IJBESAR

International Journal of Business and Economic Sciences Applied Research 9(1): 57-68

http://ijbesar.teiemt.gr

The Nonlinear Analysis of External Dynamics on Economic Growth: The Case of Turkey

Sinem Pınar Gürel[1] and Aykut Lenger[2]

[1]*Pamukkale University, Department of Economics, pgurel@pau.edu.tr*

[2] *Ege University, Department of Economics, aykutlenger@ege.edu.tr*

Abstract:

Purpose *- This paper attempts to analyse the empirical link between economic growth and the external shocks in a small open developing economy, Turkey, focusing on the nonlinearity between the dynamics for the 1992-2011 period.*

Design/methodology/approach *- This paper examines the effects of trade and financial openness and oil price, the most important trading partners' GDP growth as well as for external dynamics of economic growth. To this end, this paper employs a Structural VAR (SVAR) and a nonlinear Markov-Switching VAR model. We examine the nonlinearity to let the effects of the external dynamics vary with the level of economic growth.*

Findings *- The results suggest the external dynamics considered in this paper- namely trade and financial openness, oil prices and growth rate of Germany-initially explain 29 % of economic growth in Turkey, according to the linear estimation method. In the long run, this percentage climbs to 51 %. The nonlinear analysis shows that the magnitude of the effect of the external dynamics in recession periods is almost twice as high as in expansion.*

Research limitations/Implications- *This paper provides first attempt of the nonlinear analysis of the growth- external dynamics for Turkey, future research effort is required to substantiate our findings.*

Originality/value *– The originality of this paper lies in the finding that the effects of external dynamics on economic growth differs according to the growth stage as the economy is in the expansion period or recession period.*

Keywords: *Economic Growth, External Dynamics, Nonlinear Estimation, Turkey*

JEL Classification: O40, C34, F14

1. Introduction

The economic performance of countries has increasingly been exposed to external dynamics for a few decades due to the ever increasing globalization process. Traditionally, the theories of economic growth focus on the internal dynamics of a closed economy such as physical and human capital accumulation and technological change. However, in such an economic design of the world economy, external dynamics may play a significant role in the income level of countries. Thus, the cross-border flow of commodities, financial capital, and investment, as well as economic shocks transmitted through these channels, are now in the scope of economic analysis in addition to internal determinants of economic performance. One can add the price of oil to this list as it also acts as an external dynamic for non-oil economies in which oil is the primary input for production.

It is not surprising that being exposed to external dynamics brings opportunities and threats simultaneously for economies; especially for developing ones. The effects diversify for countries with different levels of development. For example, financial capital flows are expected to improve the current account balance and boost investments in an economy in which such outcomes are greatly needed in many developing economies. However, these flows also increase the dependency of an economy on external funds, making it vulnerable to any external dynamics, and in such a dependent economy may expedite economic turmoil.

Therefore, a growing empirical literature is addressing the links between openness and growth. Not surprisingly, there is no common view about the effect of these mentioned dynamics on the growth performance of a country in the literature. Some authors report that openness positively affects growth (eg. Dollar, 1992; Edwards, 1993, 1998; Barro and Sala-i Martin, 1995). On the other hand, Levine and Renelt (1992), and Rodriguez and Rodrik (1999) found that there is no positive relation between openness and growth. The direction of cause between these dynamics and growth, i.e. from the external dynamics to growth, or vice versa, is also discussed and inferences in both directions made. For example, Jung and Marshall (1985), found unidirectional causality from exports to growth. Chow (1987), found bi-directional causality for growth and trade openness. Yücel (2009), examined the causality between financial openness, trade openness

and growth and showed the bi-causal relationship between these dynamics.

