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All Comments Are Welcomed

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Abstract

The purpose of this paper is the determination of sources and pattern of business cycle in Turkey throughout the period 1988-2002 using quarterly data. The question of the paper is "Has financial liberalization increased the fragility of the financial and real sides of the Turkish economy?" The quantitative analysis of the paper includes the cross correlation and causality analysis. Financial development indicators are the bank credits and capital flows, efficiency indicators are the domestic and foreign interest rate spreads. It has been found that the pattern of real GDP is determined by demand side variables, whereas the source of fluctuations in the real GDP is the financial variables in Turkey. External spread, capital flows, and domestic spread are the transmission channels of a shock to the real economy.

JEL classification: C32, E32, E36, E44

Keywords: business cycle, liberalization, decomposition, efficiency indicator, development indicator, Turkey.

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I. INTRODUCTION:

Financial liberalization policies that began to be discussed with McKinnon-Shaw hypothesis through the first period of seventies created important impacts from the point of not only the functioning but also the run of the whole economic system. Although the first experiments of the implementation of financial liberalization policy results could be described, at least, as being unexpected but it did not bring the end of those implementations for developing countries. On the contrary, through the 1980s, financial liberalization gained impetus. The domestic market, which completed its integration within the whole market as it was claimed, went one step further and integrated with the world market. The results of international integration have been more unpredictable than domestic integration. Financial turmoil turned into deep real-side crisis and it is described as the global crises.

Through the 1980s and 1990s, a different approach of the neo-classical theory attempted to understand what was happening to the real economy. As the new approach was trying to give a new shape to the structure of the economy, the real business cycles were figuring out the fluctuations of the real economy. The cyclical variations of the real GDP were explained by real variables, like unemployment, total hours worked, and the real wages. At the end of the 1990s, another question appeared to be answered. "What is the relationship between the cyclical behaviors of real aggregates and those of monetary

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aggregates?" Furthermore, financial crises have triggered the curiosity about the question that "Is there any positive impact of the financial market on the real side fluctuations?"

In the second half of the 1990s, the increasing frequency of financial and real crises and the unexpected realization of observations on the financial variables made the economists think about financial crises and real fluctuations together. The negative impacts of financial variables over the real economic fluctuations are mainly observed.

Turkey is one of the examples on which all phases of the discussions about financial liberalization policies can be observed clearly. In September 1980, Turkey changed its economic structure from controlled economy to liberalized one step by step. Main economic policy that adopted from the mid-sixties was the import substitution policy. This policy was abandoned and encouraged exports with the great amount of subsidies. In addition, the import substitution policy was gradually replaced by import liberalization. Price mechanism became the basic indicator in order to provide the functioning of market. In that direction, the public sector became smaller and the government interventions were deceased. In addition to the trade liberalization, tax and SEE reforms were realized. Flexible prices included exchange rate and interest rate determination, and TL was devalued at the rate of 48.6%. The limitations were implemented on the net domestic assets of the Central Bank and the net Central Bank credit to non-financial public sector.

In 1984, foreign exchange rate regime was liberalized and residents were allowed to open a foreign currency accounts. Banks could engage in external transactions that were determined by the government. As inter-bank money market was established for short-term borrowing activities in 1986, the government started open market activities in 1987. The chain was completed in 1989 and the capital inflows and outflows were allowed.

The reel side effect of the 1980s has sourced from the groundless export-led growth but it can be described as the immature domestic market. Economic actors were so inexperienced to utilize the opportunities of the liberalized economies. The credit

allocation did not fill out its mission. The private investment on the manufacturing sector was not sufficient to support the export-led growth, so opening the domestic market to the world market was a necessary action because of the limits of financing the export that was not feed by the real side. Then, the 1990s were the years of huge amount of capital flows. The destiny of the economy was left to the justice of the international capital market. Non-residents investors began to manage the route of the financial side of the economy. Moreover, the breaking point, when the financial market was collapsing, it was sweeping away the real market.

In this study, the main question is whether financial liberalization policies increased the fragility of the financial and real side of the economy for the Turkish case through the period 1988-2002 for quarterly data. The cyclical behavior of the financial variables and the real variables are examined together. As defining liberalization policy indicators, two main targets of liberalization are taken into account: financial efficiency and financial deepening (development). Then, the relationship between these indicators with the real side variables has been examined.

The domestic and external interest rate spreads are chosen for examining financial efficiency whereas bank credit is for explaining the impact of financial deepening. The short-term and portfolio capital flows are chosen to analyze the impacts of financial liberalization on the financial side and the real side of the economy.

Next section of this paper includes a theoretical survey. The third section consists of a quantitative analysis. The first part of third section contains the investigation of the data. In this part, a brief overview of the Turkish economy, trends and irregular behavior are discussed. Second part includes the decomposition of the variables. For this purposes, the cyclical components have been separated from the seasonal, trend, and irregular components. Third part consists of an analysis of the relationship among the cyclical patterns of the economic series and the sources of business cycle. In this analysis the sources and patterns of cycles in real output (RGDP) have been related to the cyclical patterns of real GDP components (total consumption, total investment, private

consumption, private investment, public consumption, and public investment), of the financial developments and efficiency indicators (total credit, private credit, public credit, domestic spread, and external spread). Procyclical and countercyclical movements of the variables have been determined by the cross correlation coefficient. In the third part of the quantitative analysis, we have attempted to establish an empirical link between real GDP (business cycle) and all the other indicators of our interest those are thought to be the sources of economic fluctuations in Turkey. Thus in this part, some insights of the causality relationship between given economic variables can be gained by the Granger non-causality analysis. Last section of the paper concludes the findings.

II. THE THEORETICAL BACKGROUND

- **II.1. Theory:**

In the beginning of 1970's, the investigated characteristics of developing countries opened the way for long debates on the policy implementation of financial liberalization policies. The liberalization on the "domestic" markets and the positive correlation of the functioning of undistorted financial markets with the real economic activity are defended but the fact that financial crises whose severity, frequency and volatility have increased with the application of international financial liberalization policies has put on the agenda of the investigation of the relationship between financial markets and the real economic activity.

According to McKinnon (1973), there is a strong relationship between the large real cash balances processed by credit mechanism and the growth rate of investment and aggregate economic activity. Any kind of intervention or direction on the set of all prices will prevent the equilibrium of all markets so no economic indicator will clarify anything about the market mechanism and the will of the market. For McKinnon (1973), not only the interest rate ceilings but also other types of intervention, i.e. directed credit mechanisms, make the economy underdeveloped because the intervening actions do not allow any market to choose the best and the most productive, so may cause the funds to flow into unproductive investment areas or into the same industries every time. Hence, any fragmented or "repressed" economy must be liberalized domestically, or in other

words, if the financial market can do many things for the real economy perfectly, it must be allowed to do so.

Shaw has the same arguments with McKinnon. They both defend the argument that liberalized financial system can attract an increased volume of financial saving and in turn allocate more capital to efficient projects. This result contributes to economic growth.

Stiglitz and Weiss (1981) paper explains the credit rationing mechanism that stems from the inefficient information environment of financial market. According to Stiglitz and Weiss, there are two main factors which banks take into account while making loan decisions. One is the interest rate and the other is the riskiness of any project. In an imperfect and costly information environment, the interest rate is an important device to evaluate the riskiness of any project. If the domestic interest rate is above the foreign interest level, which maximizes the expected return of the bank, then it shows that the project is riskier and it will decline the average expected return of the bank.

The role of financial intermediaries whose existence is shown as an indicator of the development of financial market is not only mobilizing savings and trading of any type of assets but also diversifying the risk of individual projects over the market. However, the information asymmetries prevent the correct risk diversification. If the debt market does not improve any solution, either big financial crash will occur or real economy will face the fact of rationing inevitably.

As it is reached to the twenties, the role of financial development, by increasing both the volume of financial transactions and the quality of all financial services as a result of domestic and international financial liberalization policies, on growth and development process is analyzed by the huge literature but the impact of the financial development on the fluctuations of the real economy is not focused intensively.

There are some studies after the first half of nineties, which examines the impact of external, contagious shocks on the efficiency indicators of financial markets and the real

economic activity. Agenor and Aizenman (1997) analyzes the impact of external shocks, triggered by the events elsewhere, on the real economy. Agenor, Aizenman and Hoffmaister (1998) study the impacts of banking sector spreads for the output fluctuations in Argentina case. It is found that as the external spread and output fluctuations increase the domestic spread, the increase in external spread trigger the domestic spread but decrease the cyclical component of fluctuations.

Aizenmann and Powell (2002) present a model that explains the not only the spreads in the interest rates but also the joint effect of the shocks and the imperfect information on the supply of credit and the employment and output. The impact of the increasing volatility, i.e. external shocks to the economy, with the imperfect information makes the real economic activity fall significantly. Many studies suggest that the credit channel is strong in many middle-income countries. The spread between lending and foreign interest rates, so called the external spread has a strong effect on GDP, and even stronger effect on credit.

Financial liberalization caused capital flows to travel freely, which in turn made the domestic economies in middle income countries more fragile due to the movements in capital flows. As a result, in some policy circles it has been argued that it might be optimal to impose restrictions on capital flows and stop lending booms, which typically followed by financial liberalization, as they mainly reflect excessive risk taking. Although lending booms typically precedes twin crises, very few lending booms end in crises. Most of the time the final is not a crises, but a gradually decelerating credit growth.

Kregel (1998) explains aftermath of the international stabilization policies and the reasons behind the 20th and 21st Century financial crises. Kregel considers the link of financial crises to the combination of increasing free competition in banking and increasing free global capital flows.

- **II.2. Applied Studies:**

Reinhart and Tokatlidis (2001) provide a theoretical survey about the impact of financial liberalization on investment, growth, financial deepening, and saving. They analyses domestic liberalization and capital account liberalization using panel data from total 50 developed and developing countries for the period 1970-1998. They conclude that financial liberalization results in higher interest rates, lower investment, higher foreign direct investment, and higher gross capital flows in high income countries, however, low income countries do not have any such benefits of financial liberalization.

