Impact of Financial Liberalization on Economic Growth in Iran: An Empirical Investigation

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ABSTRACT

The aim of this thesis is to investigate the impact of financial liberalization on economic growth in Iran through Johansen Cointegration tests by using time series data from 1965 to 2005.

While testing for the impact of financial repression on the economic growth in Iran, the thesis also investigates the determinants of economic growth in Iran. A financial liberalization index is used in econometric models along with the conventional theoretical determinants of economic growth as suggested by the existing economic growth theories such as Solow growth model, Endogenous growth model, Cobb-Douglas production function and the Export-Led growth hypothesis.

The results suggest that financial intermediation, capital, research and development, and financial liberalization have positive and statistically significant impact on economic growth. In addition, reserve requirement ratio has a negative but statistically insignificant impact on economic growth. Likewise, exports have a positive but statistically insignificant impact on economic growth. On the other hand, the results suggest that labor shows a negative impact on economic growth in the case of Iran, which suggests that labor force in Iran is not effective in promoting economic growth on the contrary of what the existing theories suggest. This can be attributed to low productivity of the labor force.

Keywords: Financial liberalisation, economic growth, Iran.

ÖZ

Bu tez İran'daki finansal serbestleşme politikalarının iktisadi büyüme sürecine etkisini 1965 ve 2005 yıllarını kapsayan yıllık verilere dayanarak Johansen eş-bütünleşme testi ile araştırmayı amaçlamaktadır.

Finansal serbestleşme politikalarının iktisadi büyüme sürecine etkisini araştırırken, tez ayni zamanda İran'daki iktisadi büyüme sürecinin belirleyicilerini de tespit etmeyi amaçlamaktadır. Solow büyüme modeli, İçsel büyüme modeli, Cobb-Douglas üretim faktörü ve İhracat önderliğinde büyüme hipotezi gibi geleneksel ekomnomik büyüme teorilerinin önerdiği teorik iktisadi büyüme belirleyicilerinin yanısıra ekonmetrik modellerde bir finansal serbestleşme endeksi kullanılmıştır.

Johansen eş-bütünleşme testi sonuçlarına gore finansal serbestleşme, finansal aracılık, sermaye, ve araştırma ve geliştirme iktisadi büyüme sürecine olumlu ve istatistiki olarak anlamlı bir etki yapmaktadır. Öte yandan, mevduat munzam karşılığı oranının İran'daki ekonomik buyüme sürecine olumsuz fakat istatistiksel olarak anlamsız bir etkisi olduğu sonucuna varılmıştır. Ayrıca, ihracatın ekonomik buyüme sürecine olumlu fakat istatistiksel olarak anlamsız bir etkisi olduğu tespit edilmiştir. Diğer yandan, tezin ilgi çekici bir sonucu olarak elde edilen sonuçların işgücünün İran'daki ekonomik büyümeye olumsuz bir etkisi olduğunu işaret etmesi ile İran'daki işgücünün mevcut teorilerin tersine ekonomik büyümeyi destekleyici bir rol oynamadığı sonucuna varılmıştır. Bu sonuç İran'daki işgücünün verimsizliği ile açıklanabilmektedir.

Anahtar kelimeler: Finansal serbestleşme, Ekonomik büyüme, İran.

To My Parents

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Chapter1

INTRODUCTION

Iran is located in South-West Asia in Middle East region, under Caspian Sea and above Persian Gulf, sharing borders with Turkey, Armenia, Iraq, Azerbaijan, Turkmenistan, Afghanistan, and Pakistan[1]. For this reasons, Iran has historically played a very important role since it is geographically placed in a very important location in the world, linking west to east. Its strategic position has cost Iran a war with Iraq and 30 years of sanctions with a series of restrictions on its trade, exports, imports and financial transactions to date. This was accompanied by financial repression policies implemented by the Iranian government.

Financial repression refers to the situation, where government sets a series of rules, regulations and political restrictions to prevent the financial intermediaries from performing at their complete authority. Governments have long intervened in the financial sector not just to protect financial solidity and to protect the public from unexpected losses, but also to limit concentrations of wealth (Reinert et al, 2009).

Iran is a country with a strong economy owing to its oil and gas reserves. It serves as an interesting case study as it has a repressed financial and economic system which seems to be liberalizing in the recent years, albeit very gradually.

[1] http://www.infoplease.com/ipa/A0107640.html

Iran has developed through a number of steps since the revolution of 1979. The nationalization in 1980s and the improvement of financial system in 1990s have resulted in the relaxation of the financial regulation environment and have led to the simplification of controls on the financial system. For instance, the reforms during this period included issuing investment papers and simplifying the procedures for entry of private non-bank credit institutions. Also, in the second Five-Year Development Plan (FYDP) from 1995 to 1999, Iranian government tried to reform its financial system by setting the interest rates at a level where a positive real return on bank deposits is ensured (Taghipour, 2009).

Moreover, in the third FYDP, which spanned the period between 1990 and 2004, the financial sector liberalization reforms focused on the reduction of the administrative controls on credit allocation and interest rates, financing of the state banks by issuing participation papers, and fulfilling the preparations for the entry of private banks and non bank credit institutions (Taghipour, 2009).

Taghipour (2009) argues that the level of financial repression has decreased after 1990s which suggest that the Iranian financial system is becoming more liberal in the last two decades. He argues that this is due to the decrease in reserve requirement ratio, relaxation in interest rate controls and the partial removal reduction of directed credit programs (see Taghipour, 2009). Figure 1 shows the evolution of the Financial Repression Index constructed by Taghipour (2009). As can be seen from the figure, in the last 15 years, financial repression index is following a downward trend, which means that the financial system in Iran has gradually been liberalizing during this period.

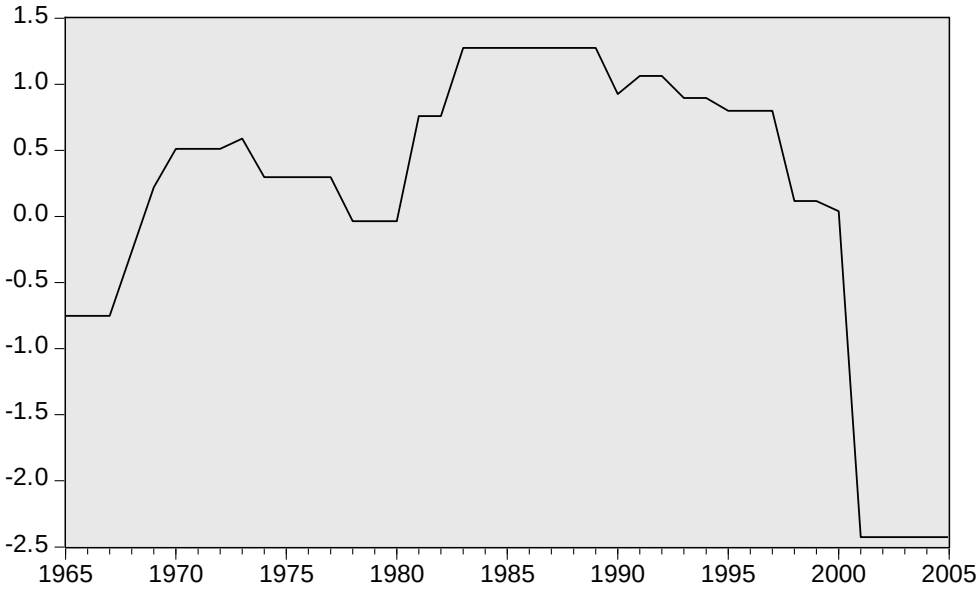

Figure 1: Financial Repression Index
Source: Taghipour (2009)

According to the theory of financial liberalization, financial liberalization is supposed to foster economic growth. Against this backdrop, the aim of this thesis is to investigate the impact of financial liberalization on the economic growth in Iran through Johansen Cointegration tests using time series data from 1965 to 2005.

While testing for the impact of financial repression on the economic growth in Iran, the thesis also investigates the determinants of economic growth in Iran. The financial repression index introduced by Taghipour (2009) is modified by multiplying it by -1 to proxy financial liberalization, and is used in econometric models along with the conventional theoretical determinants of economic growth as suggested by the existing economic growth theories, such as Solow growth model, Endogenous growth model, Harrod-Domar model, AK model, Cobb-Douglas production function and the Export-Led growth hypothesis.

In particular the thesis investigates if the financial liberalization index has indeed a significant positive impact on economic growth, while testing for significance of other theoretical determinants of economic growth at the same time. Therefore, the thesis serves for two purposes: First, it examines empirically if financial liberalization fosters economic growth. Second, it investigates the determinants of economic growth[2] in the case of Iran.

The rest of this thesis is structured as follows: The next chapter will review the economy of Iran, analyzing the performance of the economy in the period between 1965 and 2005. Chapter 3 will discuss the concept of financial repression and analyzes the repressive financial policies in the Iranian banking sector. Chapter 4 will provide a review of the related literature. Chapter 5 will set out the theoretical framework on which the empirical analysis is built. Chapter 6 will introduce the data and the methodology used in the thesis. Chapter 7 will provide the empirical results, and chapter 8 will point out the conclusion of the thesis along with the suggested policy implications.

[2] Economic growth usually means the growth rate of GDP. Economic growth is an increase in country's production levels of goods and services (Gordon, 2003).

Chapter 2

AN ANALYSIS OF THE ECONOMY OF IRAN

The economy of Iran can be divided into three periods: (1) Before the Islamic Revolution of 1979; (2) During the Iran-Iraq war; and (3) After the Iran-Iraq war. The economy of Iran before the revolution in 1979 was one the most solid economies in the Middle East with quite high economic growth rates. However, as can be seen in Figure 2, the pace of growth started to slow down significantly following the revolution with negative growth rates in some periods.

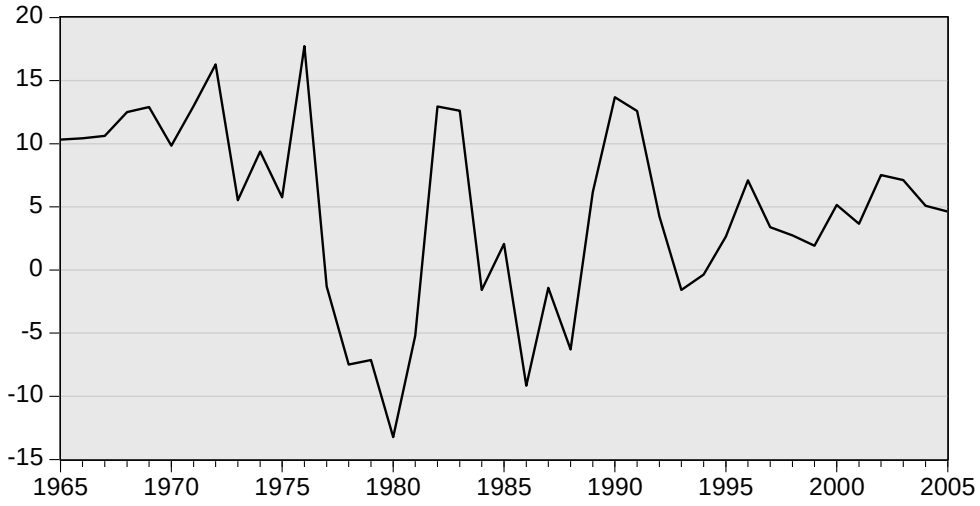

Figure 2: GDP Growth Rate (%)
Source: The World Bank's World Development Indicators (2009).

