exchange and commercial policies replaced the adjustment policies prescribed by the World Bank and IMF. From 1995 the control policies and double-rate policy for

dollar including export exchange rate alongside with float exchange rate have been implemented. This plan was almost concurrent to the second self-sufficiency strategy .

The third development plan was adopted in 1990 by the Islamic Consultation Parliament . At first, the economic reforms were started. The average GDP rate was about 5.4% which was 0.6% lower than target rate. Reforming the direct tax laws, establishing the Tax Affairs Organization, preparation and compiling of VAT, preparation, adaptation and implementation of government service fees pooling law, reforming commercial system, establishing exchange reserve fund, and implementing the single-exchange rate for dollar were the main activities undertaken by the government during this plan.

The fourth cultural, social and economic development plan was compiled for 2005-2009. This period corresponds to the high oil prices in international markets. One of the main features of this plan was embedding this plan in the 20years long-term outlook document framework. The document for this plan was compiled with the main objectives as: development of the base knowledge, equality-based, and interactive with the world, providing the national security, keeping the Iran-Islamic culture and identity, effective governance and establishing elite government. Generally speaking, the high-aimed objectives of this plan is obvious; comparing the target rate of growth with the actual rate shows that the average annual GDP growth rate in the first three-year of the plan, i.e. 2005-2007, was about 6.3% which is much lower than the target rate of 7.4%.

To summarize, it can be seen that, increasing dependency to fluctuated oil revenues is a common feature of all the development plans in Iran, and therefore, achieving the targets of the plans depend strongly on oil revenues. Due to oil price fluctuations all the developmental plans have not succeeded in achieving the sustainable economic growth.

4. Literature Review

During recent years, considerable changes have happened among the views of economists in regard to the main driving forces of the economic growth, with special reference to the studies that focused on roles of institutions including rules and regulations and their components on economic growth. This concentration led to renaissance of institutional schools and laid the ground for new institutional economics. In this regard, study done by North and Thomas (1994) can be considered as the pioneer study in which institutions are the necessary conditions for economic growth. However, there is huge body of literature in this field. For instance, some seminal studies on the effects of factors such as rules and regulations and economic policies are Acemoglu et al. (2001, 2002), Rodrik (2004), and Hausman, Pritchett and Rodrick (2005). In these studies, the focus is on institutions and distinction is made between institutions and policies. In these studies institutions are mainly defined as property rights, rules and regulations, inter-personal trusts and social arrangements. Hall and Jones (1999) and Acemoglu (2001) concluded in their studies that institutions are very critical factors for long-term growth and wealth of nations; countries with better political and economic institutions in the past are today's rich countries.

Hausman, Pritchett and Rodrick (2005) in their study claim that if the researchers are interested in identifying the key factors influencing growth, they need to find the factors affecting the time of the accelerated growth. In other words, they need to identify the turning point in growth. Using this methodology and PENN World data, they examined one accelerated growth during 1957-1997. After identifying accelerated growth, they categorized the explanatory variables into three groups: external shocks, political change and economic reforms. Using statistical analyses, they examine the relationship between accelerated growth and potential determining factors. They concluded that accelerated growths are mainly due to non-conventional factors. Then, after using Probit and Tobit probability models, in which a dummy variable was defined as another explanatory variable to take one in

time of accelerated growth and zero otherwise, they observed that majority of the accelerated growths have not been associated with major changes in economic policies, institutional arrangements, political situations or external shocks. Even though, the conventional factors affect the time of the growth, but generally speaking these factors are not good predictors for starting time of growth. Djankov et al. (2006) in their study titled as "Regulations and growth" try to answer this critical question that "why some countries grow faster than the others". They examined the effects of rules and regulation governing the business activities on economic growth in 135 countries and concluded that countries with better and more favorable rules and regulations experienced faster growth. They also concluded that improving the business rules and regulations from the worst to the best case will lead to 2.3 percent increase in annual growth rate.