Wyplosz (2001) examines whether or not financial liberalization is hazardous in developed and developing countries. He concludes that fast liberalization activities have led to the 1990s crises. However, liberalization may be useful to increase competition and reduce monopoly powers in an economy as long as it is a safe liberalization.

Kaminsky and Schmukler (2002) construct a chronology of financial liberalization in 28 developing and emerging market economies, and examine the short and long run effects of financial liberalization on capital market. Their main findings are:(1) The financial liberalization chronology shows that different types of restrictions are removed during the domestic and international financial liberalization process over time. (2) The pattern of liberalization is different for developed and developing countries. Stock market is the first to be liberalized for developed countries whereas financial market is the first to be liberalized for the emerging market countries. (3) Financial liberalization leads to larger financial cycles in the short run. (4) The immediate aftermath of liberalization is larger booms and crashes in emerging market countries.

Kose, Prasad, and Terrones (2002) examine the impact of international financial integration on macroeconomic volatility for a large number of developed and developing countries for the period 1960-1997. They conclude that international financial integration does not increase macroeconomic volatility during 1990s. While financial openness increases relative volatility of consumption.

Buch (2002) reviews the theoretical and the empirical models on the linkage between globalization and real sector volatility. Similar work of Buch, Döpke, and Pierdzioch (2002) confirms that there is not a stable relationship between financial openness and business cycle fluctuations over time.

- **II.3. Selected Business Cycle and Liberalization Studies on the Turkish Economy:**

Alper (2000) analyses the sources of business cycle in two small open developing countries, namely Turkey and Mexico, for the period 1987-2000. Alper finds that (1) Consumption expenditure is more volatile that real output in Mexico and Turkey. (2) Consumption has a high contemporaneous correlation with real GDP implying that any cyclical shock to income affects consumption. (3) Investment is the most volatile component of GDP. (4) Capital flow is important, strongly procyclical and one quarter leading variable.

Denizer, Iyigun, and Owen (2000) investigates the role of finance providing empirical evidence on the link between depth and structure of a country's financial sector and the severity of its business cycle using annual data from 70 countries for the period 1956-1998. They use financial development indicator as a proxy for asymmetric information. Their main findings are: (1) Highly developed financial sectors experience less fluctuations in output, consumption and investment growth, since these economies can absorb shocks more easily. (2) Private sector finance is important in reducing macroeconomic volatility. Banks are thought to be important in reducing consumption and investment volatility, whereas availability of private sector credit helps to smooth consumption and GDP.

Boratav and Yeldan (2001) identify and study the main stylized facts and processes characterizing the dynamic macroeconomic adjustment of Turkey since 1980. They find that openness has a little impact on profits and investments, and liberalization has not generated a productivity gains in the leading exporting sectors. They conclude that the

Turkish adjustment experience throughout the post-1980 period shows a process in which a developing market economy trapped within the needs of integration with the world market.

Celasun, Denizer, and Dong He (2003) examine the impacts of capital flows on the real side of the Turkish economy for the period 1990-1997. They find that capital flows are positively associated with private consumption and investment but not with public consumption and investment.

In this study, the link is constructed among the internationally integrated domestic market and the real economic activity. The credit market is emphasized through both the domestic market efficiency defining as the spread between lending and borrowing interest rates and the international market efficiency defining as the spread between the domestic market rate and the world market interest rate. According to the study, the increase in the probability of the default of the lenders that funds their investment in credit market will trigger the domestic and foreign financial market spreads. That will also increase the loan obligations of lenders. The real economic activity will be affected negatively from the increasing inefficiency of financial markets. Moreover, the fragility of the real side of the economy will also increase. The fluctuations of the output will be observed as it decreases.

If the economy is evaluated from the side of financial intermediaries, as the inefficiency problem of financial markets sourcing from not acquiring information, liquidity and the risk diversification is not solved, the impediments front of the real economic activity will not be overcome. The models which analyze the relationship between the performance of financial intermediaries and the real economic activity support this view in a formal way through the long-term relationship but now there is another questions, especially gaining importance after the first half of nineties with the occurrence of frequent and deep financial crises. One is about the changes in the efficiency of financial intermediaries after the international financial liberalization activities. What the impact of integration with the rest of the world on the services of financial intermediaries is not handled with

formally. It is claimed that the international integration will provide the efficiency of intermediaries by increasing the number of instruments, diversifying risks over many lenders, providing liquidity and gathering information; hence increasing the efficiency of existing financial conditions but the proof of all claims is not supported empirically also. The other is about the other side of the real economy, fluctuations. In the short-term, what is the impact of financial intermediaries, the associated risk measures; such as external spread, credit channel, capital flows on the fluctuated real economic activity? Conclusively, if any shocks to the system as a reason, or any significant drops as a result of external shock can follow each other, there is another question, what is the relationship between cyclical behaviors between the financial variables and the real economic activity after the financial liberalization period?

III. QUANTITATIVE ANALYSIS

III.1. AN INVESTIGATION OF THE DATA:

1.1. A Brief Overview of the Turkish Economy: Trends, Cycles and Shocks:

In 1988 the Turkish economy went into recession because of insufficient financial sources. The low level of economic growth necessitated to implement new economic adjustments and also to find new financial support to finance the deficit.

In August 1989 the liberalization of the capital account created new financial opportunities for the government to finance the budget and current account deficits, and to achieve a high growth. The restrictions on the capital flows were removed and the TL was become a convertible currency. In addition, a substantial increase in real wages and the agriculture subsidies resulted in an increase in the domestic demand and in the budget deficit. Financial deregulations and liberalization led to a lending boom increasing the facilities for bank credits and helped the deepening of the financial sector via increasing short term capital flows into banking sector.

In 1990 the Central Bank of Republic of Turkey (CBRT) announced a monetary program in order to control the public sector credits. The real effective exchange rate was

appreciated in order to slow down the inflationary pressure. The first impacts of financial liberalization process in Turkey were the deterioration in the current account deficit and the appreciation of the TL. Rapid capital inflows led to a rapid but a short economic recovery period. Although the monetary program was successfully implemented in 1990, the early local election decision and the Gulf War in 1991 negatively affected the economy.

Throughout the 1989-93 period short term foreign borrowing grew by 223%. The main source of the economic growth during this period was the monetary expansion. The CBRT did not sterilize the capital flows from 1989 to 1993. In 1993, open market operations led to a higher level of interest payments and thus worsened the public sector financial position, whereas appreciation of the TL and high economic growth led to a larger trade deficit and hence worsened the current account deficit. All these adverse effects aggravated the devaluation expectations meanwhile higher interest rates escalated the inflationary expectations.

In 1994, an artificial reduction in the interest rates caused a sharp increase in the currency substitution and a sudden capital outflow. "1994 crisis" had the following destructive consequences: (i) The Turkish lira was sharply devaluated, (ii) the inflation speeded up, (ii) the interest rates increased, (iv) the real wages decreased substantially, and (v) the economy contracted by 6.1%.

During the period 1995-99, the central bank sterilized the capital flows in order to stop the monetization of budget deficits. However, this policy put further pressure on interest rates, and hence on inflationary expectations. In 1995 capital inflows accelerated and the economic growth reached to 8.1%. The sources of the economic growth were the domestic consumption and the private investment. Inflation declined, the real exchange stability stimulated exports and the current account deficit decreased. After 1996 the high interest rates and the inflationary expectations and thus the vulnerability and the risk of the financial sector increased once again. They also increased the cost of production by

affecting the credits and the open foreign exchange position of the banking sector through uncovered interest parity.

The "1997 Asian crisis" and the "1998 Russian crisis" reversed the capital flows to Turkey, and reduced the amount of external financing available for the budget deficit. This resulted in an increased pressure on domestic borrowing, and enlarged the size of the domestic debt, raising the real interest rates on treasury bills.

In 1998 the CBRT announced a new monetary program and managed to reduce the inflation rate. In August 1998, "Staff Monitoring Program" was signed with the IMF. 1998 economic program led the inflation and the inflationary expectations to decline. In 1994, just after economic crisis, the CBRT chose to control monetary expansion and hence a tight monetary policy resulted in high interest rates, whereas, in 1998 the CBRT chose to control the exchange rate as an anchor and left the interest rate to the market. In 1999, however, the inflation rate jumped again, and at the beginning of the year the 2000, the disinflationary program was launched.

"2001 crisis" abolished the validity of the disinflationary program, and the fixed exchange regime was abandoned. Collapse of the fixed (pegged) exchange rate regime led to withdrawal of foreign capital in February 2001 and resulted in a direct and depressing impact on the banking sector. All these brought about pressure on the currency. Devaluation of the exchange rate and a sharp increase in the interest rates worsened the cash flows of government (increasing capital outflow) and depressed output.

1.2.Data Description:

It is believed that quarterly data will give a good view of short run cyclical behavior. In this analysis GDP, total/private/public consumption, total/private/public investment, bank credits to total/private/public sector, traded/non-traded goods production are used in logarithm forms and real. Traded goods production is defined as the sum of the production at the agriculture and industry sectors, and the rest of the production is

accepted as the non-traded goods production. Real capital flow defined as the net sum of short term capital flow and portfolio investments in TL and deflated by wholesale price index. Domestic spread is the difference between three months inter-bank lending rate and deposit rate. External Spread is equal to the three months deposit rate minus three months LIBOR on US$ plus inflation rate minus depreciation rate. External spread is defined different than the uncovered interest rate parity because of over-valuation of TL during the investigation period.

1.3. Decomposition of the Economic Series

The macroeconomic indicators can be expressed as the seasonal variation, trend, cycle, and irregular components. Seasonal adjustment removes the seasonal highs and lows (annual effects) with different smoothing techniques. When the seasonal effects are eliminated from the series, the component might display erratic movements. The cyclical component exhibits the short run regular or irregular fluctuations in the series. The trend component shows the accumulated effects of the fluctuations in the long run behavior of the series. When the trend and the seasonal cycle are extracted from the original series, the residual would correspond to an irregular component. This component should be generated by a stationary stochastic process, and hence should have the characteristic that any segment of consecutive observations looks similar to any other segment of the same duration regardless of the time interval. This component sums to zero over time. However, if the irregular component of a series contains non-random events, this results in a shift in the amplitude of the time series. This is called a shock. A shock can be defined as an additive outlier or a level shift. An additive outlier shock causes a spike in the series, whereas level shift shock has a permanent effect on the series. If the irregular component follows a trend, or a regular pattern, then it includes the features of the other components.