In addition to this, the Eight-Year War and economic poor management further damaged the economic growth of the country in the mid 1980s (see Figure 2).

However, as can be seen in Figure 2, it can be argued that there has been a stable improvement in the Iranian economy over the last decade.

In particular, due to the high world oil prices, the exports revenues have increased in 1980s and early 1990s as can be seen in Figure 3 which helped to control the nation's large foreign debt. This has also contributed to the economic growth of the country during the same period.

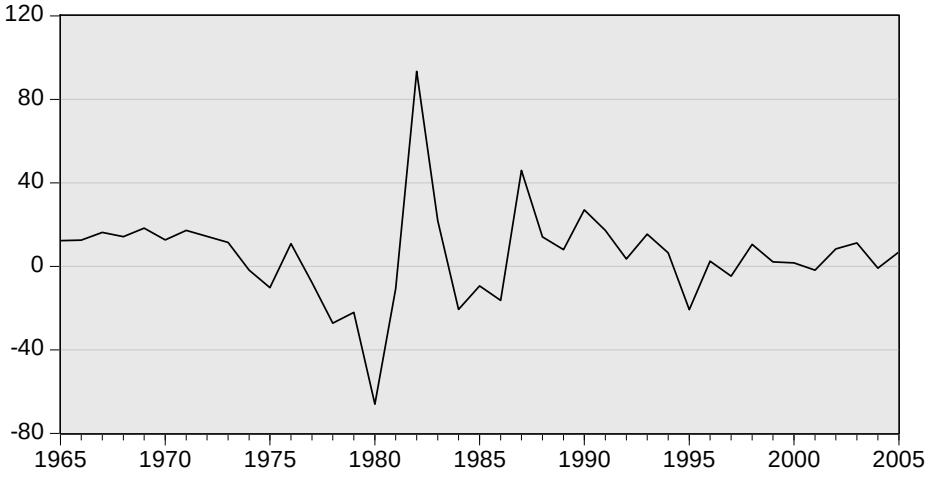

Figure 3: Export of Goods and Services (% growth)
Source: The World Bank's World Development Indicators (2009).

In spite of the stable economic growth achieved within the last decade, the economy of Iran continues to be weighted down by high unemployment, inflation, expensive subsidies, corruption, and an inefficient public sector[3]. Figure 4 shows the inflation rate in Iran. As can be seen, there has been an increasing trend since 1960s to date. However, the monetary authorities seem to have managed to keep inflation below 20% within the last decade.

[3] http://www.123independenceday.com/iran/economy.html

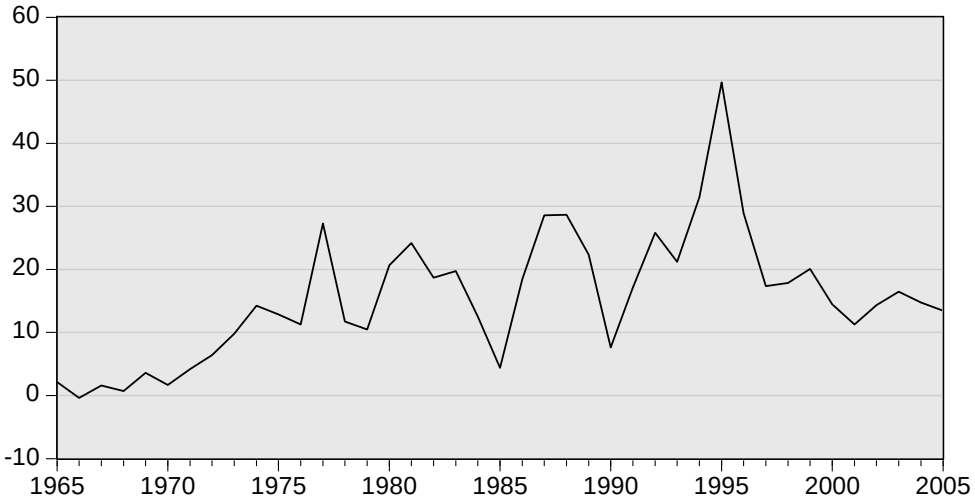

Figure 4: Inflation Rate (Consumer Price Level, %)
Source: The World Bank's World Development Indicators (2009).

2.1 Before the Islamic Revolution of 1979

Before the revolution, Reza Shah, the King of Iran, introduced the concept of centralized economic planning. This plan aimed at strengthening his power by improving three areas in the country: (1) Army; (2) Government bureaucracy; and (3) The justice system[4]. After he achieved the power, he started to pursue economic, social and cultural reforms. He believed that the way to modernization laid in replacing the religious and social norms of traditional society with the values of developed countries (Metz, 1987). He tried to build a new perspective for Iran by preferring urban over the rural, wealth over other classes and industry over agriculture. Metz (1987) states that creating this "general reform" progressively cost Reza shah most of his popularity. However, government centralization allowed him to gain the control over country's economy. Thereafter, policies for economic development started to be implemented.

[4] http://countrystudies.us/iran/63.htm

It can be argued that economic development in Iran began with the development of the transportation system. His first action was the expansion of the Trans-Persian Railway. Immediately after he came to power, Reza Shah built a network of railroads that connected ports to inland cities, by this he encouraged the trade between rural and urban cities. In 1941, he succeeded in connecting north to south and west to east in Iran by railroads. By this new transportation system, Iran moved toward an era of industrial growth, which was also supported by the government's financial incentives (Metz, 1987). As can be seen in Figure 5, industrial development in Iran has been stable in last decade despite some periods of frequent fluctuations between 1970s and 1990s.

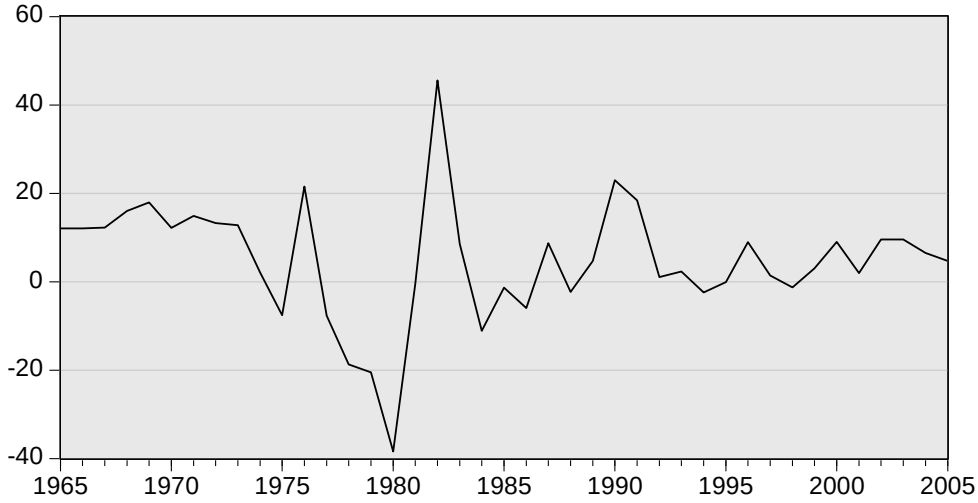

Figure 5: Industry (% growth)
Source: The World Bank's World Development Indicators (2009).

The steady industrial growth as shown in Figure 5, has created new industrial workforce primarily in the five major urban centres, namely, the cities of Tehran,

Tabriz, Isfahan, and the states of Gilan and Mazandaran, where 75 percent of the modern factories are located[5].

According to Metz (1987), the basic development strategy before the revolution was the practical method of hastening growth by combining the latest technology into large-scale, capital-intensive industries. During this period, the enlargement of the infrastructure, diversification of the industry, which aimed to ease import substitution, and the growth of large-scale industry enabled the Iranian economy to reap the benefits of economies of scale[6].

2.2 Iran-Iraq War (1980-1988)

The second period of Iranian economy encompasses the eight-year Iran-Iraq war. In September 1980, Iraqi army started the war by trespassing the Iranian border and the resulting war caused several damages not just to the Iranian economy, but even for the world economy, since both Iran and Iraq are among the largest petroleum producers.

As a result of this war, a significant share of the Iranian government's revenue, which was obtained primarily from sale of oil, was directed to military expenditures rather than on industry, agriculture and infrastructure. As can be seen in Figure 6, there has been an observable increase in military expenditures of the Iranian government after 1990s, reflecting the government's efforts of preparing the country against an external military attack.

[5] http://countrystudies.us/iran/63.htm

[6] Economies of scale refers to the decrease in the marginal cost of production as a plant's scale of operations increases (http://www.linfo.org/economies_of_scale.html).

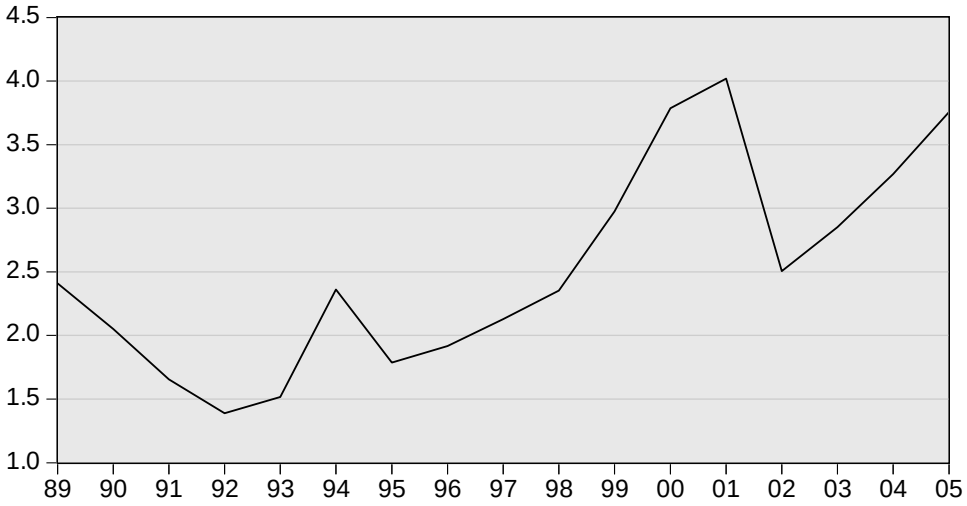

Figure 6: Military Expenditure (% growth)
Source: The World Bank'sWorld Development Indicators (2009).

The Iran-Iraq war had a number of detrimental effects on the Iranian economy. First of all, it caused great damage to physical and human capital, which resulted in a decrease in productivity and foreign currency income. Also, it led to the transfer of the workforce in peace period to military force. In addition, it resulted in brain drain, which resulted in a loss of skilled and semi-skilled workers. Furthermore, it increased inflation and trade activity in the black market, reduced productivity in the agricultural sector, led to the destruction of diversification of exports and resulted in heavy reliance on oil revenues[7].

2.3 After the Iran-Iraq War (1989 - present)

The third period of Iranian economy encompasses the period following the Iran-Iraq during which Hashemi Rafsanjani took the helm of the state in 1989 and started the first Five-Year Development Plan (FYDP) of the Iranian economy. The Rafsanjani government was fortunate to see an increase in export as this period coincided with the increase in oil prices as can be seen in Figure 6, which allowed the Rafsanjani

[7] http://www.farsnews.com/newstext.php?nn=8807081020

government to perform an open economic policy that resulted in a fall in inflation rate to 9 percent in 1990 (see Figure 4).