Jalilian et al. (2000) in their study titled as "The effect of rules and regulations on growth in developing countries" investigate the role of supervision and governing regimes on economic growth and development by examining the role of quality and capacity of governing institutions. Using two distinct econometric modeling, they found significant positive relationship between supervision quality and economic performance.

A review of the empirical studies on economic growth in Iran shows that the majority of the studies in the past mainly dealt with conventional factors of economic growth, i.e. physical capital, and labor; however, in more recent years, institutional factors such as government and social capital have been included in the models. In this regard, studies at different levels and with various indicators have been conducted and also various methodologies have been used to examine the role of social capital on economic growth. Some examples are Rahmani et al. (2006, 2007), Safdari et al. (2008), and Rannani et al. (2008) which each used distinct measures of social capital. As mentioned before, social capital concept covers various components such as trust, norms, etc. and in order to examine the role of social capital more accurately, one needs to investigate the roles of each components separately.

For instance, Rahmani et al. (2007) investigates the effect of trust on economic growth.

In Rahmani et al. (2007) study, a short review on the concept of trust and its impact on economic growth in a generalized model framework were conducted. Then, using survey data from national Scheme of Ministry of Islamic Culture and Guidance, Statistical Center of Iran and Central Bank, the effect of trust on economic growth in 28 provinces of Iran was examined. For estimating the models for 28 provinces over 2000-2003 the spatial econometrics in Matlab was used. The result of this study shows that including the variable of bounced¹ cheques as an indicator for fall in trust, the explanatory power of the model increases by 4 percent. It is concluded that this variable has significant negative impact on economic growth; put it another way, trust has positive impact on economic growth.

In another study, Amiri and Rahmani (2006) examine the effect of inter and intra-group social capital on economic growth in Iran s provinces during 2000-2003. They claim that intra-group social capital by increasing interactions will increase trust, and decrease transaction costs and rent-seeking which in turn affect economic growth positively. In a similar vein, inter-group interactions and within families and friends who means less time for inter-group interactions and interactions with outsiders of the family and friends circle will reduce the economic growth. Examining this model for the provinces reveals that the results of the model are sensitive to social capital measure choice for inter- and intra-groups. To explain, if the intra-group interactions are measured by the average number of subscribed people in associations and groups in the capital of provinces, it has positive impact on economic growth, and inter-group social capital has negative impact. But if the number of organization and associations per capita are considered as measure of intra-group interactions, then intra- and inter-group social capitals both have positive impacts on economic growth.

1. Dishonored

Samadi (2008) examines the effect of protecting property rights (as an important economic institution) on Iran's economic growth. He utilized an endogenous growth model consistent with Iran's economy. He estimated the model using Two-Stage Least Squares (TSLS) over 1059-2002 period. The results of the Garigori-Honson cointegration test shows that there is causal long-term relationship between the variables (with and without the variable representing the protection of property rights), which in turn shows that protecting the property rights and other variables in the model have long-term effect on real output in Iran. The results of the estimation excluding the property right protection variable shows that the stock of capital and foreign exchange oil and gas revenues have positive impacts on economic growth, while number of employees and human capital do not have significant impact. The results including property rights protection variables, however, show that protecting property rights has positive and significant impact on economic growth. Inclusion of these variables improved the significance of the other variables in the model as well. The implication is that improving the quality of institutions such as protecting property rights has meaningful impact on economic growth. The author recommends that institutional analyses need to be considered as a complement in analyzing Iran economy. In this regard, one recommendation is to define individual property rights more clearly and adequate efforts need to be made to protect individual property rights. This has a compound effect on the economic variables.