In this analysis the purposes of decomposition are as follows: First, the elimination of the seasonal and irregular components from the economic series gives a clearer picture of the important characteristics. Second, the elimination of short run erratic movements improves the economic relevance of the estimation results.

Accordingly, the relationship among the cyclical patterns of the economic series and the sources of business cycle has been examined. For the above purposes, the cyclical components have been separated from the other components following the two steps. First, the X-12-ARIMA model-based technique has been used to decompose the seasonal adjusted, irregular, and trend-cycle components of each series. Then, the cyclical components for each series have been extracted from the trend-cycle components by applying the Hodrick-Prescott (HP) de-trending filtering technique.

1.4.Trend and Irregular Tendencies:

The trend and the cycle components of real GDP have been shown in Figure.1. There is a positive long run trend throughout the period 1988-2002. However, in 1998 the increase in the trend component of real GDP slows down. Table.1 shows the cyclical movements in real GDP. The real GDP has completed approximately five cycles over the period. Each cycles exhibits a different pattern. Second and third phases last longer than the others.

The trend and the irregular components of the series are shown in Figure.2 and Figure.3, respectively. The negative impacts of the 1994, 1998, and 2001 economic crises on the macroeconomic fundamentals can be explained in terms of a change in the tendency of trends, and the large deviation in the irregular components.

- **Trend Components:**

An important benchmark to start analyzing the aftermath of financial liberalization in Turkey is the interpretation of the trend behavior of the series. The empirical growth literature and the literature on the determinants of real and financial crises explore that the main macroeconomic indicators are interconnected to the potential currency and banking crisis. An investigation of a possible interrelation between the real and financial variables, or in other terms “early warning” indicators of crises give a clear view that:

FIGURE.1: ACTUAL REAL GDP and TREND

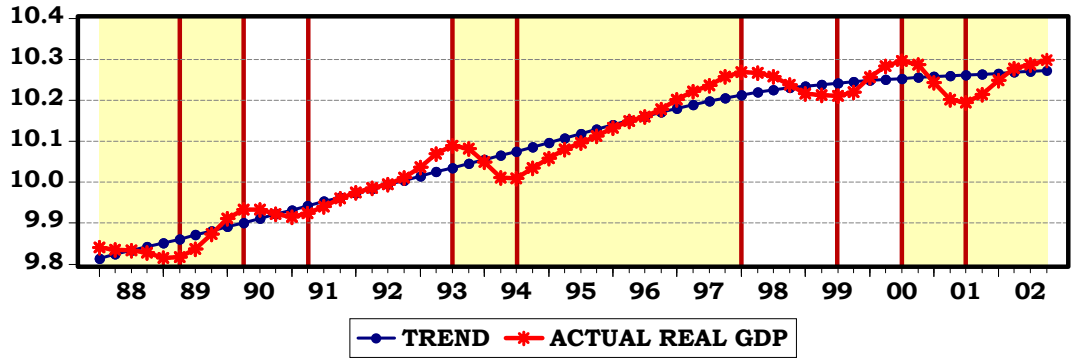


Table.1: A Brief Time Pattern of the Business Cycle in Turkey: 1988:1-2002:4

Business Cycle	Recession	Trough	Recovery	Peak
I. 1988:1-1990:2	1988:1-1989:2 6 quarters	1989:2	1989:3-1990:2 4 quarters	1990:2
II. 1990:2-1993:3	1990:2-1991:2 5 quarters	1992:2	1992:3-1993:3 5 quarters	1993:3
III. 1993:3-1998:1	1993:3-1994:3 5 quarters	1994:3	1994:4-1998:1 14 quarters	1998:1
IV. 1998:1-2000:3	1998:1-1999:3 7 quarters	1999:3	1999:4-2000:3 4 quarters	2000:3
V. Second and third 2000:3-continues	2000:3-2001:3 5 quarters	2001:3	2001:4-2002:4 continues	continues

(a) Real GDP, total consumption, private consumption, public consumption, traded goods and non-traded goods productions display a linear upward trend, but it slows down after 1998. The correlation coefficients are higher than 0.90 indicate the strong co-movements of trends. This result implies that the trend behavior or direction of the main real macroeconomic fundamentals in Turkey have been changed in 1998.

(b) The trend components of total and private investment, total and private credit, capital flow and external spread exhibit a non-linear trend. Capital flow and the spread have an increasing trend up to 1994, after then they follow a decreasing trend. Investments and credits have a positive trend up to the 1998 crises and then the tendencies reversed. Interestingly, the trend in capital flow and external spread change the direction in 1994. These results show a high level of correlations, and

explain the coherent transition of trends between the financial development indicators and the corresponding real variables[1].

(c) Domestic spread shows an interesting trend, first increases up to 1994, then decreases up to 1998, and rises again. This result shows the implications of the interest rate and exchange rate policies in Turkey.

(d) Downwards trend behavior in the public sector credit is consistent with the financial liberalization process. Even though the trend in consumption has increased over time, the non-linear trend in public investment has changed the pattern just after 1994.

- **Irregular Components:**

The plots of the irregular components attract the attention that all of the components are affected by the 1989, 1994, 1998, and 2001 shocks. In Table.2 pair-wise high positive correlation coefficients of the irregular components of the real GDP with a corresponding variable reveal that a shock to the real total consumption; to the real private consumption; and to the real traded/non-traded production, respectively, is highly related to a shock to the real GDP. That is, any production shock will directly affect the fluctuations in these variables[2].

Shocks to production and external spread are negatively related to each other. However, there is a weak relationship between the irregular components of real GDP and real (total and private) credits, real investment (total/private/public), respectively, implying that there is no synchronization of a real GDP shock with these variables.

On the other hand, the irregular components of capital flow, public consumption, public credit, and domestic spread are not related the irregular component of real GDP. This result implies that the irregular components of these variables are not affected by the same shock contemporaneously.

[1] The pair-wise correlation results are not shown in the paper.
[2] Note that these variables are related in a non-causality manner, there is a contemporaneous relationship between them.

Table.2: The Irregular and Trend Correlations: 1988:I-2002:IV		
VARIABLE	Contemporaneous Pairwise Correlation Coefficients	
	Irregular Components	Trend components
Real Total Consumption	*0.9010*	*0.998*
Real Total Investment	*0.4544*	*0.831*
Real Total Credit	*0.4232*	*0.938*
Real Private Consumption	*0.8444*	*0.995*
Real Public Consumption	*-0.0038*	*0.985*
Real Private Investment	*0.3323*	*0.785*
Real Public Investment	*0.3096*	*0.029*
Real Private Credit	*0.3892*	*0.956*
Real Public Credit	*0.1380*	*-0.963*
Real Traded Goods Prod.	*0.8911*	*0.999*
Real Non-Traded Goods Prod.	*0.9451*	*0.999*
Domestic Spread	*0.1306*	*-0.363*
External Spread	*-0.4903*	*0.691*
Real Capital flow	*0.0458*	*-0.511*

Shaded area shows the strong relationships. Correlation coefficients between irregular component of real GDP with the irregular components of the indicators, and trend component of real GDP with the trend components of the indicators are shown in the table.

III.2. THE CYCLICAL BEHAVIOR OF MACROECONOMIC VARIABLES- THE DEGREE AND THE TIMING OF THE CO-MOVEMENTS:

In this quantitative analysis the sources and patterns of cycles in real output (RGDP) have been related to the cyclical patterns of real GDP components[3] and of the financial developments[4] and efficiency indicators[5].

Cyclical behavior of a macroeconomic variable has mainly two characteristics. The first is "direction" and the second is "timing". The direction explains the degree of co-movements with the cyclical pattern of real GDP. The **"procyclicality"** and the **"countercyclicality"** definitions are used as to evaluate the measure of the degree/direction of co-movements. In some cases, the business cycle does not occur at regular and predictable intervals, this tendency is called **"recurrent"**, but not periodic. A standard pattern of the phases recurs again and again.

[3] Total consumption, total investment, private consumption, private investment, public consumption and public investment.
[4] Total, private and public credits.
[5] Domestic spread and external spread.

Regular and predictable pattern or tendency of the business cycles tendency is known **"co-movement".** An increase in real GDP might be followed by further increase, or a decline in real GDP to be followed by further decline is called **"persistence**". The persistency of the business cycle shows the tendency and it is measured by the first order autoregressive coefficient.

The contemporaneous movements of cyclical components for each variable with the cyclical behavior of the real GDP are determined according to the positive and negative signs of cross correlations at the four lags/leads interval. When a positive cross correlation coefficient approaches to 1, it shows the **"strong procyclical"** characteristic of the series. The opposite is true for the **"strong countercyclical**" relationship. A value close to zero indicates that two series do not move contemporaneously in any systematic way and in any clear pattern. These series are called "**acyclical"** economic series.

The timing explains the turning points (peak and trough) of a variable relative to the turning points of the real GDP (business cycle). In other terms, timing explains the phase shift in the movement of a time series relative to real GDP. Figure.3 in appendix shows the cyclical components of variables.

An economic variable is a **"leading variable"** if it tends to move in advance of real GDP. This means that the peaks and troughs in a leading variable occur before the corresponding peaks and troughs in the real GDP. This variable ***leads*** the cycle and is shifted backwards. A **"lagging variable"** is one whose cycle peaks and troughs occur later than the corresponding peaks and troughs in the real GDP. This means that the peaks and troughs in business cycle occur before the corresponding peak and troughs of an economic variable. This variable ***lags*** the cycle and is shifted forwards. Peaks and troughs of a **"coincident"** variable occur about the same time as the corresponding business cycle peaks and troughs.

a) Pattern and Source of Business Cycle:

In this part of the paper it is conjectured that "the source and pattern of the real GDP is affected by the patterns of the components of real GDP, the financial development indicators (credits and capital flow) and the efficiency indicators (domestic and external spreads) during the financial liberalization process over the period 1988-2002."