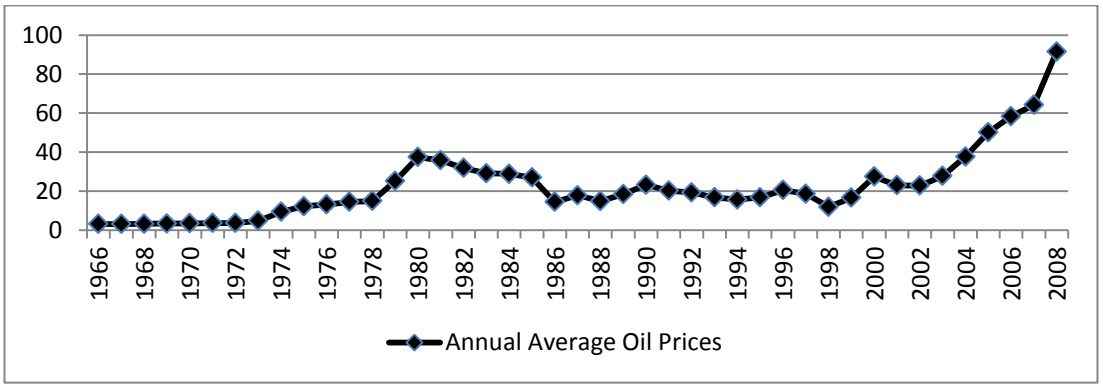

Figure 7: Annual Average Oil Prices (USD/barrel)
Source: http://www.inflationdata.com[8]

In 1997, Mohammad Khatemi was elected as the president of Iran. He introduced a broad spectrum of fiscal structural reforms, encouraging foreign investment inflows and ongoing process of privatization for major industries. In a short time, president Khatemi succeeded in taking inflation under control, and reducing the unemployment rate, which was also accompanied by increase in GDP growth rate[9] (see Figure 2).

[8]http://www.inflationdata.com/inflation/Inflation_Rate/Historical_Oil_Prices_Table.asp
[9] http://www.bashgah.net/pages-10482.html

Chapter 3

FINANCIAL REPRESSION AND RESTRICTIVE FINANCIAL POLICIES IN IRAN

3.1 Financial Repression

The origins of financial repression can be traced back to World War II years, when the governments around the world tried to control the allocation of credit by fixing the interest rates below the market level. However, over time, financial liberalization has taken over, and most of governments around the world have relaxed or removed such controls to avoid the fiscal and financial costs associated with financial repression[10].

According to Hermes and Lensink (2005), financial repression takes place in six dimensions: (1) When the government, not the financial market, channels the credit; (2) When the government, not the financial market, determines interest rates; (3) When the government determines whether new institutions would be allowed to enter the financial sector; (4) When the government set limits on banks' operations; (5) When most of the financial institutions are owned or controlled by the government and, (6) When the government decides from whom to borrow and to whom to lend and on what terms (Hermes and Lensink, 2005).

[10]http://www.independent.org/newsroom/article.asp?id=335

Financial repression has its own benefits and costs. For instance, according to Capiro et al (2001) economic growth in many countries have declined gradually under financial repression. In these countries, financial system have contracted or remained small and the efficiency of their lending has remained low, eventually leading to widespread bank insolvencies. The declared goals of the government policies have not been achieved, while the beneficiaries of the rents that were generated through financial repression have fostered a political constituency for their perpetuation. As a result, economic growth and macroeconomic stability has been impaired (see Caprio et al, 2001).

According to Oosterbaan et al (2000), interest rate ceilings are imposed by the governments to prevent banks from charging high interest rates on their loans. However, such a financially repressive policy causes an increase in the bank spread, which is the difference between the lending and the borrowing rates. Instead of charging the deposit interest rate the banks would normally charge, they are directed to offer a lower rate, reducing the amount of funds supplied by the depositors. In order to offset this fall in deposits, banks resort to increasing the lending rate, which, leads to a widespread between lending and borrowing rates (Oosterbaan et al, 2001). Needless to mention, in this case, financial repression leads to a fall in available loans. As a result, a restrained and controlled financial sector discourages both savings and investments because the interest rates are set at a level which contradicts with the level that could be determined in a competitive market. In other words, in a repressed system, financial mediators fail to channel savings to proper investments (Reinert et al, 2009).

In this way, financial repression prevents the efficient distribution of capital and, thus, damages economic growth. On the contrary, according to MacKinnon (1973) and Shaw (1973), an economy with a liberalized financial system can achieve growth and development through efficient distribution of capital.

Despite their drawbacks, governments choose to apply financial restriction policies in order to control fiscal resources and to channel funds to their own purposes instead of going through market procedures. At the same time, because of capital controls, almost all savings remain in domestic financial assets, which can easily be taxed by the government (Reinert et al, 2009).

Furthermore, in some countries, the government compels banks to meet high required reserve ratios and uses these reserves to generate government revenue. In this case, reserve requirements restrict the banks from directing deposits into productive investments. This type of revenue source is known as "implicit taxation" (see Reinert et al, 2009).

Overall, as summarized by Feridun (2009), some reasons for implementing financial repression policies can be listed as follows: (1) To prevent usury, i.e., charging illegally high interest rates on loans; (2) Inability of the governments to raise taxes either due to administrative inefficiencies or political constraints; (3) A repressed financial sector under restraints provides easy access to funding for the government; (4) In this way government has more control on the money supply; and, (5) Governments believe they can allocate savings more optimally for the society than the market forces (Feridun, 2009).

3.2 Restrictive Financial Policies in the Iranian Banking Sector

In the case of Iran, the Central Bank of Iran (CBI) implements two sets of repressive monetary policy instruments. First, direct instruments, which are used regardless of the market conditions, and, second, indirect instruments, which are market-oriented instruments dependent on market conditions (CBI, 2009).

Direct instruments include banking profit rates and credit ceilings. The CBI's policies regarding banking profit rates involve the implementation of usury-free banking laws and introduction of fixed returns on contracts, as well as the regulation of profit rates or expected rates of return on banking facilities. As specified in the by-law of the usury-free banking law, these are determined by the Money and Credit Council (MCC). Moreover, the CBI is authorized to intervene to determine these rates for all other types of facilities such as investment projects (CBI, 2009).

On the other hand, according to the monetary and banking law of Iran, the CBI's credit ceiling policies involve, intervening in and supervising monetary and banking affairs through the regulation to limit banks, specifying the usage of funds, i.e. deposits, and determining the ceilings for loans and credits in each sector (CBI, 2009).

In addition to this, indirect instruments include reserve requirement ratios, CBI Participation Papers and Open Deposit Accounts (ODAs). According to reserve requirement ratio policy, banks are obligated to deposit part of their liabilities in the form of deposits with the CBI. Through increasing reserve required ratio, the CBI contracts the volume of credits given by banks, and by decreasing this ratio, it expands the volume of credits. According to the monetary and banking law of Iran,

the CBI is authorized to determine reserve requirement ratio within 10 to 30 percent range depending on banks' liabilities and their area of activity (CBI, 2009).

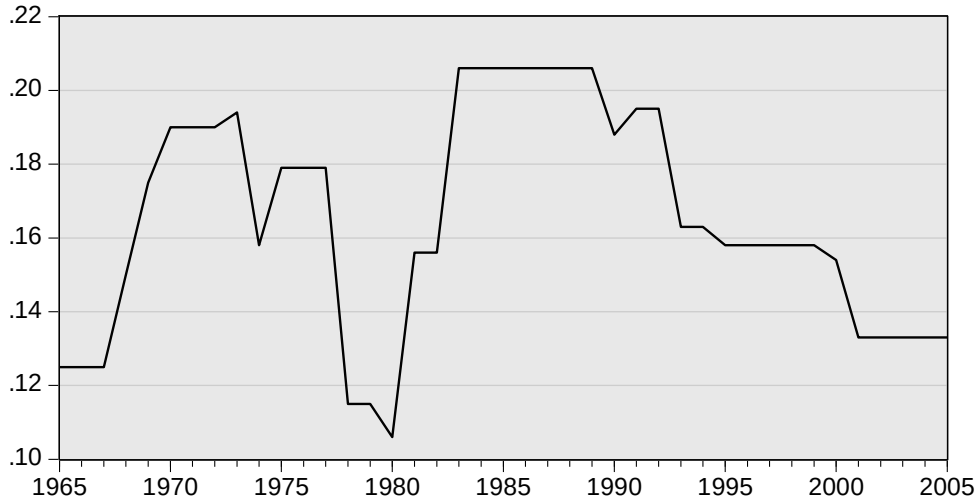

Figure 8: Reserve Requirement Ratio
Source: Taghipour (2009)

As can be seen, in late 1960s, the CBI increased the ratio to enforce the banks to hold more liquidity in the Central Bank, and then this ratio kept fluctuating until 1978 when a remarkable fall occurred. Afterward, this ratio increased till 1983 when deregulation took place by constant steady decrease to date.

On the other hand, CBI Participation Papers are used for the implementation of monetary policies by the CBI through open market operations (OMO). As the use of government bonds is prohibited according to Islamic Sharia rules, CBI participation papers enable the investors to engage in financial investment activities due to their fixed interest rate nature (CBI, 2009).

As mentioned above, another indirect instrument is the Open Deposit Account (ODA) policy, which allows banks to open special deposit accounts with the CBI. The main objective of this strategy is to control liquidity in the banking sector

through absorption of banks' excess resources. The CBI has special rules regarding the profits on these deposits (see CBI, 2009).

After the revolution in Iran in 1979, the revolutionary council decided to change the banking system by nationalizing all banks, which were formerly held in private hands, and to give full power to the government to control the banking system. Furthermore, the government launched a project for merging Iranian banks in such way that 36 active banks were merged into 9 and more than 1500 bank branches were closed down, reducing the number of branches from almost 8275 at the end of 1979 to approximately 6581 at the end of 1983[11]. The reason behind this action was the fear of the government that expansion of branches network would jeopardize the implementation of the policy for monetary and credit allocation (Sammadi, 1999).

During the Iran-Iraq war, the Iranian government used to run a chronic budget deficit. Consequently, the government undertook policies such as the imposition of credit ceilings, to ease the pressure of inflation and to avoid imbalance of the economy. This policy was pursued to limit credit extensions to the private sector of the economy. However, with the end of the war and the beginning of the implementation of liberalization policies, the government started to relax the constraints on credit extensions (Sammadi, 1999).

Nonetheless, the Iranian government decided to expand the extension of credit to some priority sectors such as agriculture, industry and construction. Accordingly, the CBI dictated banks to allocate more credit to production sector, especially the

[11] However, a decade after of implementing this policy, the government realized that "bank branch expansion" is one the main factors needed for country's economic growth (Hosseini-Nasab and Balanchi, 2003).

agriculture sector and to direct less credit to the services and commerce sectors. Such directed credit policies have been a form of restrictive financial policies in Iran to date.

The extension of financial facilities to the private sector organizations by banks started to slow down significantly in 1980s due to the fall in the deposit rates, credit ceilings, credit controls and the requirement for banks to acquire the government bonds (Hosseini-Nasab and Balanchi, 2003).