A review of the empirical studies on economic growth reveals that there is huge spectrum of studies over various periods of time and distinct econometric methodologies. Generally, there is no consensus among the researchers on the factors affecting economic growth directly. The effects of savings, private sector investment, human capital, taxes, non-oil exports, financial development, monetary, fiscal and commercial policies, inflation, income distribution, and education on economic growth are mixed. However, there are some consensuses on the positive impact of foreign direct investment (FDI), export diversifications, imports, R&D expenditures, information and communication technologies (ICT), and energy, and negative impact of foreign exchange rate and exchange rate policies, unstable

export revenues, population growth and finally institutional constraints on economic growth.

Another notable point is that some of the researchers have questioned the applicability of endogenous growth models in Iran's economy, while the majority of conducted studies have used this methodology. The main point coming out of all the studies is that institutions are vital part of economic analyses. Without building the needed institutional infrastructures, physical capitals are not capable of guaranteeing a considerable rate of growth.

5. Model Estimation and Interpretation of the Results

In this section first using Hausman, Pritchett and Rodrick (2005) methodology, the time of the accelerated growth in economy of Iran over 1959-2007 period is extracted. Then using regression analyses, those variables correlated with growth during transitional periods will be determined. Next, the effects of external shocks, political changes and economic reforms in developmental plans on economic growth will be examined. At the end, using Probit, Logit and Gombit probability models, we examine that how good are the explanatory variables in predicting the time of incident of accelerated growth.

5.1. Calculation and Estimation of the Periods of Accelerated Growth in Iran's Economy

As mentioned before, following Hausman, Pritchett and Rodrick (2005) methodology, a filter is used to identify the accelerated growth in Iran economy. This filter has the three following features, in which $g_{t,t+n}$ represents growth rate in time t for time horizon of n , $\Delta g_{t,n}$ represents change in growth rate in time horizon of n , and y represents gross domestic product per capita:

1. $g_{t,t+n} > 3.5$ percent per year
2. $\Delta g_{t,n} > 2$ percent per year

However, this measure is arbitrary. And the average of growth rate in next period should be higher than highest growth of output in previous period:

$$3. y_{t+n} \geq \max\{y_t\}, i \leq t$$

Following Hausman, Pritchett and Rodrick (2005) methodology, and arbitrarily for Iran, the time horizon 5 years is considered, that means n is 4. The main reason behind considering 5 year is that most of the Iran's developmental plans were 5-year plans. In this regard, the economy can have more than one period of accelerated growth provided that the distance between them is more than 5 years. If the period for accelerated growth is numerous that means that accelerated growth occurred following small changes.

Based on the three conditions it can be seen that for 5-year period two accelerated growth can be observed, and if the time horizon reduces to 3-year, the number of accelerated growth jump up to 4 and if the time horizon increases to 8-year, only one period of accelerated growth can be observed.¹ Based on $n=4$, Iran witnessed accelerated growth in 1967 and 2003, i.e. pre- and post-revolution third development plans. In pre-revolution third development plan, the main changes that occurred were: integration of planning organization to government, and becoming the main body responsible for management of economic affairs in the economy.² As

1. If time horizon of 3-year is chosen, then the starting of accelerated growth are associated with 1965, 1969, 1993 and 1382, i.e. pre-revolution second and third development plans and post-revolution first and third development plans. However, If time horizon of 8-year is chosen, then Iran only had accelerated growth in 1973.

2. The main objectives of this plan were: 1) establishing and development of industries capable of generating more income, 2) prepare the ground for building iron industries, petrochemical, machinery, aluminum industries, tractor-building plants and pipe industries, 3) development of infrastructure, and education and training and health services. This plan has been prepared in three levels, macro, sectoral and projects with the target rate of 6 percent growth per year. Its secondary objectives were job-creation, more equitable distribution of income, and providing the opportunities for individual capabilities. The land reforms started in 1962 which was not part of this plan. These reforms prepared the necessary grounds for economic activities in manufacturing and therefore industrial development of Iran's economy (Toufigh, 2006, pp. 55-56, and Beheshti, p. 197)

mentioned before, the third post-revolution development plan aimed at economic reforms in the areas of commercial and business systems, foreign exchange market, money market, taxes, and labor market.