The existing literature provides a partial analysis of the relationship between external dynamics and economic growth, i.e., the effect of foreign investment on economic growth. Furthermore, a linear relationship between the variables was assumed. However, the relationship under consideration may well be of a nonlinear character rather than a linear one, and thus exhibit diverse effects in recession and expansion periods. So, this paper was motivated by the need for a full account of nonlinear analysis of external dynamics on economic growth both in recession and expansion in a developing country, i.e. Turkey. The objective of this paper is to set out how external dynamics are effective on the growth performance of Turkey and to draw attention to the threats these dynamics involve as well as the opportunities. The data used in the study covers 1992-2011 and was retrieved from International financial statistics and the Central Bank of Turkey.

The plan of this paper is as follows: The next section provides a brief review of the relevant theoretical and empirical literature about the relationship between growth and external dynamics. The third section - the empirical contribution of the paper - presents the methodology, the data set, and the results of the empirical analysis. Both linear and nonlinear econometric results are presented to clarify the need for a nonlinear analysis. The last section discusses extensions and concludes.

2. Theoretical Background

The effects of external dynamics on an economy will be directly dependent on the degree of openness of the economy. Traditionally, openness used to be defined only in terms of the trade regime followed by a country, i.e., inward or outward oriented. Following the late 1980's, economies liberalized their capital accounts and removed the barriers in front of financial capital movements across borders. The openness of an economy thereby gained another meaning. Thus, a new definition covering both meanings of the term can be suggested for developing economies in particular: The openness of an economy means the degree of its integration with other economies, and the extent to which it is addressing shortage or surplus in its domestic supply or demand of goods, services and funds by employing external resources. Openness is potentially expected to contribute to economic growth since it removes shortages by providing a higher level of integration in capital and goods markets. Given the definition of the concept above, this may resolve disequilibrium in a market and thus improve the functioning of markets.

The classical and neoclassical theories emphasize the importance of trade in terms of output growth. To the proponents of these theories, foreign trade not only increases the level of output and welfare, but also results in optimal distribution of resources. Endogenous growth theories have also elaborated that openness to trade may increase economic growth through the diffusion of technology. It is argued that countries that are more open to the rest of the world have a greater ability to absorb technological advances generated in leading nations (Edwards, 1998)[1]. Specifically, trade openness is associated with the *Export-Led Growth Model* and it was considered to be the most important source of economic growth through several channels: the first, trading firms and trade sectors provide positive externalities to non-exporting sectors through production techniques and management styles (Feder, 1982); the second, as trade enhances, output and productivity increases due to the economies of scale (Helpman and Krugman, 1985). Free trade will also facilitate the import of intermediate goods (Esfahani, 1991). The effects of these channels on economic growth are also supported by endogenous growth theories (Lucas, 1988; Romer, 1986; Grossman and Helpman, 1991; Edwards, 1992). Third, trade openness will also create positive externality by providing knowledge spill-overs between countries and this will then increase efficiency in production (Miller and Upadhyay, 2000).

Given these remarks, international institutions like the IMF, OECD, UN and the World Bank had a consensus in their strategy and policies relying on openness contributing to the economic growth process. According to the IMF (1997, p.84), 'policies toward free trade are among the more important factors promoting economic growth and convergence in developing countries'. According to the OECD (1998), more open and outward-oriented economies have displayed better performance than countries with restrictive trade and foreign investment regimes. Similarly, while the World Bank (2000), argues that international trade provides unique opportunities for growth and development, the United Nations (UN 2002), emphasizes that foreign direct investment contributes toward financing sustained economic growth in the long term (Cieslik and Tarsalewska, 2011).

Although trade openness is regarded as a beneficial regime for economies, the detrimental effects it may create are also discussed in the literature. For example, free trade may also restrain the development of infant industries (List, 1841). The competitiveness of multinational enterprises is incomparable with those of incumbent and entrant domestic firms in a host economy. So, entrant domestic firms can be pulled out of the market before they reach the cost advantages provided by economies of scale. Incumbent firms can also go out of business as the acquired cost advantages may not be sufficient to compete with the imported products of multinational firms. So, these arguments point out a condition for free trade to be beneficial. There must be internationally competent industries or

[1] On the other hand, protective policies such as infant industry arguments, anti-damping, balance of payments, and protection against unemployment were also defended on the grounds that they will improve economic growth in developing countries (List, 1841; Balassa, 1971; Bhagwati, 1988).

firms for positive effects on growth to be created by free trade. Also, entrant firms must equally be competitive.