As can be seen in Figure 7, the spread between the lending and borrowing rates has become wider after early 1990s suggesting that the banks are charging higher interest rate on credits to compensate the loss in their funds due to credit ceilings on deposits.

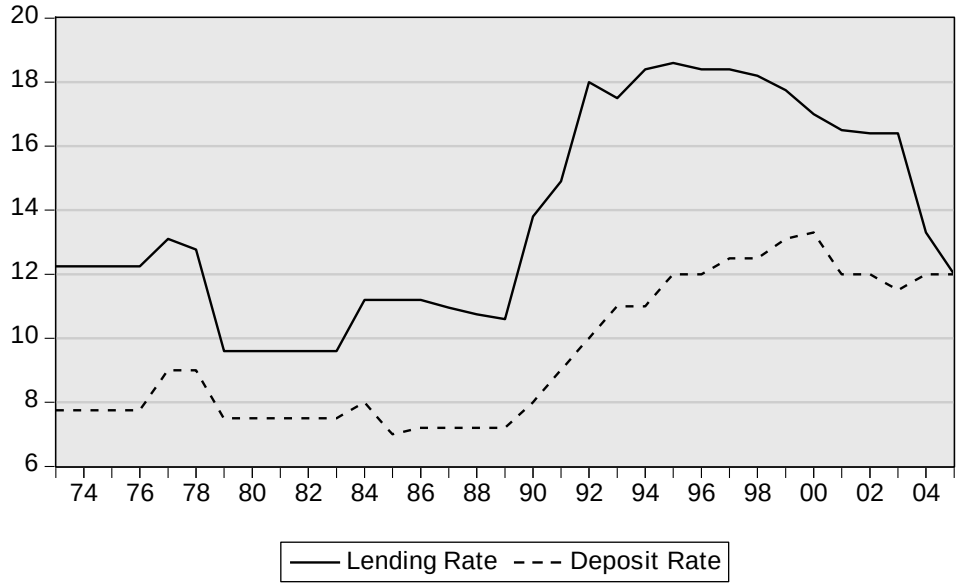

Figure 7: Weighted Average Deposits Rates and Lending Rates
Source: Prepared by the author using the data presented in Taghipour (2009).

Chapter 4

REVIEW OF THE LITERATURE

In the existing literature, a large number of empirical studies have been carried out to answer the question of whether financial liberalization affects economic growth. Overall, the conclusion that emerges from the review of the literature is that some prominent studies (Schumpeter, 1911; Goldsmith, 1969; MacKinnon, 1973; Shaw, 1973; Odedokun, 1996; King and Levine (1993a) support the importance of finance as a factor of economic growth, another group like (Robinson, 1952; Lucas, 1988; Stern, 1989) regards finance as unimportant. On the other hand, a third group focuses on possible negative relationship between finance and economic growth (Wijnbergen, 1983; Buffie, 1984).

Several arguments supporting financial liberalization have been made based on the empirical positive relationship between financial development caused by financial liberalization and economic growth such as, *inter alia*, Schumpeter (1911), Outreville (1999), Greenwood and Jovanovic (1990) and King and Levine (1993a). These studies lead to two major conclusions. First, they assert that implementing market doctrine and fair competition in a free financial market will increase interest rates on deposits, which leads to higher saving rates. This, in turn increases the amount of funds available for investment. It also causes an increase in the capital inflows to support increase in amount of funds needed for investment and growth. Second, competition places force on fund suppliers, especially on the lending rates demanded for loans. This will reduce the cost of capital and will increase investment

and economic growth. For instance, authors like Greenwood and Jovanovic (1990) and King and Levine (1993a) have built up financial models in which financial sector services help in bringing economic growth. Schumpeter (1911), conducts an empirical analysis, including industrial level studies, firm-level studies, individual country studies and cross-country comparison and found a strong positive relationship between improvement in financial system and economic growth in the long-run.

Some studies in the literature explain the channels through which financial liberalization may lead to economic growth. For instance, in a seminal study, Levine and Zervos (1996) provide evidence that liberalization provides liability for stock market, which facilitates growth in the market as investors can enter and leave the market easily. In addition, Hermes and Lensink (2005) find that when the financial markets are liberalized, they can become more active in introducing new financial instruments and reducing overhead costs by improving bank and risk management. Likewise, Greenwood and Jovanovic (1990) introduced a model show that financial intermediaries can identify the investment and profitable projects better than individuals which itself leads to higher return and promote the growth.

On the other hand, in the case of the debate on capital controls, Bekaert et al (2005) provide evidence that foreign investors are the reason why local institutions stick to international standards, which, in turn, improves domestic corporate management, which ultimately leads to economic growth. Hosseini-Nasab and Balanchi (2003) find that restriction policies such as branch restrictions and credit ceiling will have negative effect on economic growth while increase in credit to main sectors like agriculture and industry will positively affect economic growth. Khan and Qayyum

(2006) empirically investigate the impact of trade and financial liberalization on economic growth in Pakistan and find that both trade and financial policies play an important role in enhancing growth in the long-run.

Fung et al (2005) shows how reforms in the Chinese financial system affect the long-run economic performance. They examine the link between the governmental banking system and informal credit provided by the market, and measure the effect of financial liberalization on the macroeconomic aggregates.

Table 1 provides a summary of some of the leading studies in the related literature. As can be seen in the table, most studies have documented evidence in favour of financial liberalization. Financial liberalization advocates, such as Robinson (1952), Lucas (1988) and Stern (1989), argue that financial liberalization is the reason behind increase in the flow of funds in market, which helps to improve the functioning of financial system and leads to financial deepening. Similarly, Obstfeld (1998) argues that financial liberalization is beneficial because international capital markets are able to lead the world saving to their most fruitful uses without regard to the location. Furthermore, Stulz (1999) and Mishkin (2001) argue that financial liberalization can improve transparency and accountability, moderate liquidity problem in financial market and decrease the moral hazard problem.

Levine (2001) provide an analysis that shows liberalizing restriction lead for international portfolio flows which in turn enhance the economic growth mainly by boosting productivity growth. Bekaert et al (2005) document evidence that financial liberalization leads to increase in GDP by one percent growth. Bonfiglioli (2005)

provides empirical evidence from 93 countries that financial liberalization spurs productivity growth and marginally affects capital accumulation.

On the other hand, a strand of the literature discusses that financial liberalization has no positive effect and that it may even lead to negative consequences. For instance, many arguments blame financial liberalization for some past crises, and claim that, financial liberalization increases a country's exposure to international financial crises and shocks. For instance, Baldacci (2002) documents evidence that financial liberalization increases the possibility of currency crises. In addition, Dornbusch and Reynoso (1989) argue that the there is no confident evident that financial liberalization positively affect the economic growth. Ranciere et al (2006) show that the direct effect of financial liberalization on growth by far outweighs the indirect effect via a higher propensity to crisis. Furthermore, Chou and Chin (2002) argue that financial liberalization causes increase in financial innovations and increases the financial intermediation productivity. In addition, Chan-Lau and Chen (2001) show that improper combinations of both financial development and liberalization processes lead to an increase in financial crises. In some usual conditions, to prevent financial crises, it is necessary that financial liberalization is linked to financial development to improve the financial sector efficiency.

Overall, it can be summarized the financial liberalization advocates in the literature, have documented evidence that, financial liberalization increases the number of opportunities available for economic growth by improving diversification of portfolios, shrinking liquidity constraints and reducing lending rates. On the other hand, some studies in the literature discusses that financial liberalization has no

positive effect and that it may even lead to negative consequences by increasing the vulnerability of the countries to currency crises.

Table 1: Summary of the Related Literature

Study	Country	Findings
Schumpeter (1911)	Multiple countries	There is a positive relationship between improvement in financial system and economic growth in the long-run.
King and Levine (1993a)	Multiple countries	There is a strong positive relationship between each of the financial development indicators and growth indicators (real per capita GDP growth, growth in capital stock per person and total productivity growth).
Bencivenga and Smith (1991)	Theoretical Study	Intermediaries that improve corporate governance reduce credit rationing, higher productivity, capital accumulation and growth.
Bencivenga, Smith and Starr (1995)	Theoretical Study	Lower transactions, greater investment in illiquid capital and higher rate of return on savings have impact on economic growth.
Demetriades and Hussein (1996)	Multiple countries	The results provide little support to the view that finance is a leading sector in the process of economic growth.
Levine and Zervos (1996)	Multiple countries	There is a significant relationship between financial deepening and economic growth.
Levine (1997)	Multiple countries	There is a positive relationship between economic growth and financial development.
Williamson and Mahar (1998)	Theoretical Study	Financial liberalization increases efficiency in the allocation of capital, but its effect on savings has been ambiguous
Henry (2000a)	Multiple countries	Cost of capital decreases after major deregulation and economic reform.

Table 1: Summary of the Related Literature (Continued)

Henry (2000b)	Multiple countries	Investment to GDP ratio increases while consumption to GDP ratio does not increase after liberalization.
Rousseau and Wachtel (2000)	Multiple countries	With small feedback evidence, finance leads growth
Rajan and Zingales (2003)	Multiple countries	Financial development has a strong effect on economic growth
Bandiera et al (2000)	Multiple countries	There is no evidence of any positive effect of the real interest rate on saving. The effects of financial liberalization on saving are negative and significant on Korea and Mexico, Positive and significant on Turkey and Ghana.
Levine, Beck and Loayza (2000)	Multiple countries	The exogenous component of financial intermediary development is positively associated with economic growth.
Demetriades and Luintel (2001)	South Korea	There is a positive association between financial deepening and the degree of state control over the banking system combined with mild repression of lending rates,
Hosseini and Balanchi (2003)	Iran	Branch restrictions and credit ceilings have a negative impact on economic growth, while increase in credit in priority sectors had a positive impact.
Shandre and Ang (2004)	Australia	Financial market has causal effect on growth. There is also causal effect running from economic growth to financial intermediaries.
Hachicha (2005)	Tunisia	Financial repression has significant and negative effect on financial development.
Hassan and Suk-Yu (2007)	Morocco	There are strong linkages between financial development and economic growth in short-run.
Tswamuno et al (2007)	South Africa	Liberalization of the capital account is necessary but not sufficient for economic growth.
Taghipour (2009)	Iran	A mild repressive policy can increase financial intermediation.

Table 1: Summary of the Related Literature (Continued)

Katircioglu (2009)	The Euro area	There exists bidirectional causation between real income growth per capita and domestic credit growth.
Phuan, Lim and Ooi (2009)	Multiple countries	The long run integration relationships and the short-run causality relationships among ASEAN-5 markets have both increased after the financial liberalization.
Ben-Gamra (2009)	Multiple countries	There is a mixed link between financial liberalization and growth in emerging countries.

Chapter 5

THEORETICAL FRAMEWORK

5.1 Theory of Financial Liberalization

According to financial liberalization theory, deregulating the domestic financial market and allowing the market to define the interest rate and controlling the capital i.e. credit, will help in macroeconomic stability and economic growth of countries.