Hausman et al. (2005) for stability or instability of growth considered two thresholds. However, in our study, considering the convergence of growth models, Iran as a developing country, and the average growth rate of the economy over half a century, we chose 2.5 as threshold. Based on this measure, the two-period of accelerated growth, 14, 2 and zero percent growth cases can be considered as high, normal and negative growth, respectively. In this context, the occurred accelerated growth in year 1967, Iran experienced high growth rate, and this growth continued in the following years. However, for the second period of accelerated growth in 2003, Iran economy started with a normal growth, and then high growth occurred. This shows that the patterns of the starting of the accelerated growth are different.

Before detail investigation and usage of regression analyses, one critical question remains to answer; what factors are associated with accelerated growth. In this regard, reviewing the average value of some of the variables during two transitional periods, namely $t-1, t, t+1$, i.e. value of variables in the time of accelerated growth and comparing the values of the same variable in 4 previous and future years can be helpful. Another approach can be identifying the variables with high correlation with growth during one transitional period (4-years here) and compared it with 4-years ago.

The results of both of these two approaches are presented in table below. For this, we examined the relationship between starting of accelerated growth using both methodologies with investment, exports, and imports, openness degree of the economy, inflation, exchange rate, and trade relation. According to the table 1, under first approach, accelerated growth is associated with imports at 96 percent; i.e. accelerated growth has positive and significant relationship with imports. However, no significant relationship with the other variables is observed. This shows that accelerated economic growth in Iran has happened during the time of solving macroeconomic crises in the economy.

Table 1: Correlation of Variables with Accelerated Growth

Title		Trade relation	Export to output ratio	Export + import to output ratio	inflation	Investment to output ratio	Real exchange rate	Imports to output ratio
Starting growth acceleration versus 4 years ago	Correl.	0.362421	0.125411	0.156287	0.024186	0.112645	0.432989	0.966041
	t-stat	0.673521	0.218947	0.274064	0.041904	0.196356	0.831995	6.47568
	P-value	0.5489	0.8407	0.8018	0.9692	0.8569	0.4664	0.0075
	number	5	5	5	5	5	5	5
5- year period versus 4 years ago	Correl.	0.53653	0.716774	0.783719	-0.198858	0.723231	3193.714	0.815983
	t-stat	1.682138	2.719616	3.338393	-0.53685	2.770735	3.734608	3.734608
	P-value	0.1364	0.0298	0.0124	0.608	0.0277	0.0073	0.0073
	number	9	9	9	9	9	9	9

Another approach in which instead of the time of starting accelerated growth, we compare the variables for a five-year accelerated growth with the starting time of accelerated growth. Under this approach, all variables except inflation and trade relation have positive and significant relationship with accelerated growth. Exports, openness of the economy, investment, and real exchange rate have positive and significant relationship; however, trade relation and inflation have positive but insignificant impact on the timing of accelerated growth.

These results do not necessarily present the causal relationship between these variables and accelerated growth. However, the finding that accelerated growth requires investment, exports, and competitive exchange rate is of great importance. Therefore, it can be claimed that accelerated growth not only depends on total factor productivity (TFP) improvements and increases in import capacity, but also on increasing in exports and investments and competitive exchange rate.

5.2. Estimation of the Roles of Explanatory Variables on Accelerated Economic Growth in Iran

In economic literatures, exploring the factors driving economic growth is highly important; historically it started from physical capital and labor and extended to R&D expenditures, human capital, technology and institutions and rules and regulations, and social capital. Now, we ask this question that to what extent explanatory variables can explain the growth? The explanatory variables included are external shocks, domestic economic reforms and political situation.

a) External shocks (DTOT): trade relation represents external shocks and defined as a dummy variable taking one for year t , i.e. from the start time of the accelerated growth to $t+4$, and zero otherwise. Inflow and outflow of capital is an alternative that can be used as a proxy for external shocks. However, since this variable is endogenous and needs more caution in model specification, we decided not to use this variable.

b) Political changes (DENDWAR): a dummy variable represents the revolution and Iran-Iraq ceasefire, in which it takes one for revolution and ceasefire occurrence years and zero otherwise.

c) Economic reforms (ECONLIB): in defining this variable, we follow the movements toward economic liberalization and more open economy. A dummy variable is defined, taking one for the years the economy moved toward more open economy and zero for the remaining years.