- **Cyclical Components:**

The comovements of cyclical components are determined according to the highest cross-correlation coefficients of lag or lead values, which are significantly greater than the contemporaneous values of the correlations.

Table.1 in appendix summarizes the cross correlation results. The real GDP and the real total consumption are the first two series examined for the co-movement relationship. The result shows that the direction of the current relationship is procyclical with the cross correlation coefficient of 0.91. It is a coincident variable. Like total consumption, real private consumption has a procyclical relationship with the real GDP, 0.92, and it is also a coincident variable. The cross-correlations decrease as the lead and lag numbers increase. For example, the fourth lag of private consumption has an effect of -0.31 on the real GDP where negative relationship observed after the second period.

When the relationship between the real public consumption and business cycle is examined, it has been found that the cross correlation between the current real public consumption and the real GDP (0.49) is not as high as the cross correlation between the private consumption and the real GDP. The public consumption displays procyclical movement and is a coincident variable.

Accordingly, the results indicate that a high degree of correlation between real GDP and private consumption implies the synchronization. In addition, the procyclical and coincident characteristics of private and total consumption and also their volatilities support the view that rational individuals adjust their portfolio positions to smooth

consumption. This can be explained in terms of "wealth effect" since the volatility[6] of investment (9.226) is higher than of consumption (3.343) and output (3.146).

Real total investment, the real private investment, the real public investment has the highest cross correlation coefficients with real GDP, (0.85, 0.79, and 0.67, respectively). Total investment and private investment are coincident, but public investment is a lagging variable. As in the consumption case, on average, the volume of private investment in total investment is more than the public investment and private investment has lower volatility than public investment during the period.

As traded and non-traded sectors are taken into account, both of them have high positive cross correlation coefficients (0.95 and 0.98, respectively) with the current real GDP. They show a strong pro-cyclical characteristic and they are coincident variables. The result displays that there is no clear distinction between the tradable and non-tradable sectors in the light of procyclical relationship. This is an unexpected result in the sense that traded sectors can have bigger borrowing opportunities in the international credit market than the non-traded sectors and could lead the real GDP fluctuations. There is also a clear distinction between the tradable and the non-tradable sectors from the perspective of the external and internal borrowing opportunities. However, in the Turkish economy, there is a high dependency of the traded and non-traded sectors to the domestic credit market but less to the international borrowing facilities. In addition, financial liberalization stimulates specialization of production through the reallocation of capital and promotes the total output. However, in Turkey, financial liberalization has produced a depressing impact rather than specialization.

The relationship between the real GDP and the real private credit is highly procyclical, and the private credit is a lagging variable. The timing of the relationship is unexpectedly from the real side to the financial side. The highest level of the correlation, 0.70, is observed between the current real GDP and the one period ahead of the private credit. The evidence is against the view that the financial development in the liberalization

[6] The volatility of the series is measured as the percent standard deviation of the cyclical components.

process is expected to trigger the real economic activity. The relationship is also investigated in sub-periods. It is observed that the strength of the correlations increase but the timing does not change during 1987-2000 period.

When the comovements between the cyclical behavior of the real GDP and the domestic and external spreads are investigated, both spreads show a countercyclical characteristic and they lead the business cycle. The second lag of domestic spread affects the real GDP in a negative direction (0.57) but the real GDP creates a positive impact on the two period ahead in the future, while a negative relationship (0.58) is observed between the first lag of the external spread and the real GDP.

Another leading variable in this analysis is the real capital flow. The positive cross correlation coefficients indicate a procyclical characteristic between the real GDP and the capital flow. In emerging market economies, capital account liberalization is expected to promote financial sectors, to reduce the cost of capital flow and thus to increase production.

The cyclical components of domestic and external spreads move in the same direction with the cyclical component of real GDP, but it is shifted forward.

Figure.2: Contemporaneous Relationships with Real GDP (Direction):

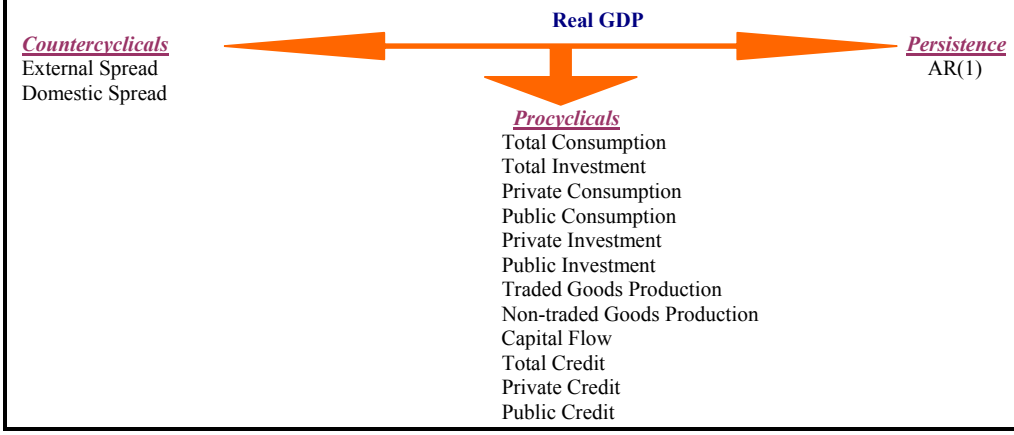
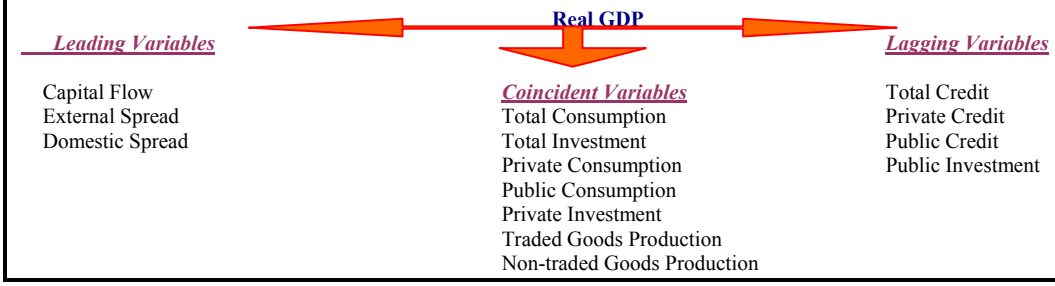


Figure.3: Contemporaneous Relationships with Real GDP (Timing):



b) Cyclical Relationships Between the Components of Real GDP and the Indicators:

This part of the paper investigates the conjecture that "the financial liberalization process has positive impacts on the production and spending through the amelioration of financial development and efficiency indicators".

The impacts of economic development and efficiency indicators on consumption, investment, and traded and non-traded goods production and also on each other are examined by the cross correlation analysis and results are reported in Table.2 in the appendix, and summarized at the Figure.3.

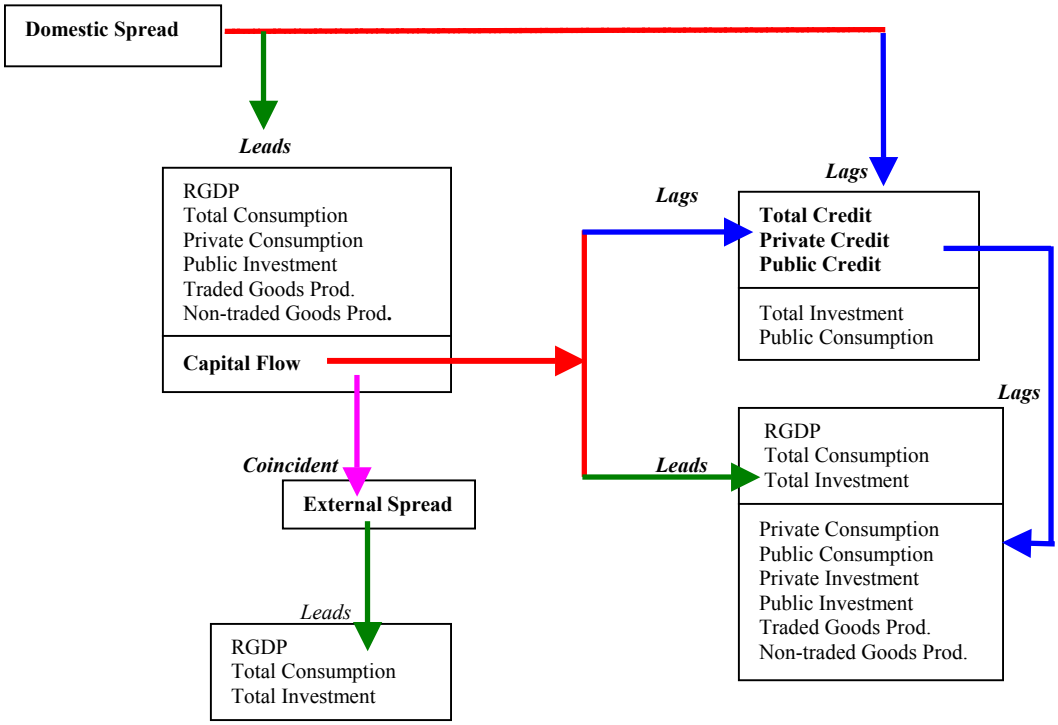
- ✓ Real total credit, real private credit and real public credit are highly procyclical and lagging variable. Economic development indicators all reach the peak and trough after consumption and investment in expansion and contraction periods, respectively. This means that, in Turkey, a higher level of consumption and investment put an upward pressure on credits. Thus in an expansion, increasing lending activities show a response to higher real spending, and reverse case is in a contraction. This outcome supports the view that bank credit to private sector is important in smoothing consumption and investment variability at the low-income countries (İyigün, Denizer, Owen (2000)).
- ✓ Capital flow is countercyclical and lagging variable for total, private, and public credit, but procyclical and leading variable for total, private, and public consumption, total, private, and public investment, and traded and non-traded goods production. This results show that capital flow leads spending and production in the same

direction, however, lags credits in the opposite direction, in Turkey throughout the period 1988-2002.