This theory is elegantly explained by the seminal works of MacKinnon (1973) and Shaw (1973). According to these authors, financial liberalization can promote economic growth by increasing investment and productivity. Furthermore, Mandel (2009) points out that financial liberalization could be beneficial if it results in: (1) Greater savings; (2) Reduction in cost of capital; and (3) Adoption of improved governance practices (Mandel, 2009). Theoretically, financial liberalization is expected to lead to higher real interest rates and to stimulate savings (see MacKinnon, 1973, and Shaw, 1973). In return, a higher level of savings would be expected to finance a higher level of investments, therefore, leading to higher economic growth.

Financial development can be defined as improvement in quality, quantity and efficiency of financial intermediary services. In this respect, financial development refers to how efficiently intermediaries and financial markets are functioning, and it depends on the financial structure of the economy (Krause and Rioja, 2006).

According to MacKinnon (1973) and Shaw (1973), financial development is fostered when all regulations and controls that cause financial repression are removed and financial liberalization takes place. Financial liberalization can be promoted by use of appropriate supervision and well regulatory infrastructure to protect domestic and foreign investors and also to transfer sources created by new savings to efficient investments[12].

Improvement in financial system leads to better allocation of financial resources in presence of a well functioning financial system. In this case, firms can expand their businesses by the ease of borrowing at lower rates. Also, financial intermediaries can channel their funds to the best projects. This is also expected to lead to an improvement in quality, quantity and efficiency of financial intermediary services (Ang, 2008).

5.2 Theory of Financial Development

According to Patrick (1966), there exist two theoretical links between financial development and economic growth. The first link is called "demand following", and it involves the measurement of the growth in demand of financial services which depend on the growth of real economic output and the process of commercializing and advancement of agriculture, industry and other sectors. In other words, economic growth causes financial development. The faster growth of real national income, the larger will be the demand by firms for external funds and also among different sectors or industries, the need for financial intermediation will be more sensible for transferring savings to fast growing sectors from slow growing sectors and from individuals.

[12] http://www.uneca.org/eca_resources/major_eca_websites/nairobi/fiance%20presentation.ppt.

The second theoretical link between financial development and economic growth is called "supply leading"[13] (Patrick, 1966). Supply leading works in two ways: First, by transferring the resources from old low growth sector to the modern high growth sectors and, second, by stimulating the enterprises response to the modern sectors (Patrick 1966).

As mentioned earlier, financial repression policies hinder financial development and, hence, are theoretically expected to have a negative impact on a country's economic growth. For example, interest rate ceilings usually cause an increase in the spread between deposit and lending rates. In this case, the government controls interest rates on bank operations, and, hence, commercial banks can compete neither on the market for deposits nor on that for loans.

Therefore, it is theoretically expected that financial development will lead to economic growth, whereas, financially repressive policies such as interest ceilings, high reserve ratios and credit programs alike, will lead to lower savings, lower investments and will ultimately have a negative impact on economic growth.

5.3 Theoretical Models of Economic Growth

Economic growth is a term used to show increase in specific measure of gross national output such as gross domestic product (GDP) or gross national product

[13] "According to this view, the financial sector precedes and induces real growth. In the "demand-following" pattern, on the contrary, the real side of the economy develops, its demands for financial services materialize and are met passively from the financial side. As the process of real growth occurs, the supply-leading impetus gradually becomes less important, and the demand-following financial response becomes dominant" (Patrick, 1966: 177).

(GNP). GDP is the value of all goods and services produced within a nation in one year. GDP can be calculated as the value of output produced in the country or equivalently as the total income of country such as wages, rent, profits and interests obtained (Vuranok, 2009).

5.3.1 Solow Growth Model

It is very difficult to construct a model to include all related macroeconomic factors. The Solow growth model is well-known economic growth model introduced by the economist Robert Solow who won the Nobel Prize in 1987 for his research in the area of economic growth. This simple model shows the basic mechanism of economic growth elegantly. In contrary to other models, for example Keynesian model which focuses on demand side of an economy, the Solow model focuses on supply side of economy and simply assume that increase in supply of goods can imply economic growth (Mankiw, 2002).

The Solow growth model is designed to exhibit how increase in capital and labor force and advancement in technology can effect total output of goods and services of a nation (Mankiw, 2002). According to the model, the output depends on two input factors, capital stock and the labor force. The production function is given by:

$$Y = F(K,L) \qquad (1)$$

Where K denotes capital, L denotes labor, and Y denotes output.

The Solow growth model shows that a higher rate of savings causes higher stock of capital and thus larger number of output (Mankiw, 2002). Furthermore, the Solow growth model shows that an increase in the rate of labor force will lower the level of

output. The model also suggests that technological progress can affect the level of output as it increases the efficiency of labor (Mankiw, 2002).

5.3.2 Endogenous Growth Theory

Endogenous growth theory emphasizes the factors that have impact on long-run economic growth. The theory argues that the economic growth is acquired from internal processes such as improvement in a nation's human capital, i.e. education and introduction of innovation (Gordon, 2003).

To understand the endogenous growth theory we need to go further than the Solow growth model and develop a model which can explain the technological progress. The major differences between these two models are that the Solow growth model simply assumes the effect of technology progress without explaining the source of technological progress. The production function of this model is as follow:

$$Y = AK \qquad (2)$$

where Y is output, K is capital stock and A is constant state of knowledge and available techniques (Mankiw, 2002). In summary, endogenous growth theory suggest four important conclusions. First, technological progress should not be considered as an exogenous effect. Second, increase in capital investment will lead to increase in returns. Third, the main source of technological progress is obtained from investing in research and development (R&D) and, finally, investment in human capital such as education and training of the workforce is the key for growth[14].

[14] http://tutor2u.net/economics/content/topics/econgrowth/theory_endogenous.htm

5.3.3 Cobb-Douglas production function

The Cobb-Douglas production function is one of the most simple production functions. The model was introduced by Douglas and Cobb (1928). The model has the following form:

$$F(L, K) = b\, L^{\alpha} K^{\beta} \qquad (3)$$

where $f(L, K)$ is total production function of an economic system for input factors, labor (L) and capital (K). The parameter b is a number greater than zero and measures the total factor productivity; whereas α and β are estimated from empirical data. For example if $\alpha = 20\%$, then one percent increase in labor force will increase the output nearly by 20% (Edmond, 2008).

If $\alpha + \beta = 1$, the Cob-Douglas production function shows constant returns to scale. If $\alpha + \beta < 1$, it shows decreasing in returns to scale. For instance, if the labor factor increases by 10% the output will increase by less than 10%. If $\alpha + \beta > 1$ the model shows increasing in returns to scale[15].

5.3.4 AK model

AK model suggests that long-run economic growth is not driven by some exogenous process, like exogenous technological progress, which increases the growth rate for the short-run. Instead, the long-run growth rate depends on the economic decisions of a country.

The model states that a perpetual change in government policies will cause a permanent change in economic growth of a country. AK model is shown as:

[15] http://www.math.cmu.edu/~howell4/teaching/tanproj.pdf

$$Y=AK \qquad (4)$$

where *A* reflects the level of technology and *K* is the capital. This model assumes that the growth can be obtained endogenously and return on capital will not diminish as capital stock increases. In summary AK model argues that the growth in output depends on total factor productivity and the efficiency of financial intermediation[16].

5.3.5 Export-Led Growth Hypothesis

The Export-Led Growth Hypothesis adds a new input factor to the economic growth theory by suggesting that the export factor can also increase economic growth rate, and by expanding the export beside other factors such as labor and capital, the overall economic growth will be fostered (Medina-Smith, 2001).

5.3.6 Harrod-Domar Model

The model was introduced by Sir Roy F. Harrod in 1939 and Evsey Domar in 1946. This model argues that increase in savings will cause the investment rate to increase, and if the investments are used efficiently, this will cause accumulation in capital which will itself lead to economic growth.

According to the Harrod-Domar Model, the growth rate of an economy is dependent on two factors savings rate and capital per output ratio. In summary, this model suggest that economic growth can be achieved if more is invested on both physical capital and human capital, i.e. if the ratio of capital per output, is reduced through technological progress[17].

[16] http://www.cer.ethz.ch/resec/people/tsteger/AK_Models.pdf
[17] http://www.bized.co.uk/virtual/dc/copper/theory/th7.htm

Chapter 6

DATA AND METHODOLOGY

6.1 Data

As discussed earlier, the purpose of this thesis is to investigate empirically the impact of financial repression on economic growth in Iran. Empirically, it is not straightforward to capture the magnitude of financial liberalization and to measure its size. In this thesis, repressive financial policies in Iran are captured by the financial constraints index constructed by Taghipour (2009). This index is multiplied by -1 to proxy financial liberalization and is used in econometric models along with the traditional determinants of economic growth. Variables used in the model are obtained from the existing economic growth theories in the literature such as Solow growth model, Endogenous growth model, Cob-Douglas production function, AK model, Harrod-Domar model and the export-led growth hypothesis. For instance, as discussed earlier in Chapter 5, Solow growth model suggests that labor and capital are the determinants of economic growth. Endogenous growth model suggests that, in addition to labor, research and development (R&D) is also an important determinant of economic growth. The model also points out that human knowledge accumulation is also important in economic growth. Cob-Douglas production function suggests that physical capital, labor and technology are the determinants of economic growth.

Likewise, Harrod-Domar model emphasises the importance of physical and human capital. In addition to these, the export-led growth hypothesis suggests that exports are also among the determinants of economic growth. AK model, on the other hand, suggests that economic growth depends on total factor productivity, and the efficiency of financial intermediation.

Furthermore, as discussed earlier, MacKinnon-Shaw hypothesis suggests that financial liberalization leads to economic growth. Accordingly, the variables which can be drawn from the existing theories on economic growth can be summarized as shown in Table 2.

Table 2: Theoretical Models and the Suggested Explanatory Variables

Theory	Variables
Solow Growth Model	Labor, capital (investments & savings)
Endogenous Growth Model	Research and development, human knowledge accumulation
Cob-Douglas production function	Physical capital, labor, technology
AK Model	Total factor productivity, capital (efficiency of financial intermediation)
Export-led Growth Hypothesis	Exports
MacKinnon-Shaw Hypothesis	Financial liberalization, Financial development
Harrod-Domar Model	Savings, capital-output ratio

Based on the review of the theories on economic growth, the following time series data have been used in the thesis as summarized in Table 3 below:

Table 3: Explanatory Variables and Data Sources

Variable	Data	Data Source	Symbol
Labor	Total Labor Force	The World Bank's World Development Indicators (WDI)	L
Capital[18]	Gross capital formation (% of GDP)	The World Bank's World Development Indicators (WDI)	K
Human Knowledge Accumulation	Number of higher educated employed	Statistics Center of Iran	HK
Research and Development, Technology	Research expenditure in Iran	Statistics Center of Iran	RD
Capital[19]	Physical capital input	Statistics Center of Iran	PK
Financial Intermediation	Domestic credit provided by banking sector(% of GDP)	The World Bank's World Development Indicators (WDI)	FI
Exports	Export of goods and services (% of GDP)	The World Bank's World Development Indicators (WDI)	EX
Reserve Requirement Ratio	Reserve requirement ratio	Taghipour (2009)	RR
Financial Liberalization	Financial repression index * -1	Taghipour (2009)	FLIB

As can be noted from the table, the financial repression index obtained from Taghipour (2009) has been multiplied by -1 to represent financial liberalization which is the opposite case of financial repression.

[18] The transfer of savings from individuals and organizations into capital for the business sector, resulting in increased output and economic expansion (http://www.wisegeek.com/what-is-capital-formation.htm).