Despite the strong positions taken by international institutions, the relationship between openness and economic growth has continuously been one of the most controversial empirical issues in international economics and growth literature over the years. Preceding studies in this issue, both theoretical and empirical, diverge significantly in terms of their results. Not surprisingly, the differences in the results of these empirical studies can be attributed to the use of different openness definitions and econometric methods. Many studies provide evidence that openness positively affects economic growth (Dollar, 1992; Edwards,1993; Sachs and Warner, 1995; Frankel and Romer, 1999; Levine and Loayza, 2000; Wacziarg, 2001; Yanıkkaya, 2003; Singh, 2003; Utkulu and Özdemir, 2004). Michaely (1977), by investigating the relation between openness and growth for forty-one countries, and Balassa (1978) - for eleven countries - reported a positive relationship between trade openness and output growth. Later, Feder (1982), showed that trade affects growth through externalities and productivity for thirty-one countries. With the trade liberalization wave in the 1980s, trade openness and economic growth attracted much more attention in the literature. Dollar (1992), Edwards (1998), Greenaway, et al. (1998), Sachs and Warner (1995), and Vamvakidis (1998), have shown that trade barriers and protections reduce growth rates in cross-country comparisons (Arora and Vamvakidis, 2004). On the other hand, Levine and Renelt (1992), and Rodriguez and Rodrik (1999), provide no evidence for the positive effect of openness on economic growth. Rodriguez and Rodrik (1999), also criticized the robustness of the positive results reported by some of the studies, arguing that some important determinants of growth were not controlled and the openness measure used was not proper.

The other dimension, the financial openness, consists of policies which aim at removing the barriers in front of the inflow and outflow of funds across economies. Financial openness is regarded as the complementary step to free trade to fully liberalize an economy as it also contributes to trade by increasing the opportunities for financing trade activities. Financial liberalization decreases the cost of capital for domestic firms and develops the domestic financial sector. Financial liberalization allows world sources to be distributed more effectively by directing capital from developed countries to developing ones (Mathieson &Rojas-Suarez, 1994). In addition to this, financial liberalization and openness decrease the cost of borrowing because they ease access to the international financial markets.

Although it has charming benefits, both the risks and the costs brought by financial openness have become the focus of empirical studies due to the recent global crisis and to the idiosyncratic crises in some developing economies. The liberalization period of capital markets has seen a sharp increase in the varieties of capital investments and borrowing. While commercial bank loans had the highest share in capital markets in the 1970s, portfolio investments represented the highest share in the 1990's. With this increase in the share of portfolio investments in international capital markets, the character of economic crises has changed. Financial flows, which facilitate financing opportunities, have encouraged developing economies to run ever-increasing deficits in their accounts. The financial flows, which were expected to support growth, thus put a limitation on the sustainability of the growth process in these economies as the deficit could not be financed by the Ponzi game. The dependency of developing economies on foreign funds increases and in any case of insecure environment for financial capital arising from internal developments leads to a sudden outflow of funds triggering financial turbulence. So, Rodriguez and Rodrik (1999), argued that openness is not appropriate for economies without proper regulation mechanisms, and it can actually be detrimental in economies with macroeconomic instability.