- ✓ Domestic spread is a countercyclical and leading variable for total consumption, private consumption, public investment, traded/non-traded goods production and capital flow but it is procyclical and lagging variable for total/private/public credit, total/private investment, and public consumption.
- ✓ External spread is countercyclical and leading variable for total consumption and total investment. It is an acyclical variable for all the other variables. This implies that external spread does not move in any systematic way and contemporaneously with these variables.
- ✓ External and domestic spreads have countercyclical behavior with capital flow, the former is a coincident but the second one is a leading variable. This result supports the Turkish case that any capital inflow reduces current interest rate differentials. A higher level of capital inflow leads to increase in the liquidity and hence reduce domestic interest rate, on the one side. On the other side, it causes real appreciation of TL, and finally reduces inflation.

The above results indicates that in the Turkish economy financial sector transmits the impacts of capital flow and external spread volatility to the real economy, and the effects of them are reflected by the financial sector variables. Domestic and foreign interest differentials and capital inflows are all thought to be very sensitive to the fragility of the Turkish financial sector. In general, it is believed that as long as the interest rate is determined as a result of economic policy decisions rather than market conditions, and also as long as the real exchange rate is appreciated, then large and volatile spreads and capital flow will be unavoidable.

Figure.4: Contemporaneous Interrelationships Between Variables:



III.3. CAUSALITY RELATIONSHIP:

In this paper, we have attempted to establish an empirical link between real GDP (business cycle) and all the other indicators that are thought to be the sources of economic fluctuations in Turkey. Some insights of the short run causality relationship between the economic variables are gained by the Granger non-causality analysis.

It is important to keep in mind two points about the causality relationship. First there will not exist a stable causality patterns if the results are different for the different lag length, namely 1 to 4. Second there might exist reverse causality if the volatilities in variables are large.

Table.3 and Table.4 in appendix illustrate the causality test results. It is assumed that first if the results are the same for any two lag lengths the causality pattern is accepted as stable. Second if the percent standard deviation of a variable is larger than 4 percent, the volatility of that variable is accepted as large.

As it has been presented in Table.3 in appendix, consumption (except public), bank credits, traded and non-traded goods production, capital flow, and external spread all have a stable causality pattern with the real GDP, even though some of them have large volatilities over the period 1988-2002.

Figure.4 shows that first, there is a contemporaneous rather than causality relationship between the Turkish real GDP and total consumption, private consumption, total credit, private credit, public credit, traded and non-traded goods production, and capital flow, respectively. These results support that all these variables possess very similar cyclical characteristics (coincident) with the real GDP, and the cyclical movements are accompanied generating demand side effects. Second, the real GDP causes the public consumption and investment in Turkey. So the cyclical movement in the private sector spending is a reason, but in the public spending is a consequence of the real GDP movements. External spread is also a consequence of the real GDP cycles. Third, the mutual causality between real GDP and domestic spread explains the virtual spiral in the Turkish economy.

Figure.5 represents some historical interconnections between the development and efficiency indicators and Table.4 in appendix presents the causality relationships between the different combinations of GDP components and the development/efficiency indicators. A stable causality pattern has been obtained between total investment and external spread, public consumption and public credit, public consumption and capital flow, private consumption and private credit, public investment and capital flow, private credit and capital flow, total credit and capital flow, public credit and capital flow, total consumption and capital flow, traded goods production and capital flow, and finally non-traded goods production and capital flow, capital flow and external/domestic spreads, respectively.

Figure.5: Causality Relationship with Real GDP:

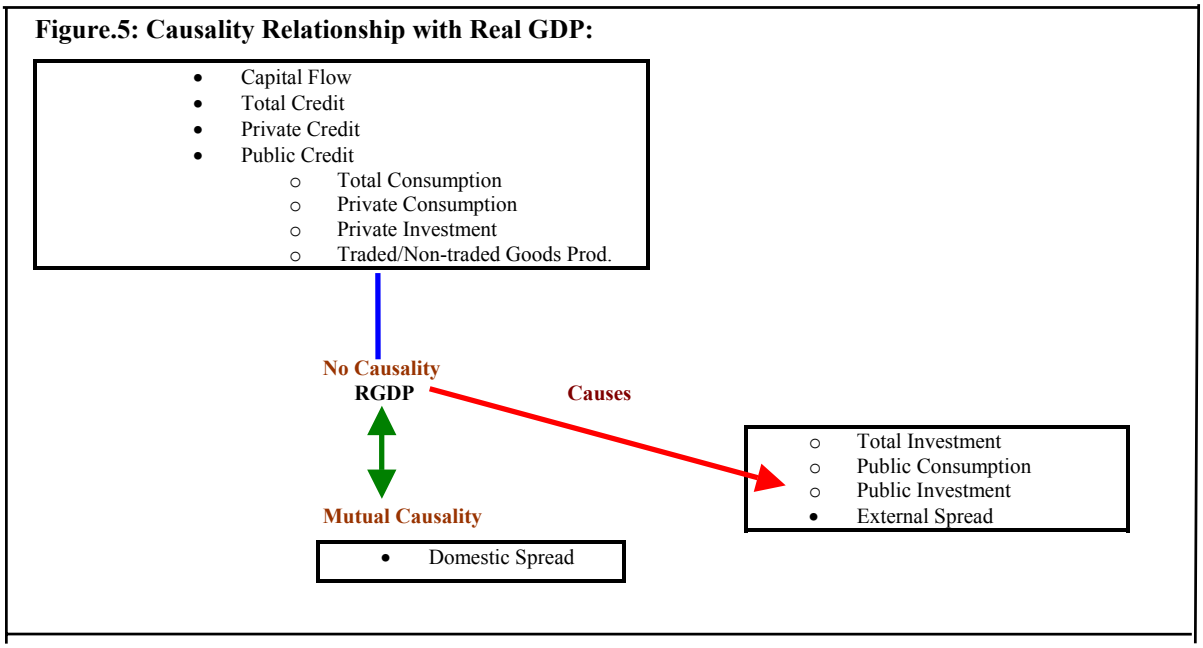
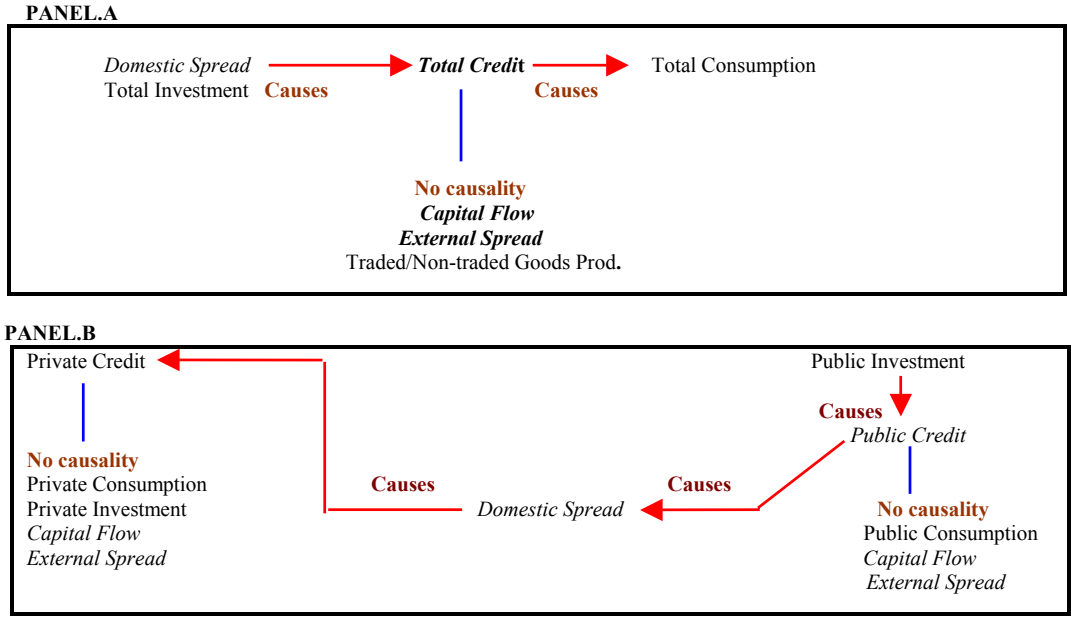
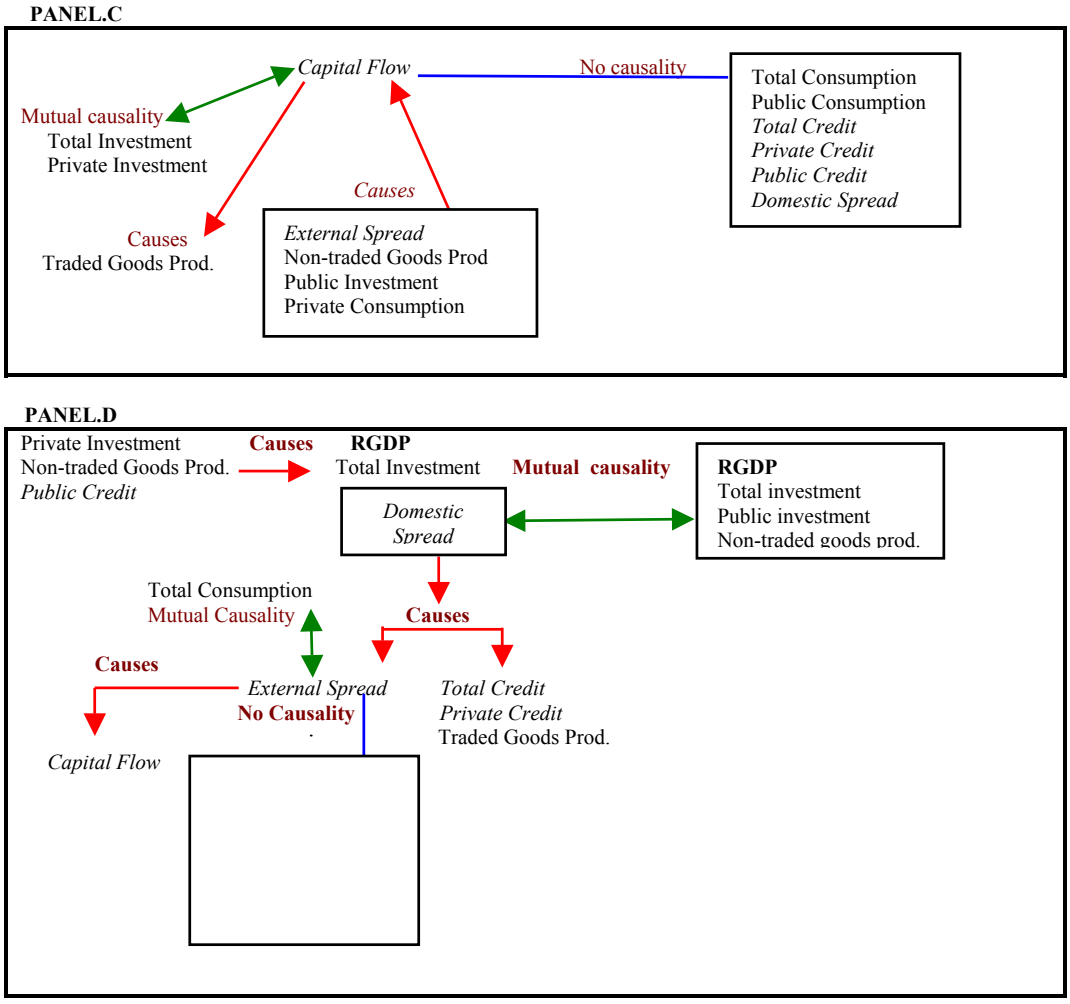