[19] In general physical capital refers to any non-human asset made by humans and then used in production (investordictionary, 2009).

The dependent variable of economic growth is measured by GDP (see King and Levine, 1993a; Levine and Zervos 1996; Rajan and Zingales, 2003). Accordingly, the estimated models can be represented in the empirical framework as generalized below. However, all variables cannot be used in the same model due to econometric problem of multicollinearity which will be explained in the next chapter.

$$GDP = f(L, K, PK, HK, RD, FI, EX, RR, FLIB)$$

which means that GDP is a function of labor (L), gross capital formation (K), physical capital (PK), human knowledge accumulation (HK), research and development (RD), financial intermediation (FI), exports (EX), trade openness (TR), reserve requirement ratio (RR), and financial liberalization (FLIB). All variables except (RR) are expected to have positive coefficient. In the other words, they are expected to have a positive impact on economic growth.

6.2 Measurement of Financial Liberalization

Since the measurement of financial liberalization of the Iranian economy was not directly available, this thesis used an index introduced by Taghipour (2009) which consist of financial repression variables that could have impact on Iranian economy. These variables are directed credit programs, reserve and liquidity requirements, and interest rate controls. The index is then multiplied by -1 to convert it to an index capturing financial liberalization.

As discussed in Taghipour (2009), the dummy variable IC is used for interest rate control and it shows severe control if it is 1 and, 0.5 if fractionally strict, and 0 if freely determined by the banking sector. The DC dummy variable is used to determine the level of directed credit programs and is set to 0 when there is no use of

directed credit programs, is set to 0.5 when there is only up to 5%, is set to 1 if it is between 5 to 15%, and is set to 2 for more than 15% use of direct credit programs on total bank lending. For the reserve and liquidity requirement, the reserve requirement ratio (RR) on bank deposit is used (see Taghipour, 2009).

Taghipour (2009) computes a composite index, which includes interest rate controls, reserve requirement and directed credits using a procedure called Principle Components Analysis[20] (PCA). The index is constructed as follows:

Financial Restraints Index = 0.358(DC) + 0.658(IC) +0.661(RR).

If the number is small, it means that there is less repression and vice versa. However, as discussed earlier, in the present thesis, this index will be multiplied by -1 to represent the financial liberalization. In this case, higher values of the index will mean higher level of financial liberalization. Accordingly, the financial liberalization index used in the present thesis is shown in Figure 9 below.

[20] Principal components analysis (PCA) is a statistical method used to solve multicollinearity problem by transforming a number of high correlated variables into a smaller number of uncorrelated variables called principal components, keeping most of the original variability in the data (Jalil et al, 2010)

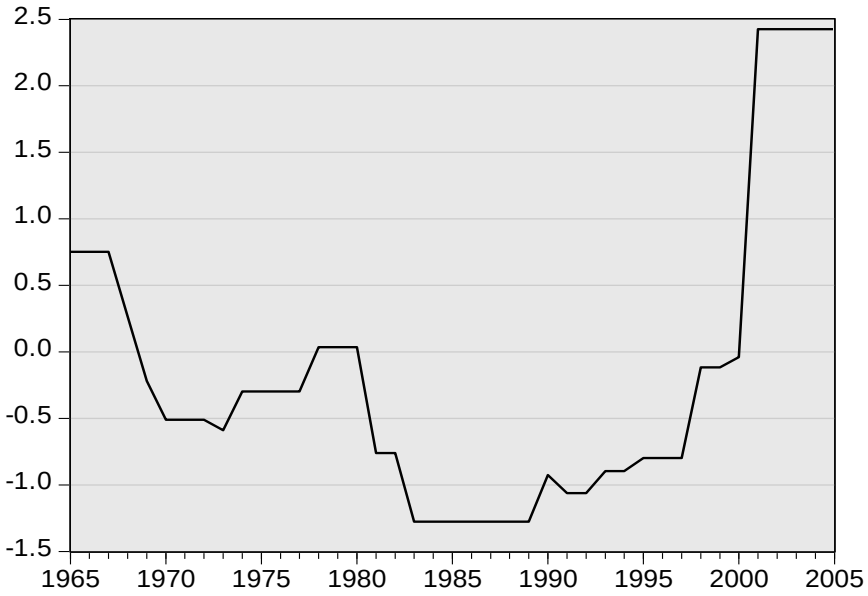

Figure 9: Financial Liberalization Index
Source: Taghipour (2009)

As can be seen in Figure 9, from 1960s to 1970s, the index displays an increase in financial repression on the economy of Iran which was simultaneous with the increase in reserve requirement ratio on deposits. In 1980, financial repression level rose and this was because of nationalization of banks which allowed the government to ask for greater level of reserve and liquidity requirement and to strengthen the directed credit programs and the control on interest rates. The Iranian government carried on with this procedure until year 1997. After this period, the index showed a remarkable increase in the level of financial liberalization which coincides with relaxing the controls such as partial decrease in interest rate controls, decrease in reserve and liquidity requirements, and decrease in directed credits (Taghipour, 2009).

6.3 Methodology

In time series econometrics, the major tool for investigation of economic models is Ordinary Least Squares Regression (OLS). OLS is commonly used for econometric analysis but the problem is that it requires the underlying variables to be stationary. However, in real life, most economic series are not stationary. Therefore, in this case OLS cannot be used. If the variable are not stationary and they are *I*(1), i.e. integrated of order 1, then the available methodology is to use the Johansen cointegration analysis which allows the underlying variables to be *I*(1).

This thesis uses Johansen cointegration tests to investigate the relationship between the dependent and independent variables. Therefore, the first step of this procedure is to find out whether the series are *I*(1), i.e. integrated of order 1. Thus, logarithms of time series were taken and two tests were applied. First, Augmented Dickey Fuller (ADF) and Phillip-Perron (PP) test were employed to test for stationarity. Second, Johansen cointegration tests were used to investigate the long-run relationship between explanatory variables and economic growth.

6.3.1 Cointegration

The theory of cointegration, introduced by Granger (1981) and elaborated by Engle and Granger (1987), addresses the issue of integrating short-run dynamics with long-run equilibrium.

Cointegration provides long-run relationship between non-stationary variables. If the variables are *I*(1), then Johansen cointegration test is used to find out whether there exist a long-run relationship between the variables or not. Linear combination of *I*(1) variables will be stationary if variables are cointegrated (Vuranok, 2009).

In this thesis Eviews are used to test for cointegration between the variables, before applying Johansen cointegration test, deterministic trend assumption of test must be defined. In this thesis, we allow for linear deterministic trend in data for our test.

In case of cointegration, two series are limited by long-run relationship. If the two or more series that are not stationary i.e. *I*(1), but may have possible relationship in their long-run trend, Johansen cointegration test must be applied to identify if these variable are co-integrated or not (Vuranok, 2009).

Maximum Eigenvalue and Trace tests are provided by Johansen Maximum likelihood test. Trace test defines whether the number of cointegrating vector is zero or one and then Maximum Eigenvalue test is used to define whether a single cointegration equation is sufficient or not.

6.3.2 Unit Root Tests

A stationary series is known to have a constant mean, constant variance and constant autocovariance for each lag and that is why the notion of non-stationarity is important. If series are non-stationary, then differences should be taken until series will be stationary. However, taking differences for making series stationary is risky since there is possibility of losing the long-run information. Therefore, it is preferable to use the variables in their original orders of integration (Vuranok, 2009).

I(1) means that, the variable is not stationary and first difference needed to be taken to make it stationary. Then, it is expressed to be integrated of order 1. This would be written as $Y_t \sim I(1)$.

Then, if $Y_t \sim I(1)$ then $\Delta^d Y_t \sim I(0)$. This term shows that by applying the first differences, the series become stationary $I(0)$, which has no unit root.

Phillip-Perron and Augmented Dickey Fuller are two tests provided by Eviews software to find the order of integration of the variables. It is important that the result of unit root test of both Phillip-Perron and Augmented Dickey Fuller tests to be $I(1)$ so the long-run relationship between the variables can be tested by Johansen cointegration test.

The ADF test is used to decide if the series are stationary or not and can be set as:

$$\Delta Y_t = Y_0 + at + \Phi Y_{0-1} + \sum \Phi_i Y_{0-1} + u_t$$

$\Delta Y_t = Y_t - Y_{0-1}$ where,

Y_t : dependent variable
Y_0 : constant term
t : trend variable
u_t : stochastic disturbance term

The related hypothesis and the alternative hypothesis are:

H_0 : $\Phi = 0$ (Y_t is non-stationary)
H_1 : $\Phi \neq 0$ (Y_t is not non-stationary)

According to Brooks (2002), the series can be stationary if calculated t-statistic in absolute terms is greater than MacKinnon critical values. Its significance level is determined by comparing the t-statistic value with each level of MacKinnon critical values. For example, if the t-statistic value is greater than MacKinnon critical value at 5% levels, but smaller than MacKinnon critical value at 10% levels, this means the value is significant at 5% level, but if the t-statistic value in absolute term is not

greater than any of MacKinnon critical values, it shows that the series is not stationary and first differences[21] need to be taken.

Phillip-Perron test is the second test that this thesis used to define whether the variables are stationary or non-stationary. For example, as it can be seen from Table 4 all the variables that were tested by PP test shows that they are non-stationary except human capital and labor which are stationary only under no trend and intercept conditions, also physical capital is stationary only by taking second differences, i.e. it is integrated of order two and is shown by *I*(2).

[21] The first difference means that the value in an earlier period is subtracted from the latter period. The first differences of a time series are defined by ($\Delta Y_t = Y_t - Y_{t-1}$).

Chapter 7

EMPIRICAL RESULTS

7.1 Results of the Unit Root Tests

Before applying the unit root tests the logarithm of variables are taken because log variables give us elasticises and reduce the impact of outliers and smoothes out the time series (Maddala, 1992). Thereafter, variables represented in logs are denoted by prefix L. However, logs of series which include negative observations are not taken. Results of unit root tests are provided in Table 4 below.