These variables can project transitional growth partly. The results using OLS have been presented in table 2 below. According to the results, there is no significant relationship between economic growth and trade relation. However, the results show that there is significant and positive relationship between political situation and economic reforms with economic accelerated growth.

Table 2: Model Results for Iran Economic Growth During 1959-2007

Variable	coefficient	t-statistics
External shocks	0.291141	0.165667
Political changes	7.975184	2.817275
Economic reforms	4.191141	2.107946
R-squared	0.442307	-

5.3. Probability Models' Estimation and Interpretation

Now, in order to conduct more detailed statistical analyses and also determine the power of prediction of the variables we use Probit, Logit and Gombit models. Under these models, a dummy variable appears on the left-hand side which is known as Quantitative dependent Variable Model (QDVM). It has been used in economic growth empirical models in recent years. As mentioned in theoretical section, according to the Hausman et al. (2005) study, theoretically the conventional endogenous and exogenous

economic growth models need to be capable of identifying the relationship between growth and macroeconomic variables (diagram 1).

Our dependent dummy variable takes the value of 1 in times close to the occurrence of accelerated growth and zero otherwise. Explanatory variables are three groups as before. In estimating the coefficients, the methodology of probability models are used. The simplest method under these models is Linear Probability Model (LPM) which has some drawbacks including heteroskedasticity of error terms which can be treated using FGLS technique. Another drawback of the LPM method is that there is no guaranty that the coefficients lie in 0-1 domain. To avoid these flaws, we use Probit and Logit under which the distribution functions are normal and Logistic distributions, respectively.

In table 3, the results of all three probability models including Logit, Probit and Gompit are presented. In order to choose among the models, we can consider the maximum value for LL function, and also Schwarz-Bayesian and Akaike criteria. The values for all these three criteria show the superiority of Logit over the others.

Table 3: Estimation Results of Accelerated Economic Growth for Probability Models

Title	Logit	Probit	Gompit
Intercept	-6.39 (-2.35)	-3.83 (-2.60)	-3.35 (-2.17)
External shocks	-7.93 (-2.35)	-4.71 (-2.60)	-4.56 (-2.17)
Economic reforms	9.48 (-2.133)	5.7 (-2.24)	5.6 (-2.01)
Number of observations	49	49	49
LL statistics	-15.161	-14.8841	-14.4836
SBC statistics	-20.99	-20.77	-
AIC statistics	-18.16	-17.88	-
Marginal effect	0.6953	0.1326	-

The results of the all models, especially Logit model, show that in Iran economy external shocks have negative significant impact on occurrence of accelerated economic growth. Economic reforms through development plans in pre- and post-revolution third development plans have led to occurrence of accelerated economic growth. Its effects are significant at 95% confidence interval.

6. Conclusion

In this study we examined the effects of rules and regulations on accelerated economic growth. Following Hausman et al. (2005), a filter for identifying the accelerated growth was introduced. The results deriving from the filter identified two accelerated economic growth considering two five-year periods; 1967, the third pre-revolution development plan, and 2003, the third post-revolution cultural-social-economic development plan.

By examining the correlation between the starting time of growth and its past 4-year period and investment, export, import, economic openness, inflation, exchange rate, and trade relation, we concluded that growth acceleration has positive and significant relationship with imports, but insignificant for the other variables. That means that growth acceleration has been experienced during the periods with exceptionally low macroeconomic imbalances in Iran.