Empirical evidence on the links between financial openness and growth is also inconclusive. The empirical literature on financial openness reflects both of the arguments outlined above. Liberalising capital account and international capital flows promotes economic growth in some countries but it also causes financial crisis in some countries by increasing the vulnerability of economies. Edwards (2001), proposed that the relationship between growth and liberalization differs according to the income rate of countries. While there is no effect of liberalization on growth in low-income countries, there are significant positive effects in high-income countries. Similarly, Klein and Olivei (1999), found that financial openness has a tendency to reduce growth in countries that are not industrialized. Tornell et al. (2004), document the empirical relationship between financial liberalization and the increased incidence of financial crises. Hoeven and Lübker (2006), showed that foreign capital flows cause economic volatility and this volatility causes both financial and economic crises in developing countries. Aizenman (2002), on the other hand, inferred weak evidence that financial openness increases the risk of financial crisis and that it has positive contributions on long-term growth performance.

External Shocks and Economic Growth

External shocks, to which an open economy may be exposed, can be collapsed into two groups: demand-side and supply-side shocks. The former consists of shocks which affect the growth of both domestic and foreign demand. Exchange rate movements, changes in the terms of trade, and economic downturn in trading partners are examples of demand-side shocks. For example, a sudden change in exchange rates will affect export demand, and thus labor demand, output level, and other sectors through backward and forward linkages. Changes in growth rates of trading partners will also affect trade within both goods and service sectors. Government policies affecting demand, i.e., monetary or finance policy, can compensate the effects of shocks. Supply-side shocks, on the other hand, originate from other countries, not necessarily trading

partners, and affect domestic costs. The oil crisis in 1974 is most commonly referred to supply side shock.

External shocks can be positive or negative depending on their effects on growth performance and macroeconomic stability. While discovery of a new technology decreasing the cost of production has a positive effect on growth, an increase in oil prices has a negative effect. Interestingly, the effects of these types of shocks on domestic growth are not always symmetric. The effects of negative shocks may outweigh those of positive shocks. Collier and Dehn (2001) report a sharper finding: although negative shocks reduce the growth rate, positive shocks have no significant effect.

The relevant literature focusing on developing countries deals also with terms of trade, GDP of industrialized countries, real interest rates in international capital markets, natural disasters in other countries, growth rates of trading partners and changes in oil prices. Easterly, et al. (1993) showed that a large proportion of the growth rate is explained by external shocks[2]. Calvo, et al. (1993) showed that in Latin American countries real exchange rates are significantly affected by external shocks.

The external shock is approximated by sudden changes in four variables in the literature thereafter:

GDP shocks in trading partners; affects the growth rate of open economies. Financial and monetary crisis, recession, increase in foreign debt and unemployment in the trading partners can cause the domestic demand to shrink. In a similar way, positive economic developments in trading partners will contribute to domestic growth positively by increasing the demand in trading goods. Arora and Vamvakidis (2004) showed that a 1% increase in economic growth of a trading partner is correlated with an increase in domestic growth of 0.8 %, at most.

World interest rate; is also an effective factor on domestic growth. Köse (2002) found that shocks in the world interest rate explain 1% of changes in the output in the developing countries, while Blankenau, et al. (2001) suggest that one-third of output volatility is explained by the world interest rate in small open economies.

Terms of trade; is another important external variable, changes in which can be classed as an external shock. Broda (2004) argued that shocks arising from terms of trade have a greater effect on actual output in countries with a fixed exchange rate policy. Mendoza (1995) and Kose (2002) suggest that terms of trade shocks explain half of aggregate output fluctuations in developing countries. In spite of this, Deaton and Miller (1996) and Hoffmaister et al. (1998) found that a small proportion of output fluctuations stem from changes in terms of trade.

Oil shock; casts its effects on economies through two channels: First, oil prices affect the cost of production for oil importers. Second, it may decrease real GDP through a structural change. Higher oil prices result in a withdrawal of resources from industries which use oil heavily as an input and in a reallocation to those with less dependence on oil (Brown and Yucel 1999). This is called production cost effect. Many empirical studies support the negative relationship between oil shocks and growth (Gisser and Goodwin 1986; Rotemberg and Woodford 1996).