Table 4: Augmented Dickey Fuller and Phillip-Perron Tests

Name of variables	ADF		Conclusion at the 5%	Phillip-Perron		Conclusion at the 5%
	Levels	Difference		Level	Difference	
LEX[a]	-1.92	-7.08	I(1)	-2.04	-7.04	I(1)
LEX[b]	-1.87	-7.00	I(1)	-1.99	-6.97	I(1)
LEX[c]	0.04	-7.15	I(1)	0.09	-7.11	I(1)
LFI[a]	-1.97	-5.85	I(1)	-2.05	-5.85	I(1)
LFI[b]	-1.65	-5.94	I(1)	-1.69	-5.94	I(1)
LFI[c]	0.27	-5.91	I(1)	0.26	-5.91	I(1)
LFLIB[a]	-0.37	-5.78	I(1)	-0.68	-5.82	I(1)
LFLIB[b]	-0.84	-6.51	I(1)	-0.80	-6.51	I(1)
LFLIB[c]	-0.49	-5.81	I(1)	-0.80	-5.85	I(1)
LK[a]	-3.39	-6.72	I(1)	-3.36	-15.97	I(1)
LK[b]	-3.77	-6.64	I(1)	-3.68	-17.34	I(1)
LK[c]	-0.13	-6.81	I(1)	0.29	-14.69	I(1)
LGDP[a]	-2.40	-4.53	I(1)	-2.29	-4.52	I(1)
LGDP[b]	-1.54	-4.77	I(1)	-1.59	-4.77	I(1)
LGDP[c]	2.65	-4.01	I(1)	2.08	-3.97	I(1)
LRR[a]	-2.26	-4.31	I(1)	-2.47	-6.29	I(1)
LRR[b]	-2.27	-4.37	I(1)	-2.36	-6.44	I(1)
LRR[c]	-0.30	-4.38	I(1)	0.29	-6.37	I(1)
LPK[a]	-2.39	-4.23	I(1)	-2.14	-2.59(-8.62)	I(2)
LPK[b]	-2.60	-4.26	I(1)	-2.03	-2.51(-8.33)	I(2)
LPK[c]	1.48	-3.85	I(1)	1.76	-2.53(-8.91)	I(2)

Table 4: Augmented Dickey Fuller and Phillip-Perron Tests (Continued)

LHK[a]	-2.05	-5.26	I(1)	-1.95	-5.44	I(1)
LHK[b]	-1.66	-5.91	I(1)	-1.69	-5.91	I(1)
LHK[c]	-8.56	-	I(0)	5.70	-	I(0)
LRD[a]	-0.61	-6.01	I(1)	-0.56	-6.02	I(1)
LRD[b]	-2.58	-5.93	I(1)	-2.58	-5.93	I(1)
LRD[c]	1.43	-5.42	I(1)	1.37	-5.41	I(1)
LL[a]	0.22	-4.63	I(1)	0.22	-4.57	I(1)
LL[b]	-3.28	-4.57	I(1)	-2.63	-4.50	I(1)
LL[c]	8.42	-	I(0)	4.42	-	I(0)
LTR[a]	-2.19	-4.29	I(1)	-1.96	-4.33	I(1)
LTR[b]	-2.14	-4.25	I(1)	-1.94	-4.28	I(1)
LTR[c]	-1.01	-4.33	I(1)	-1.06	-4.36	I(1)

a indicates for Intercept, b indicates for Trend and Intercept, c indicates for None.

As can be seen from Table 4, all variables are stationary after taking first differences and for this reason they are shown by the notation *I*(1), except physical capital, which is stationary at first difference in Augmented Dickey Fuller test while stationary in second difference in Phillip-Perron test. However variables like labor and human capital are stationary without taking any difference only for the case of no trend and intercept assumption.

Before presenting the model, the presence of multicollinearity has been examined. Multicollinearity is an econometric issue which shows the correlation between the dependent variable with independent variable and also the correlation between the independent variables with each other. The issue of multicollinearity is explained by Maddala as follows:

> Very often the data we use in multiple regression analysis cannot give decisive answers to the questions we pose. This is because the standard errors are very high or the t-ratio is very low. The confident intervals for the parameters of interest are thus very wide. This sort of situation occurs when the explanatory variables display little variation and/or high intercorrelation. The situation where the explanatory variables are highly intercorrelated is referred to as multicollinearity (Maddala, 1992, p. 269).

Therefore, multicollinearity occurs when two independent variables have high correlation with each other, in this case, it is better to remove one of them and not to include both in the same model. However, there is no specific rule to remove any variable for its high correlation with other variables, in this thesis variables with correlation coefficients of more than 0.6 are not used in the same model.

Table 5 shows the correlation coefficients. As evident from Table 5, variables like RR and FLIB are not used in the same model since they have correlation coefficient of more than 0.6. Also, variables like HK, PK, RD and L are not used within the same model for their multicollinareaty problems.

Table 5: Correlation Matrix of the Variables

	LGDP	LFLIB	LHK	LEX	LFI	LK	LL	LTR	LPK	LRR	LRD
LGDP	1.000	-0.124	0.842	-0.149	0.630	-0.035	0.772	-0.094	0.853	0.178	0.767253
LFLIB		1.000	0.127	0.388	-0.426	0.285	0.202	0.373	0.134	-0.697	0.193373
LHK			1.000	-0.055	0.432	0.301	0.987	-0.056	0.784	0.020	0.965434
LEX				1.000	-0.699	0.137	-0.100	0.929	0.226	-0.333	-0.082585
LFI					1.000	-0.120	0.411	-0.577	0.273	0.318	0.414838
LK							0.351	0.253	0.120	-0.066	0.357852
LL							1.000	-0.108	0.711	-0.037	0.974832
LTR								1.000	0.279	-0.291	-0.097481
LPK									1.000	0.032	0.729622
LRR										1.000	0.110799
LRD											1.000000

Based on this consideration, the following models have been established with various combinations of the variables as summarized in Table 6:

Table 6: List of Models used in the Cointegration Tests

Model	Explanatory Variables
Model A	FI, K, RD, L
Model B	FI, K, RD, L, RR
Model C	FI, PK, RD, FLIB, L
Model D	FI, PK, RD, L, RR
Model E	FI, L, RD, HK, FLIB
Model F	FI, K, RD, EX, L

The independent variables are used after lagging one year because the variables theoretically expected to have impact on GDP with some delay. Since annual data is used in this study, lagging independent variables one period seems to be an appropriate approach to see the impact of these variables on the dependent variable after one period rather than measuring their contemporaneous effects.

In fact, this approach has proven to be effective in the present analysis as it yielded better results than the cases where independent and dependent variables are considered to be in a relationship with no lags. In this section the results of the cointegration test which has indicated the presence of cointegration relationships have been provided.

7.2 Johansen Cointegration Tests

In Johansen cointegration analysis, the first step is to determine lag length. There are several criteria available for this purpose. These are Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC), Hannan-Quinn Information Criterion (HQ), Sequential Modified LR test statistics (LR) and Final Prediction Error (FPE). The results of these criteria are obtained from the Eviews software.

The results of the lag length selection processes are not reported here due to space limitation but the selected lag lengths and the selection criteria are reported in the Appendix. In each case, up to 4 lags are considered until significant results are obtained.

The results of Johansen cointegration tests which yielded a co-integrating relationship with sensible results are reported below. In each table, the results of both Maximum Eigenvalue and Trace tests are presented.

Table 7: Results of the Maximum Eigenvalue and Trace Tests for Model A

Hypothesized No. of Cointegration Equations	Maximum Eigenvalue Statistic	0.05 Critical Value	Trace Statistic	0.05 Critical Value
R==0	43.32981*	33.87687	97.84835*	69.81889
R<=1	31.91749*	27.58434	54.51854*	47.85613
R<=2	17.26455	21.13162	22.60105	29.79707
R<=3	5.334903	14.26460	5.336496	15.49471
R<=4	0.001593	3.841466	0.001593	3.841466

* denotes rejection of the hypothesis at the 0.05 level. Lag length is selected as 1 based on LR, FPE, AIC, SC, HQ.

According to the results in Table 7 for model A, both Trace and Maximum Eigenvalue tests indicate that there are two cointegrating vectors at the 5% level.

Table 8: Results of the Maximum Eigenvalue and Trace Tests for Model B

Hypothesized No. of Cointegration Equations	Maximum Eigenvalue Statistic	0.05 Critical Value	Trace Statistic	0.05 Critical Value
R==0	50.54641*	40.07757	128.0881*	95.75366
R<=1	37.01007*	33.87687	77.54165*	69.81889
R<=2	22.65849	27.58434	40.53158	47.85613
R<=3	12.31230	21.13162	17.87309	29.79707
R<=4	4.329183	14.26460	5.560796	15.49471
R<=5	1.231613	3.841466	1.231613	3.841466

* denotes rejection of the hypothesis at the 0.05 level. Lag length is selected as 1 based on LR, FPE, AIC, SC, HQ.

As can be seen in Table 8 for model B, both Trace and Maximum Eigenvalue tests indicate that there are two cointegration vectors at the 5% level.

Table 9: Results of the Maximum Eigenvalue and Trace Tests for Model C

Hypothesized No. of Cointegration Equations	Maximum Eigenvalue Statistic	0.05 Critical Value	Trace Statistic	0.05 Critical Value
R==0	127.5554*	95.75366	56.46994*	40.07757
R<=1	71.08548	69.81889	30.39818*	33.87687
R<=2	40.68730	47.85613	24.61540	27.58434
R<=3	16.07190	29.79707	9.333310	21.13162
R<=4	6.738588	15.49471	6.738517	14.26460
R<=5	7.13E-05	3.841466	7.13E-05	3.841466

* denotes rejection of the hypothesis at the 0.05 level. Lag length is selected as 1 based on LR, FPE, AIC, SC, HQ.

As evident from Table 9 for model C, Trace test indicates that there are two cointegrating vectors while Maximum Eigenvalue test indicates only one cointegrating vector at the 5% level.

Table 10: Results of the Maximum Eigenvalue and Trace Tests for Model D

Hypothesized No. of Cointegration Equations	Maximum Eigenvalue Statistic	0.05 Critical Value	Trace Statistic	0.05 Critical Value
R==0	57.30878*	40.07757	131.5743*	95.75366
R<=1	33.20888	33.87687	74.26553*	69.81889
R<=2	24.64785	27.58434	41.05665	47.85613
R<=3	11.54542	21.13162	16.40880	29.79707
R<=4	4.423739	14.26460	4.863382	15.49471
R<=5	0.439643	3.841466	0.439643	3.841466

* denotes rejection of the hypothesis at the 0.05 level. Lag length is selected as 1 based on LR, FPE, AIC, SC, HQ.

Table 10 shows that in model D, Trace test indicates that there are two cointegrating vectors while Maximum Eigenvalue test indicates only one cointegrating vector at the 5% level.

Table 11: Results of the Maximum Eigenvalue and Trace Tests for Model E

Hypothesized No. of Cointegration Equations	Maximum Eigenvalue Statistic	0.05 Critical Value	Trace Statistic	0.05 Critical Value
R==0	55.08540*	40.07757	133.9839*	95.75366
R<=1	30.37258	33.87687	78.89849*	69.81889
R<=2	22.47975	27.58434	48.52591*	47.85613
R<=3	17.67996	21.13162	26.04615	29.79707
R<=4	8.333547	14.26460	8.366192	15.49471
R<=5	0.032645	3.841466	0.032645	3.841466

* denotes rejection of the hypothesis at the 0.05 level. Lag length is selected as 1 based on LR, FPE, AIC, SC, HQ.

As can be seen in Table 11 for model E, Trace test indicates that there are three cointegrating vectors while Maximum Eigenvalue test indicates only one cointegrating vector at the 5% level.

Table 12: Results of the Maximum Eigenvalue and Trace Tests for model F

Hypothesized No. of Cointegration Equations	Maximum Eigenvalue Statistic	0.05 Critical Value	Trace Statistic	0.05 Critical Value
R==0	49.52055*	40.07757	145.5091*	95.75366
R<=1	38.29462*	33.87687	95.98855*	69.81889
R<=2	27.07996	27.58434	57.69393*	47.85613
R<=3	20.51769	21.13162	30.61397*	29.79707
R<=4	10.09580	14.26460	10.09628	15.49471
R<=5	0.000480	3.841466	0.000480	3.841466

* denotes rejection of the hypothesis at the 0.05 level. Lag length is selected as 1 based on LR, FPE, AIC, SC, HQ.

As evident from Table 12 for model F, Trace test indicates that there are four cointegrating vectors while Maximum Eigenvalue test indicates two cointegrating vectors at the 5% level.