Under the second approach, in which instead of the starting time of growth acceleration, the variables for a period of 5-year compared with the starting time of growth acceleration, except for trade relation and inflation, all other variables had significantly affected growth acceleration positively. In addition, the correlation coefficient between export, economic openness, investment and real exchange rate and growth acceleration was positive and significant, but it is insignificant for the trade relation variable. However, the model estimation shows positive and significant for trade relation variable. With regard to inflation, the estimated coefficient is positive but insignificant. Overall, based on these results it can be claimed that accelerated growth not only depends on total factor productivity (TFP) improvements and increases

in import capacity, but also on increasing in exports, investments and more competitive exchange rate.

At the end, Logit, Probit and Gombit models have been used. The results of all of these three models show that in Iran economy, growth acceleration is affected adversely by the external shocks, through the channel of high dependency of the economy to the revenues gained from crude oil exports. In addition, the results show that economic reforms embedded in development plans, specifically in the third pre- and post-revolution development plans, have led to growth acceleration.

References

- Acemoglu, Daron Johnson Simon, & A.James Robinson (2002). The Colonial Origins of Comparative Development: An Empirical Investigation, "The American Economic Review" 91, no. 5: 1369-1401.
- Barro, R. & Sala-I-Martin (1995). *Economic Growth*, MIT Press.
- Ben-David, Dan, & David H. Papell (1998). "Slowdowns and Meltdowns: Postwar Growth Evidence from 74 Countries", *Review of Economics and Statistics*, November, pp. 561-571.
- Bergstrom, Willy (1999), *Government and Growth*, Translated by A. Hayati, Budget Organization publishing.
- Beheshti, Mohammad Bagher (1999), Assessing the impact of past programs in formulating future plans, *Proceedings of the conference lectures and fifty years of development planning*, Allameh Tabatabaei University. Center for Economic Research.
- Cheng. L.K. & Dinopoulos (1992), *Endogenous Growth in Open Economics*, Schumpeterian Growth and International Business Cycles.
- Djankov, Simeon, Caralee McLiesh, & Rita Maria Ramalho, (2006). "Regulation and growth", *Economics Letters* 92 (2006) 395-401.
- Hall, Robert E. & Charles I. Jones (1999). "Why do Some Countries Produce so Much More Output per Worker Than Others?" *Quarterly Journal of Economics* 114, no. 1: 83-116.
- Hausmann, Ricardo, Pritchett Lant, & Dani Rodrik (2005). "Growth Accelerations", *Journal of Economic Growth*, 10, 329-303, 2005.
- Helliwell, John F. (1994). "Empirical Linkages Between Democracy and Economic Growth" *British Journal of Political Science* 24, April 1994, pp. 225-248.
- Helliwell John F. (2000). "Economic Growth and Social Capital in Asia", in R. Harris, ed., *The Growing Importance of the Asia-Pacific Region*.

Iran. Rules and Orders (1989), The First Development Plan of Iran, 1989 to 1993: Adopted in 1989, Budget and Planning Organization, *The Socio-economic Documents Center publishing.*

Iran. Rules and Orders (2003), Iran labor law, adopted November 1990, *the Institute of Labor and Social Security.* Iran. Rules and Orders (2003). The Third Development plan of Iran (2000-2004) adopted in 2000, *The Management and Planning Organization, Vice President of Support Center for Scientific Documentation and Publications.*

Central Bank of Iran (2010), Time series of the 1959-2007 National Account [.WWW.CBI.IR](http://WWW.CBI.IR)

Tafazzoli, Ferydon (1996). *History of economic ideas*, Straw Printing and Publishing.

Tofigh, Firuz (2006). The planning in Iran and view of future, *Institutions of higher education and research planning and management.*

Jahangard, Esfandiar (2005). "Forecasting economic growth during the fourth development plan", *Journal of Planning and Budget.* No. 89.