External shocks significantly (and generally negatively) affect growth performance, stability and the sustainability of debts in economies. Low-income countries especially have a structure which is more vulnerable to external shocks (IMF 2003; World Bank 2004a, 2004b; UNCTAD 2002). To Balassa (1978), even though external shocks negatively affect developing countries following an outward-oriented development policy more than those following an inward-oriented development policy, the development performance shown by open economies balances the negative effects. Developing economies are in a more disadvantageous position than developed ones in the face of external shocks due to their product specialization, non-diversified sources of income, incomplete financial markets, unstable policies, and weak institutions (Calderon et al. 2004,). Besides, the protection of developing industry has become more difficult in open countries. Small-scaled enterprises in developing countries are forced out of business because they cannot resist the strong competitive environment. In brief, vulnerability may be a much more important factor than removing shortages, especially for developing countries.

3. Empirical Analysis

This paper primarily employs a nonlinear structural VAR (SVAR) analysis of the external dynamics of economic growth in Turkey, as a case of an upper middle income country. However, for benchmarking purposes, the results of a linear analysis are also presented. The analysis uses quarterly time series data retrieved from International Financial Statistics and the Central Bank of the Republic of Turkey (TCMB) databases which cover the 1992-2011 period. The data set includes the following series: the industrial production index *(IPI)* as a proxy for GDP, the trade openness *(TAO),* the financial openness *(FAO),* and - adopted as external shock variables - the GDP of Germany as the largest trading partner of Turkey *(GGDP)* and World real oil prices *(ROP)*. We use the natural logarithm of the relevant variables[3], thus their first differences reflect the rate of change of each variable. A detailed description of these series can be found in Appendix 1.

A Linear Model

The time series properties of the variables should be examined before setting up the SVAR model. ADF, DF-GLS and PP tests were used to test the presence of unit root in the series. According to results of these tests, financial openness is stationary while the other variables are not. *IPI, TAO, ROP, GGDP* are integrated

[2] The changes caused by war and debt crises were also considered as external shocks.

[3] Except for the financial openness as this variable has negative values.

of order 1 *(I(1))* and FAO is order 0 *(I(0))*(see also Appendix 2).So, we need to eliminate unit roots by taking first differences of the non-stationary series.

An SVAR model is constructed initially by running a reduced form of VAR model. To this end, optimum lag lengths for the estimated VAR model should be determined. The optimal lag length for the VAR model was determined as 2 by using various model selection criteria, such as LR, FPE, HQ and AIC. An autocorrelation problem was not detected in the model with two lag by using Lagrange Multiplier (LM) test. Also, the stationary property of the model is assured as the inverse of the roots lie outside the complex unit circle.

Industrial Production Index *(IPI)* was considered as purely endogenous, trade openness *(TAO)* and financial openness *(FAO)* were considered as endogenous, and oil prices *(ROP)* and GDP of Germany *(GGDP)* were considered as exogenous variables in the estimated model. *ROP* variable is in the first row of the long-run matrix. Thus, while oil prices are not affected by other variables in the model, this variable affects all the other variables. In a similar way, the economic growth rate of Germany is also in the second row of the matrix. GGDP will be affected only by its shock and shocks of oil prices but not affected by the shocks in the other variables, and so on. This taxonomy of the variables can be explained on the basis of the following rationale: Small economies do not have the power to affect the macroeconomic variables that are determined in the world markets. So, the growth rate of Turkey, trade and financial openness lack the power to affect the oil prices in the world and the growth rate of Germany. The VAR model in terms of structural shocks is illustrated in (1).

$$\begin{bmatrix} \Delta ROP \\ \Delta GGDP \\ FAO \\ \Delta TAO \\ \Delta IPI \end{bmatrix} = C(L) \begin{bmatrix} \varepsilon_{ROP} \\ \varepsilon_{GGDP} \\ \varepsilon_{FAO} \\ \varepsilon_{TAO} \\ \varepsilon_{IPI} \end{bmatrix} \quad (1)$$