Figure.5 Panel.A shows domestic spread and total investment cause total credit, and then total credit causes total consumption. Panel.B presents the causality relationship between domestic spread and the public sector investment and credit cycles. The causality link from domestic spread to private credit is from spread to credit and a higher volatility in domestic spread and bank credits is a crucial result of high and volatile lending rates in Turkey. Panel.C shows that total and private credits have a mutual causality with capital flow. Capital flow is a result of external spread, public investment, private consumption, and non-traded goods production cycles, whereas it causes traded goods production. Public investment, private consumption, and non-traded goods production trigger capital flow, and capital flow contribute traded goods production in Turkey between 1988 and 2002. There is a contemporaneous relationship between the economic development indicators, namely bank credits and capital flow. This result supports the view that the removal of restrictions on the Turkish financial market (deregulations) has produced the synchronic movements of short run bank credits and capital inflow. Panel.D summarizes the causality sequence of the cyclical components. Domestic spread causes both external spread and credits, and external spread causes capital flow.

The overall causality results support the view that the real side variables are closely related to the financial variables. The prevalence roles of capital flow and spreads on the real variables are noteworthy results. Capital inflows heavily relied on an arbitrage of interest rate differentials has made the pursuit of domestic stabilization more difficult in Turkey. Foreign flows invested on government papers led to increase in domestic credits and liquidity in the Turkish economy. These have increased international reserves and created an illusion of strong exchange rate. On the other hand, heavily issues of public debt have put an upward pressure on interest rates, and proceeded interest rate differentials and attract more foreign capital inflows. This has put upward pressure on the exchange rate in a high inflationary environment, and led to real appreciation in Turkey. As a result, increases in trade deficit and budget deficit, and also real appreciation have presented unsustainable policies in Turkey and always ended with a crisis.

Figure.6: Causality Relationships With Indicators:





III.4. IMPLICATIONS OF THE RESULTS FOR THE TURKISH ECONOMY:

Turkish economy grew with a high PSBR, high inflation rate, high interest rates, real appreciation of TL between the periods 1988-2002, but at the end of each expansion period and rapid growth, the economy experienced an economic crisis, such as 1994 and 2001. Bank credits were steered the production and spending in the boom periods via a higher level of capital inflows. Large interest differentials have always been attractive for the foreign investors and speculators. In Turkey, both spreads exhibit high volatility throughout the period 1988-2002, but the external spread is more volatile than the domestic spread. Domestic spread, in Turkey, is one of the highest one among the emerging market economies. A high level of spreads means inefficient performance of the domestic financial intermediaries, even though it also indicates a high level of non-

performing costs or imposed costs. On the one side, as a result of a high level of government domestic and foreign borrowing to finance budget and trade deficits in Turkey, the cost of borrowing has risen and domestic spread has widen and hence become more volatile. In Turkey, both spreads exhibit high volatility throughout the period 1988-2002, but the external spread is more volatile than the domestic spread. Domestic spread, in Turkey, is one of the highest one among the emerging market economies. A high level of spreads means inefficient performance of the domestic financial intermediaries, even though it also indicates a high level of non-performing costs or imposed costs. On the one side, as a result of a high level of government domestic and foreign borrowing to finance budget and trade deficits in Turkey, the cost of borrowing has risen and domestic spread has widen and hence become more volatile. On the other side, large external spreads led to the purchases of domestic assets, mainly treasury bills, by foreigners.

The mutual relationship between the capital inflow and external spread has weakened the impact of capital flow on investment. However, since the Turkish financial system is not sufficiently developed to cope with volatile capital flows, any weak or inconsistent policy resulted in sudden reversals in capital flows and hence led to a higher volatility and contraction of the economy.

The results reveal that firstly, the pattern of the real GDP cycles is determined by the demand side variables, namely consumption and investment. Secondly, the source of the real GDP fluctuations is attributed to the capital flow and bank credits via both the domestic and external spreads. Thirdly, the relationship between the efficiency and development indicators explains the fluctuations in the real side of the Turkish economy.

Throughout the financial liberalization period, markets in Turkey have not performed well and the increase in interest rates has not been sufficient to provide the capital accumulation. Liberalized financial market has not been enough for the saving and investment opportunities. The imperfect nature of the financial system has led to the collapse of financial liberalization policies. The lack of information, or in other words

asymmetric information, about the quality of borrowers has prepared the background for the distressed financial sector and the risk of lending has increased. Thus real economic activities have not expanded, rather sunk into recession. As Stiglitz and Weiss (1981) state, a higher interest rate will both invite the riskier projects to the market and also affect the incentives of existing borrowers to take projects whose payment probability is low. It is a fact that the information asymmetry between bank and borrower causes the probability of default be greater than zero. The probability of default is directly related to the interest rate on credit. Hence as the interest rate on credit increases, the probability of default also increases. Charging a high interest rate on credit is not optimal strategy for banks. The expected return on given credit should be optimized. This phenomenon stems the fact that as lending rate increases, the credit will be directed to the more risky projects and thus this will reduce the expected payoff of banks from credit.

The above explanation is about the credit mechanism and the determination of lending rate in a weak financial market. In other words, it is about the credit rationing side of the credit mechanism. In addition to the credit rationing, domestic and external spreads, and capital flows have also impacts on credit mechanism through domestic deposit and lending rates and the foreign interest rates. It is so clear that banks can lend only if there exists excess resources.

In this paper, the timing and direction relations between the credits and real GDP emphasize the mechanism behind the credit rationing in Turkey. The results suggest that total credit is procyclical and lags cycle. An increase in credit follows the increase in real GDP[7]. Thus economic expansion periods are the periods of increasing credits to the real side of the economy. Investment is closely related to the credit. Capital flows are also a source of investment in Turkey. A higher capital flow follows a higher level of credits. Increase in investment leads to increase in domestic spread in the foregoing periods as a result of the supply and demand conditions in the credit market. A higher level of demand for credit couples with a higher level of public sector borrowing and would put an upward pressure on the interest rates. This result would, in turn, decrease the expected

[7] This result is valid also for private and public credits.

payoff of banks. This view can be supported by the result that there is a countercyclical relationship between the total credits and capital flows. In other words, a higher investment would lead to a higher credit but a lower capital flows. A lower capital flow means that the risk associated with the Turkish economy is increasing. So the external spread increases signaling a higher risk of the economy. Moreover, a decrease in capital inflow would decrease future real GDP although investment is increasing. This outcome reveals that a credit increase by bidding up interest rate is not healthy way to finance big projects because of a high risk associated with these projects and also a lower level of expected payoffs from these projects. Accordingly, even in the expansion periods, the bank credits must be well controlled since a higher level of credit does not mean an increase in payoffs.

IV. CONCLUSION:

The purpose of the paper is the determination of the source and pattern of the business cycle in Turkey throughout the liberalization period. The main question is whether the financial liberalization policies have increased the fragility of the financial and real side of the economy for the Turkish case through the period 1988-2002 for quarterly data. The cyclical components of the financial variables and the real variables are examined by the cross correlation and causality analyses. Liberalization policy indicators have been used as the financial efficiency and financial deepening indicators. The domestic and external interest rate spreads are chosen for examining financial efficiency whereas credit expansion is for explaining the impact of financial deepening. The short-term and portfolio capital flows are chosen to analyze the impacts of financial liberalization on the financial side and the real side of the economy.

In this paper, if the analysis is evaluated from the business cycle side during the liberalization process, it is found that the pattern of the real GDP cycle is determined by the demand side of the economy, namely by consumption and investment, however, the source of fluctuations attributed to the supply side of the economy, namely bank credits and capital flow throughout the period 1988.I-2002.IV.

In addition, if this analysis is evaluated from the financial intermediaries side during the liberalization process, it is clear that inefficiency problem of financial market in Turkey is a source of economic instability. Thus the financial liberalization process in the Turkish economy for the period 1988.I-2002.IV increased the fragility of both the real and financial sides of the economy.