Jahangard, Esfandiar (2006), *The Economics of Information and Communication Technology*, Bulisines Co. publishing.

Jahangard, Esfandiar (2007). A half-century rise and fall of economic growth, *Economy and Society.* 13 and 14.

Razzaghi, E. (1989). *The economy of Iran*, Tehran: Ney publication Co..

Renani, M. (1997). *Market and Non-market?* Management and Planning Organization, Tehran. *The land Reform Organization* (1966).

Plan and Budget Organization (1992). *The first Development Plan of Iran*, Plan and Budget Organization. Plan and Budget Organization (1995). *History of planning*, documentation of socio - economic.

Plan and Budget Organization (1998). Experience in planning, documentation of the economic - social organization, *The Macroeconomic Office, Department of Economic Affairs and Coordination*.

Plan and Budget Organization (1998). *The Second Development Plan of Iran, 1995-1999*: approved in 1994 parliament, Plan and Budget Organization, Documentation Center of socio - economic and publications.

Planning Organization (1964), *Reports of a Second Seven-year Plan*.

Management and Planning Organization (2005). Economic Report 2004 and monitor the performance of the third Five-Year Development Plan, *Volume I, Management and Planning Organization*.

Safdari M, Mohammad Karim, H. Khosravi , R Mohammad (2008). "The effect of social capital on economic growth", *Quarterly Journal of Quantitative Economics*, Summer 2008, 5(2 (17)):39-61.

Samadi, A. H. (2008), Property Rights and Economic Growth: Developing a model of endogenous growth, *PhD thesis, Isfahan University, Department of Economics*.

Tabibian, M. (1992). *Economic rent as an obstacle to development, Planning and Development*.

Qalibaf, Mohammad Bagher (2009). A Plan for progress and justice: Institute of thought and action. Department of Economic Affairs and Coordination (1998).

Qalibaf, Mohammad Bagher (1998). The Performance report of the Second Development Plan, *Deputy of Economic Affairs and Coordination, Office of the macro economy*.

Vice president of strategic planning and monitoring (2009), *Economic Report 2007* and the first three years of monitoring plan, the first volume, vice president of strategic planning and oversight.

Meyer, Gerald M. (1994). *From Classical Economics to Development Economics*, Translated by Gholamreza Azad, NY publication Co.

Nili, M., et al. (2002). *Summary of the Strategic Plan of Industrial Development*, School of Management and Economics, Sharif University of Technology.

Zenouz Hadi, B. (2000). "Commercial and industrial development strategies in 1979-1998," *Economic Research*, No. 6. Ministry of Economic Affairs and Finance (2004). *A quarter century of ups and downs: A survey of economic developments during the years 1999-2004*, published by Paygan co.

Iran. Rules and Orders (2004). *The Fourth Development Plan of Iran, 2005-2009*: adopted in 2004, Management and Planning, Administrative, Financial and Human Resources Center for Scientific Documentation, museums and publications.

Jalilian, Hossein, Colin Kirkpatrick, & David Parker, (2007). "The Impact of Regulation on Economic Growth in Developing Countries: A Cross-Country Analysis." *World Development* Vol: 35, No 1, pp 87-103.

Jerzmanowski, Michael (2005). "Empirics of Hills, Plateaus, Mountains, and Plains: A Markov-Switching Approach to Growth", *Journal of Development Economics*.

Jones, Benjamin F., & A. Olken Benjamin (2005). The Anatomy of Start-Stop Growth, *NBER Working Paper* 11528, July .

Jones.C.I (2002). *Introduction to Economic Growth*, second edition, New York: W.W. Norton and Co.

Mauro, Paolo (1995). "Corruption and Growth", *Quarterly Journal of Economics* 110, 681° 712.

Rodrik, Dani, & Subramanian Arvind (2004). From Hindu Growth to Productivity Surge: The Mystery of the Indian Growth Transition, *NBER Working Paper* No. w10376, March.