7.3 Cointegrating Vectors

The corresponding cointegrating vectors for each model are shown below. For example, CI (A) denotes cointegrating vector for model A, and the standard errors are given in the parentheses. The level of significance is determined by dividing the coefficient with the standard error for each variable.

Model A

CI (A) = GDP-3.809(LFI) -2.896(LK) -0.932(LRD) +6.892(LL)
(0.54) (0.72) (0.27) (2.10)

In model A, financial intermediation (LFI), capital (LK) and research and development (LRD) variables show positive effect on GDP, while labor (LL) shows negative impact. Both (LFI) and (LK) are significant at 1% level, while (LRD) is not significant and (LL) is significant at the 10% level.

Model B

CI (B) = GDP-3.418(LFI)-1.103(LK)-0.673(LRD)+4.956(LL)+2.355(LRR)
(0.45) (0.52) (0.21) (1.61) (0.77)

In model B, financial intermediation (LFI), capital (LK) and research and development (LRD) have positive effect on GDP, while labor (LL) has negative effect and all the variables are significant at the 1% level.

Model C

CI (C) = GDP-1.381(LFI)-0.931(LPK)-0.570(LRD)-0.190(LFLIB)+4.163(LL)
(0.22) (0.16) (0.10) (0.06) (0.74)

In model C, financial intermediation (LFI), physical capital (LPK), research and development (LRD) and financial liberalization ratio (LFLIB) have positive effect on GDP, however labor (LL) has negative impact, in this model all the variables are significant at the 1% level.

Model D

CI (D) = GDP-0.824(LFI)-1.305(LPK)-0.340(LRD)+2.438(LL)+0.050(LRR)
(0.18) (0.12) (0.08) (0.60) (0.29)

In model D, financial intermediation (LFI), physical capital (LPK), research and development (LRD) have positive effect on GDP at 1% level, while labor (LL) is significant at 1% level and (LRR) has a negative but insignificant effect on GDP.

Model E

CI (E) = GDP-1.814(LFI)+9.160(LL)-0.324(LRD)-2.568(LHK)-0.326(LFLIB)
(0.14) (0.83) (0.06) (0.24) (0.05)

As the empirical results show in model E, all the variables except labor (LL) has positive effect and are significant at the 1% level.

Model F

CI (F) = GDP-4.184(LFI)-1.877(LK)-1.578(LRD)+11.792(LL)-0.853(LEX)
(0.77) (0.67) (0.27) (0.09) (0.51)

In model F, financial intermediation (LFI), capital (LK) and research and development are significant at 1% level, exports (LEX) shows positive effect on GDP but it is not significant. labor (LL) has negative effect on GDP and is significant at the 1% level.

Table 13 below summaries the finding of the thesis based on cointegration tests. Interpretation of the results will be provided in the next chapter.

Table 13: Summary of the Long-Run Results of the Johansen Cointegration Tests.

Model	LFI	LK	LL	LEX	LFLIB	LPK	LRD	LRR	LHK
Model A	3.809*	2.896*	-6.892*				0.932*		
Model B	3.418*	1.103*	-4.956*				0.673*	-2.355*	
Model C	1.381*		-4.163*		0.190*	0.931*	0.570*		
Model D	0.824*		-2.438*			1.305*	0.340*	-0.050	
Model E	1.814*		-9.160*		0.326*		0.324*		2.568*
Model F	4.184*	1.877*	-11.79*	0.853			1.578*		

*denotes significance at 1%, ** denotes significance at 5%, *** denotes significance at 10%

Chapter 8

CONCLUSION

The aim of this thesis was to investigate the impact of financial liberalization on the economic growth in Iran through Johansen Cointegration tests by using time series data from 1965 to 2005. The thesis has explained that the economy of Iran has developed through a number of steps since the revolution of 1979. It has emphasized that the nationalization in 1980s and the improvement of financial system in 1990s have resulted in the relaxation of the financial regulation environment and have led to the simplification of controls on the financial system. As also pointed out by Taghipour (2009), the level of financial repression has decreased after 1990s which suggest that the Iranian financial system is becoming more liberal in the last two decades. This can be attributed to the decrease in reserve requirement ratio, relaxation in interest rate controls and the partial removal reduction of directed credit programs.

The empirical part of the thesis investigated the determinants of economic growth in Iran while testing for the impact of financial repression on the economic growth in the country. A financial liberalization index was used in econometric models. The repressive financial policies in Iran were captured by the financial constraint index constructed by Taghipour (2009). This index was multiplied by -1 to proxy financial liberalization and was used in econometric models along with the conventional theoretical determinants of economic growth as suggested by the existing economic

growth theories, such as Solow growth model, Endogenous growth model, Cobb-Douglas production function and the Export-Led growth hypothesis.

More specifically, the thesis investigated if the financial liberalization index would indeed have a significant positive impact on economic growth, while at the same time the significance of other determinants of economic growth was also investigated. Therefore, the thesis served for two purposes: First, it examined empirically if financial liberalization would foster economic growth. Second, it investigated the determinants of economic growth in the case of Iran.

The results suggested that financial intermediation, capital, research and development (R & D), and financial liberalization have positive and statistically significant impact on economic growth. In addition, reserve requirement has a negative but statistically insignificant impact on economic growth. First and foremost, these findings have lent support to MacKinnon (1973) and Shaw (1973), who argue that financial liberalization can promote economic growth by increasing investment and productivity. Improvement in financial system leads to better allocation of financial resources in presence of a well functioning financial system. In this case, firms can expand their businesses by the ease of borrowing at lower rates. Also, financial intermediaries can channel their funds to the best projects. This is also expected to lead to an improvement in quality, quantity and efficiency of financial intermediary services as argued by Ang (2008). The findings also lend support to Patrick (1966), who points out that financial development leads to economic growth by transferring the resources from old low growth sector to the modern high growth sectors and, by stimulating the enterprises response to the modern sectors.

Likewise, results support the Export-Led Growth Hypothesis as exports were found to have a positive impact on economic growth. However, the impact was statistically insignificant. Nonetheless, the positive coefficient of the variable suggests that export factor can also increase economic growth rate, and by expanding the export beside other factors such as capital, the overall economic growth can be fostered in Iran.

Overall, the findings obtained in this research for the conventional economic growth variables are in line with the existing economic growth theories in the literature such as Solow growth model, Endogenous growth model, Cob-Douglas production function, AK model, Harrod-Domar Model and the export-led growth hypothesis. However, labor seems to be the only exemption. For instance, Cobb-Douglas production function suggests that physical capital, labor and technology are the determinants of economic growth.

Likewise, Harrod-Domar Model emphasises the importance of physical and human capital. In addition to these, the export-led growth hypothesis suggests that exports are also among the determinants of economic growth. AK model, on the other hand, suggests that economic growth depends on total factor productivity, and the efficiency of financial intermediation. The findings of this thesis have lent support to these theories. Likewise, Solow growth model suggests that labor and capital are the determinants of economic growth. Endogenous growth model suggests that, in addition to human knowledge accumulation, research and development, labor is also an important determinant of economic growth.

Therefore, the findings regarding the role of labor is not in line with the theory as the results suggest that labor has a negative impact on economic growth in the case of Iran, which suggests that labor force in Iran is not effective in promoting economic growth on the contrary of what the existing theories suggest. This can be attributed to low productivity of the labor in Iran. For instance, while labor productivity averages 4.5 per cent in less developed Central Asian states, it s 1.2 per cent in Iran[22]. Also, labor productivity in industry is 40 percent less than the national average, which suggests that the industrial sector in Iran lags behind other sectors of the economy[23]. This shows that low labor productivity is an important problem in Iran as it prevents this factor of production to play a role in the economic growth of the country as predicted by the economic growth theories. Policy-makers in Iran are advised to find a solution to this problem.

Major finding of this thesis is that financial liberalization has a positive impact on economic growth in the case of Iran. This result suggests several important policy implications for the Iranian policy makers. For instance, financial sector policies should be more pro-market in order to facilitate the efficiency of the financial liberalization process. Policy-makers should abstain from directed credit allocation practices in order of enable entrepreneurs to obtain financing from their potentially profitable investments. Likewise, credit ceilings should be removed to let the market forces of supply and demand determine the rates without any distortion from the government's intervention. As the results suggest, reserve requirement ratio has a negative impact, on economic growth, which suggest that policy-makers should avoid using this as a restrictive monetary policy tool.

[22] http://www.accessmylibrary.com/coms2/summary_0286-24018775_ITM
[23] http://www.encyclopedia.com/doc/1G1-86620424.html

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APPENDIX

Appendix A: Lag Length Selection Criteria for the Estimated Models

Model A (LGDP = *f* (LFI, LK, LL, LRD))

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-70.87506	NA	4.16e-05	4.101355	4.319046	4.178101
1	112.6989	307.6105	7.99e-09	-4.470213	-3.164063*	-4.009734
2	144.0734	44.09378	6.12e-09	-4.814776	-2.420168	-3.970565
3	189.2464	51.27748*	2.54e-09*	-5.905210*	-2.422144	-4.677266*

Model B (LGDP = *f* (LFI, LK, LL, LRD, LRR))

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-53.82482	NA	1.02e-06	3.233774	3.495004	3.325870
1	150.0389	330.5898	1.20e-10	-5.839939	-4.011329*	-5.195268
2	193.9732	56.99583	9.21e-11	-6.268819	-2.872830	-5.071574
3	271.9117	75.83211*	1.51e-11*	-8.535768*	-3.572400	-6.785948*

Model C (LGDP = *f* (LFI, LL, LFLIB, LPK, LRD))

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-104.8835	NA	1.62e-05	5.993702	6.254932	6.085798
1	125.6332	373.8109	4.51e-10	-4.520716	-2.692106*	-3.876045
2	181.9765	73.09391*	1.76e-10*	-5.620349*	-2.224360	-4.423104*
3	217.2092	34.28055	2.91e-10	-5.578878	-0.615510	-3.829058

Model D (LGDP = *f* (LFI, LL, LPK, LRD, LRR))

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-46.22587	NA	6.78e-07	2.823020	3.084250	2.915116
1	184.3940	373.9782	1.88e-11	-7.696974	-5.868365*	-7.052304
2	239.2861	71.21132	7.95e-12	-8.718166	-5.322177	-7.520921
3	302.2419	61.25427*	2.93e-12*	-10.17524*	-5.211867	-8.425416*

Model E (LGDP = *f* (LFI, LL, LFLIB, LRD, LHK))

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-68.98992	NA	2.32e-06	4.053509	4.314739	4.145605
1	166.1592	381.3229*	5.04e-11	-6.711307	-4.882698*	-6.066637*
2	205.4033	50.91134	4.96e-11*	-6.886667	-3.490678	-5.689422
3	245.4265	38.94146	6.33e-11	-7.104135*	-2.140767	-5.354315

Model F (LGDP = *f* (LFI, LK, LL, LEX, LRD))

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-75.59803	NA	3.32e-06	4.410704	4.671934	4.502800
1	131.0702	335.1377	3.36e-10	-4.814606	-2.985997*	-4.169936
2	176.4359	58.85277	2.38e-10	-5.320859	-1.924870	-4.123614
3	250.9992	72.54807*	4.68e-11*	-7.405361*	-2.441993	-5.655541*