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APPENDIX

FIGURE.1: TREND COMPONENTS

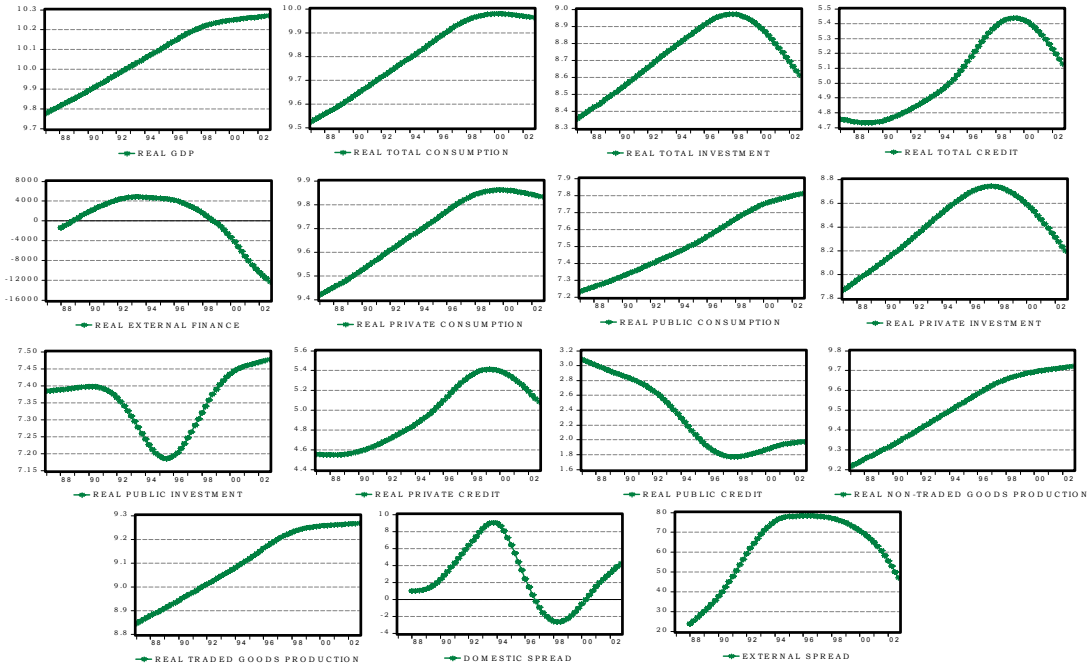

FIGURE.2: IRREGULAR COMPONENTS

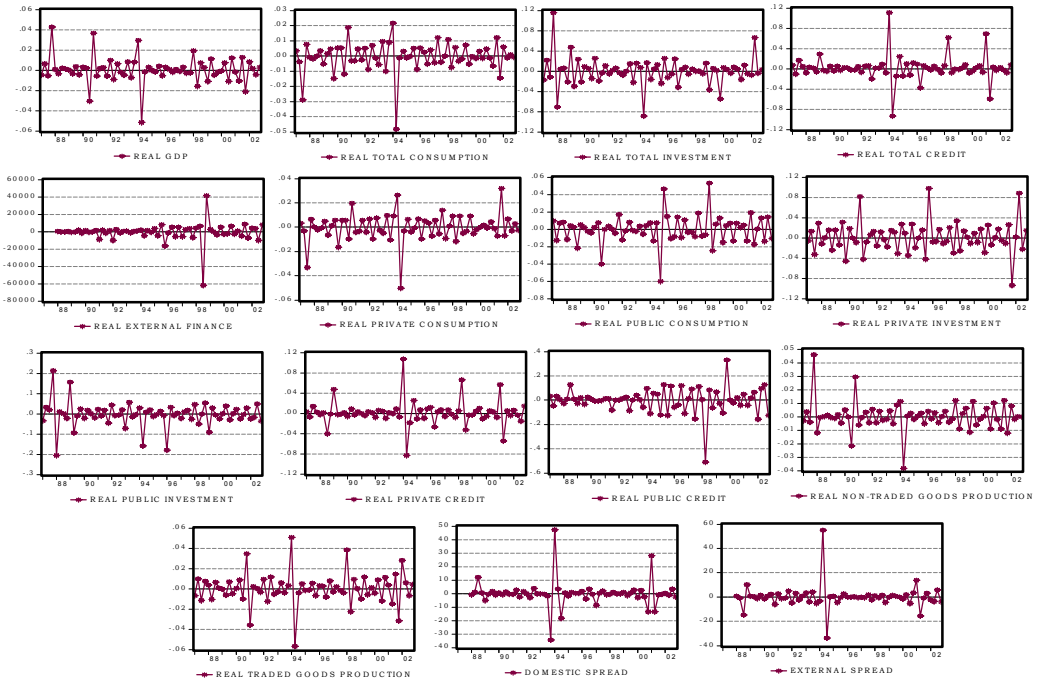

FIGURE.3: CYCLICAL COMPONENTS:

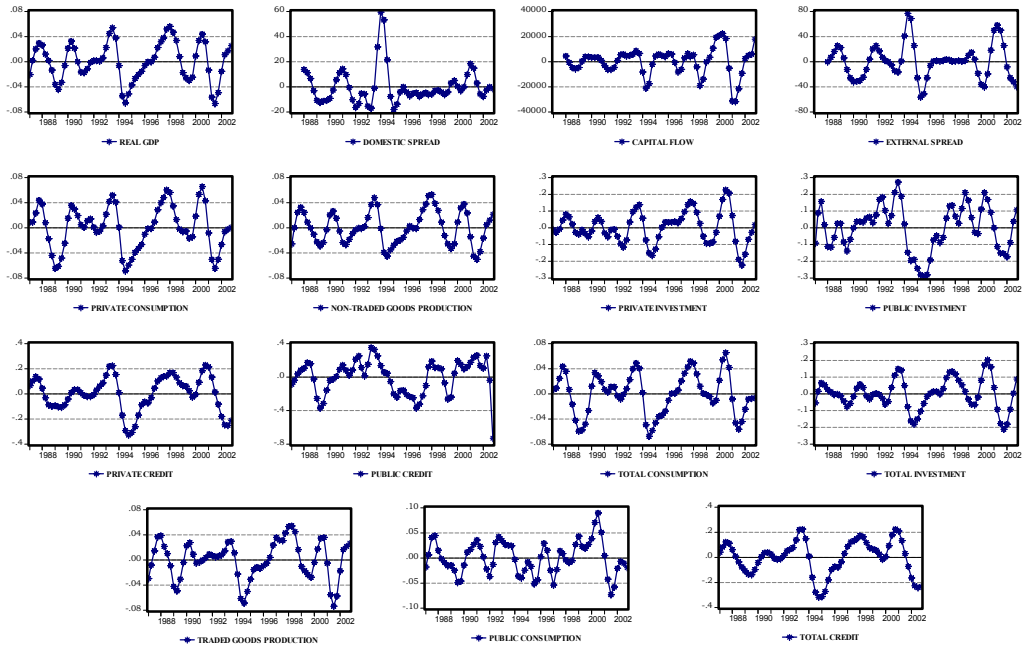

Table.1: The Relationship Between the Cyclical Component of Real GDP and Cyclical Components of Each Indicator: 1988:I-2002:IV

Variables	Volatility (%) S.D.	CHARACTERISTICS	
		Direction	Timing (Cross Corr. Coeff.) t-i, t+j
Real GDP	**3.141**	**Persistent**	**(i=1) 0.832 (i=2) 0.402 (i=3) -0.056 (i=4)-0.005**
Real Total Consumption	**3.343**	**Procyclical**	**Coincident (i=0) *0.9120***
Real Total Investment	**9.226**	**Procyclical**	**Coincident (i=0) *0.8502***
Real Private Consumption	**3.557**	**Procyclical**	**Coincident (i=0) *0.9285***
Real Public Consumption	**3.291**	**Procyclical**	**Coincident (i=0) *0.4901***
Real Private Investment	**9.716**	**Procyclical**	**Coincident (i=0) *0.7989***
Real Traded Goods Prod.	**3.084**	**Procyclical**	**Coincident (i=0) *0.9521***
Real Non-Traded Goods Prod.	**2.630**	**Procyclical**	**Coincident (i=0) *0.9833***
Real Total Credit	**13.959**	**Procyclical**	**Lags cycle (j=1) *0.7038***
Real Public Investment	**13.694**	**Procyclical**	**Lags cycle (j=1) *0.6746***
Real Private Credit	**14.153**	**Procyclical**	**Lags cycle (j=1) *0.7017***
Real Public Credit	**21.022**	**Procyclical**	**Lags cycle (j=1) *0.2742***
Domestic Spread	**14.387**	**Countercyclical**	**Leads cycle (i=2) *-0.5723***
External Spread	**27.567**	**Countercyclical**	**Leads cycle (i=1) *-0.5778***
Real Capital flow	**109.543**	**Procyclical**	**Leads cycle (i=1) *0.6112***

Bold and italic shows the cross correlation coefficients.

Table.2: The Relationship Between the Selected Cyclical Components of Real Aggregates and the Cyclical Components of Development/Efficiency Indicators: 1988:I-2002:IV

Relationships	CHARACTERISTICS	
	Direction	Timing t-i, t+j
Real Total Consumption with		
➢ Real Total Credit	**Procyclical**	**Lagging** **(j=1) *0.7968***
➢ Domestic Spread	**Countercyclical**	**Leading** **(i=3) -0.4919**
➢ External Spread	**Countercyclical**	**Leading** **(i=1) -0.5464**
➢ Capital Flow	**Procyclical**	**Leading** **(i=1) 0.5959**
Real Total Investment		
➢ Real Total Credit	**Procyclical**	**Lagging** **(j=1) *0.7440***
➢ Domestic Spread	**Procyclical**	**Lagging** **(j=2) *0.5169***
➢ External Spread	**Countercyclical**	**Leading** **(i=2) *-0.6453***
➢ Real Capital Flow	**Procyclical**	**Leading** **(i=2) *0.7254***
Real Private Consumption		
➢ Real Private Credit	**Procyclical**	**Lagging** **(j=1) *0.7684***
➢ Domestic Spread	**Countercyclical**	**Leading** **(i=3) -0.4930**
➢ External Spread	**Acyclical**	
➢ Real Capital Flow	**Procyclical**	**Leading** **(i=1) *0.5917***
Real Public Consumption		
➢ Real Public Credit	**Procyclical**	**Lagging** **(j=3) *0.3407***
➢ Domestic Spread	**Procyclical**	**Lagging** **(j=2) 0.3908**
➢ External Spread	**Acyclical**	
➢ Real Capital Flow	**Procyclical**	**Leading** **(i=1) *0.6018***
Real Private Investment		
➢ Real Private Credit	**Procyclical**	**Lagging** **(j=1) *0.6684***
➢ Domestic Spread	**Procyclical**	**Lagging** **(j=2) 0.4837**
➢ External Spread	**Acyclical**	
➢ Real Capital Flow	**Procyclical**	**Leading** **(i=1) *0.7515***
Real Public Investment		
➢ Real Public Credit	**Procyclical**	**Lagging** **(j=4) *0.5741***
➢ Domestic Spread	**Countercyclical**	**Leading** **(i=5) -0.4689**
➢ External Spread	**Acyclical**	
➢ Real Capital Flow	**Procyclical**	**Leading** **(i=2) *0.3328***