Equality (1) can also be written as

$$\begin{bmatrix} \Delta ROP \\ \Delta GGDP \\ FAO \\ \Delta TAO \\ \Delta IPI \end{bmatrix} = \begin{bmatrix} C(1) & 0 & 0 & 0 & 0 \\ C(2) & C(6) & 0 & 0 & 0 \\ C(3) & C(7) & C(10) & 0 & 0 \\ C(4) & C(8) & C(11) & C(13) & 0 \\ C(5) & C(9) & C(12) & C(14) & C(15) \end{bmatrix} * \begin{bmatrix} \varepsilon_{ROP} \\ \varepsilon_{GGDP} \\ \varepsilon_{FAO} \\ \varepsilon_{TAO} \\ \varepsilon_{IPI} \end{bmatrix} \quad (2)$$

Impulse-Response Analysis and Variance Decomposition

In order to illustrate the short term responses of models, we estimated the Impulse-Response Functions *(IRF)* for structural shocks. The sizes of shocks applied to VAR systems are traditionally measured in two ways: either as a unit or a standard deviation shock to the error. In this paper, we adopted the one standard deviation shock. As oil prices and the growth rate of Germany will not be affected by the shocks observed in the remaining variables, the responses of these variables to the shocks appearing in *TAO, FAO, IPI* were accepted as 0 in the long term matrix.

The effects of world oil price shock on the growth rate of Turkey are shown in Figure 1. The oil price shock affects Turkey's growth rate very rapidly. This expected effect can be explained by the supply-side shock argument increasing costs in the Turkish economy, which is heavily dependent on oil. However, after some time, as 3 quarters elapse, the effect disappears. The growth rate increases again after price adjustments. However, it is remarkable here that a one- unit shock in oil prices decreases the growth in Turkey more than the one unit. On the other hand, a shock in economic growth in Germany positively affects economic growth in Turkey for nearly 5 quarters. The figure below shows that this effect starts to decrease in 2 quarters. The long-run growth rate in Turkey is attained in almost 8 quarters. As a result of a shock in the *FAO*, the growth rate of Turkey follows a fluctuating pattern. Although the growth rate responds negatively to the shock in the first two quarters, the response is positive thereafter. The effect of *FAO* shock totally disappears in the long-run. This can be explained by short-term financial capital movements. In a sudden outflow of financial capital, the growth rate sharply decreases and recovers in 2 quarters. A shock in the *TAO* has a positive but declining effect on growth in the short-term (4 quarters). Afterwards, the effect turns into a negative one. The long-run rate is assured in 9 quarters. The magnitude of the negative effect is much smaller than the positive effect even though both effects have equal durations.

The effects of all shocks on the growth rate of Turkey disappear in the long-run and growth approaches its balanced level in 2.5 years (on average). The variance decomposition of forecast errors is illustrated on Table 1. Table 1 clearly indicates that the effects of all shocks will disappear in around 12 quarters at most. Therefore, the results of variance decomposition are presented for 12 periods.