Table.2 (Continues): The Relationship Between the Selected Cyclical Components of Real Aggregates and the Cyclical Components of Development/Efficiency Indicators: 1988:I-2002:IV

Relationships	CHARACTERISTICS	
	Direction	Timing t-i, t+j
Real Private Credit		
➢ Domestic Spread	Procyclical	Lagging (j=2) 0.4285
➢ External Spread	Acyclical	
➢ Real Capital Flow	Countercyclical	Lagging (j=2) *-0.4062*
Real Total Credit		
➢ Domestic Spread	Procyclical	Lagging (j=2) 0.4266
➢ External Spread	Acyclical	
➢ Real Capital Flow	Countercyclical	Lagging (j=2) –0.4071
Real Public Credit		
➢ Domestic Spread	Procyclical	Lagging (j=2) 0.3257
➢ External Spread	Acyclical	
➢ Real Capital Flow	Countercyclical	Lagging (j=3) *-0.3361*
Real Traded Goods Production		
➢ Real Total Credit	Procyclical	Lagging (j=2) *0.6791*
➢ Domestic Spread	Countercyclical	Leading (i=2) –0.5661
➢ External Spread	Acyclical	
➢ Real Capital Flow	Procyclical	Leading (i=1) 0.5525
Real Non-Traded Goods Production		
➢ Real Total Credit	Procyclical	Lagging (j=1) *0.6632*
➢ Domestic Spread	Countercyclical	Leading (i=2) –0.5227
➢ External Spread	Acyclical	
➢ Real Capital Flow	Procyclical	Leading (i=1) 0.5799
Capital flow		
➢ Domestic Spread	Countercyclical	Leading (i=1) -0.3399
➢ External Spread	Countercyclical	Coincident (i=0) -0.4683
External Spread		
➢ Domestic Spread	Acyclical	

Cycle Component of one variable related to the cycle components of the other variable:

Table.3: Granger Causality Test Between the Cyclical Component of Real GDP and the Cyclical Component of Corresponding Variables- i=1,2,3,4,1988:I-2002:IV				
Variable(X)	**i=1**	**i=2**	**i=3**	**i=4**
Real Total Consumption	**No causality**	**No causality**	**No causality**	**No causality**
Real Total Investment	Mutual causality	No causality	**RGDP causes X**	**RGDP causes X**
Real Total Credit	Mutual causality	**No causality**	**No causality**	**No causality**
Real Private Consumption	**No causality**	**No causality**	**No causality**	**No causality**
Real Public Consumption	**No causality**	**No causality**	**RGDP causes X**	**RGDP causes X**
Real Private Investment	Mutual causality	RGDP causes X	**No causality**	**No causality**
Real Public Investment	**RGDP causes X**	No causality	**RGDP causes X**	**RGDP causes X**
Real Private Credit	Mutual causality	**No causality**	**No causality**	**No causality**
Real Public Credit	X causes RGDP	**No causality**	**No causality**	**No causality**
Real Traded Goods Prod.	**No causality**	**No causality**	**No causality**	**No causality**
Real Non-Traded Goods Prod.	**No causality**	**No causality**	**No causality**	**No causality**
Domestic Spread	**Mutual causality**	No causality	**Mutual causality**	**X causes RGDP**
External Spread	Mutual causality	**RGDP causes X**	**RGDP causes X**	**RGDP causes X**
Real Capital Flow	Mutual causality	**No causality**	**No causality**	**No causality**

Results are accepted at the 5% significance level. Shaded areas show the stable causality relationship.

Table.4: Granger Causality Test Between the Cyclical Component of Real Variables and the Cyclical Component of Development/Efficiency Indicators- i=1,2,3,4 :1988:I-2002:IV

Relationships	Lag Orders			
	i=1	i=2	i=3	i=4
Real Total Consumption with				
➢ Real Total Credit	Consumption causes Credit	**Credit causes Consumption**	No causality	**Credit causes Consumption**
➢ Domestic Spread	Mutual causality	No causality	Consumption causes dom. Spr.	Domestic spr.causes Cons.
➢ External Spread	**Mutual causality**	Consumption causes Ext. Spr	**Mutual causality**	No causality
➢ Capital Flow	Mutual causality	**No causality**	**No causality**	**No causality**
Real Total Investment				
➢ Real Total Credit	Mutual causality	No causality	**Investment causes Credit**	**Investment causes Credit**
➢ Real Capital Flow	**Mutual causality**	Investment causes Capital flow	**Mutual causality**	No causality
➢ Domestic Spread	**Mutual causality**	No causality	**Mutual causality**	No causality
➢ External Spread	Mutual causality	**Investment causes External Spread**	**Investment causes External Spread**	**Investment causes External Spread**
Real Private Consumption				
➢ Real Private Credit	Mutual causality	Credit causes consumption	**No causality**	**No causality**
➢ Real Capital Flow	Mutual causality	No causality	Consumption causes capital flow	Consumption causes capital flow
➢ Domestic Spread	**Mutual causality**	No causality	**Mutual causality**	Dom. Spr. causes prv. consumption
➢ External Spread	**No causality**	**No causality**	**No causality**	**No causality**
Real Public Consumption				
➢ Real Public Credit	**No causality**	**No causality**	**No causality**	**No causality**
➢ Real Capital Flow	Mutual causality	**No causality**	**No causality**	**No causality**
➢ Domestic Spread	Mutual causality	**No causality**	**Dom. spread causes pub. cons.**	**No causality**
➢ External Spread	**No causality**	**No causality**	**No causality**	**No causality**
Real Private Investment				
➢ Real Private Credit	Investment causes Credit	**No causality**	**No causality**	**No causality**
➢ Real Capital Flow	**Mutual causality**	Investment causes capital flow	**Mutual causality**	No causality
➢ Domestic Spread	Mutual causality	No causality	**Private investment causes dom. spread**	**Private investment causes dom. spread**
➢ External Spread	**No causality**	**No causality**	**No causality**	**No causality**
Real Public Investment				
➢ Real Public Credit	No causality	Mutual causality	Investment causes Credit	Investment causes Credit
➢ Real Capital Flow	Capital flow causes Investment	**Investment causes Capital flow**	**Investment causes Capital flow**	**Investment causes Capital flow**
➢ Domestic Spread	**Mutual causality**	No causality	**Mutual causality**	**Dom. spread causes public inv.**
➢ External Spread	**No causality**	**No causality**	**No causality**	**No causality**

Table.4 (Continues): Granger Causality Test Between the Cyclical Component of Real Variables and the Cyclical Component of Development/Efficiency Indicators- i=1,2,3,4: 1988:I-2002:IV

Relationships	Lag Orders			
	i=1	i=2	i=3	i=4
Real Private Credit				
➢ Real Capital Flow	Credit causes capital flow	**No causality**	**No causality**	**No causality**
➢ Domestic Spread	Mutual causality	**Dom. spread causes private credit**	**Dom. spread causes private credit**	**Dom. spread causes private credit**
➢ External Spread	**No causality**	**No causality**	**No causality**	**No causality**
Real Total Credit				
➢ Real Capital Flow	Mutual causality	**No causality**	**No causality**	**No causality**
➢ Domestic Spread	Mutual causality	**Dom. Spread causes total credit**	Mutual causality	**Dom. Spread causes total credit**
➢ External Spread	**No causality**	**No causality**	**No causality**	**No causality**
Real Public Credit				
➢ Real Capital Flow	**No causality**	**No causality**	**No causality**	**No causality**
➢ Domestic Spread	No causality	**Public credit causes domestic spread**	**Public credit causes domestic spread**	No causality
➢ External Spread	**No causality**	**No causality**	**No causality**	**No causality**
Real Traded Goods Production				
➢ Real Total Credit	Mutual causality	**No causality**	**No causality**	**No causality**
➢ Real Capital Flow	Mutual causality	**Capital flow causes traded production**	**Capital flow causes traded production**	**Capital flow causes traded prod.**
➢ Domestic Spread	Mutual causality	**Dom. spread causes traded goods prod.**	**Dom. spread causes traded goods prod.**	**Dom. spread causes traded goods prod.**
➢ External Spread	**No causality**	**No causality**	**No causality**	**No causality**
Real Non-Traded Goods Product.				
➢ Real Total Credit	Mutual causality	N-traded prod. Causes Credit	**No causality**	**No causality**
➢ Real Capital Flow	Mutual causality	**N-traded prod. causes Cap. flow**	**N-traded prod. causes Cap. flow**	**N-traded prod. causes Cap. flow**
➢ Domestic Spread	**Mutual causality**	Non-traded causes domestic spread	**Mutual causality**	**Mutual causality**
➢ External Spread	**No causality**	**No causality**	**No causality**	**No causality**
Capital flow				
➢ Domestic Spread	**Mutual causality**	**Dom. Spread causes capital flow**	**No causality**	**No causality**
➢ External Spread	**External spr. causes capital flow**	**External spread causes capital flow**	**External spread causes capital flow**	**External spread causes capital flow**
External Spread				
➢ Domestic Spread	No causality	**Dom. spread causes external spread**	**Dom. spread causes external spread**	**Dom. spread causes external spread**

Results are accepted at the 5% significance level. Shaded areas show the stable causality relationship.