Figure 1 - The Impulse – Response Functions

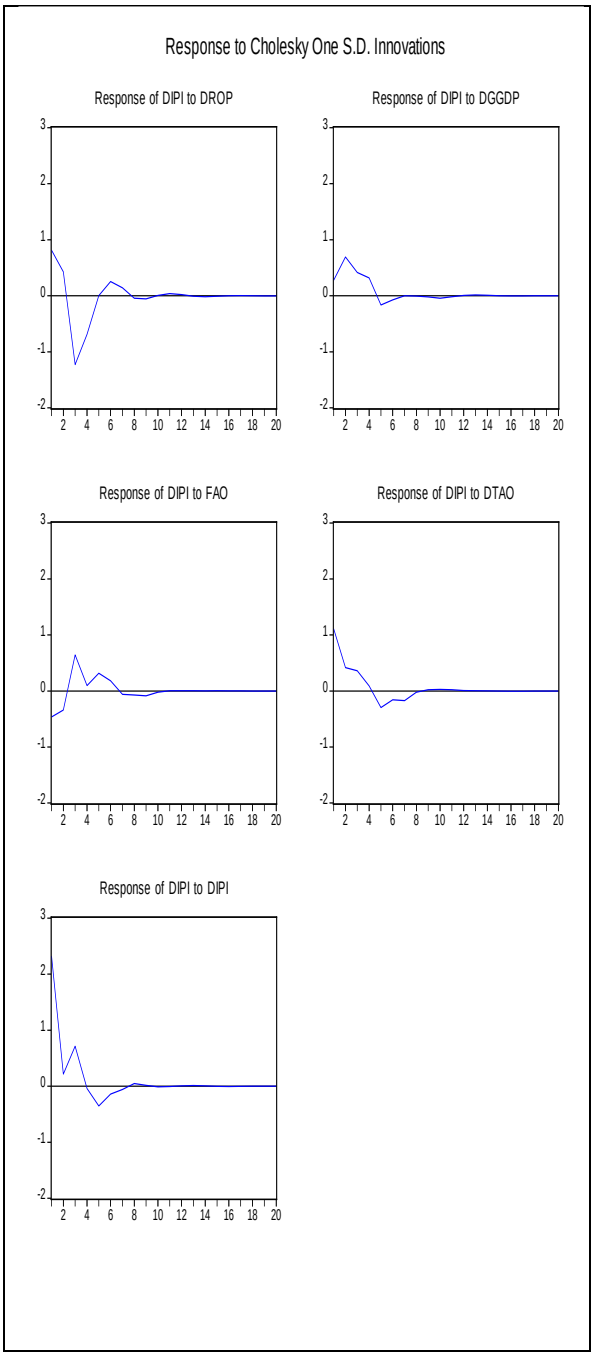


Table 1*Variance decomposition analysis*

Time	*ROP*	*GGDP*	*FAO*	*TAO*	*IPI*
1	8.77	1.01	2.823	16.28	71.12
2	9.89	6.49	3.83	16.42	63.37
3	20.83	6.46	6.56	13.61	52.54
4	23.76	7.00	6.31	13.00	49.93
5	23.10	7.03	6.96	13.35	49.56
6	23.35	6.99	7.14	13.39	49.13
7	23.40	6.95	7.14	13.56	48.94
8	23.40	6.95	7.17	13.56	48.92
9	23.40	6.95	7.23	13.55	48.87
10	23.40	6.96	7.23	13.55	48.86
11	23.40	6.96	7.23	13.55	48.85
12	23.41	6.96	7.23	13.55	48.85

71 % of the forecast variance in the growth rate can be attributed to its own variances in the first quarter. This means that the source of the changes is the dynamics of the growth itself. Following the first quarter, this effect decreases gradually and it recedes to 49 %. After the fourth quarter, the growth reaches the long term balanced path. Thus, approximately, 48 % of the change in the growth performance of Turkey is attributed to its own dynamics. The most important second source defining the growth is the trade openness of Turkey. *TAO* explains 13.5 % of the change in the growth. Shocks in the *ROP* and *GGDP*, as external shocks, explain the growth performance significantly: around 30 % of the changes in the growth rate in the long-run.

A Nonlinear Model

The nonlinear analysis employs a *MS* (Markov Switching)-*VAR* model. All *MS-VAR* specifications were tested in order to determine the appropriate specification and tested versus the linear model. The optimal lag length was determined as 2 by using the *Hannan-Quinn (HQ)* and *Schwarz Criterion (SC)*. *MSIH(2) – VARX(2)* models were preferred in the analysis since the intercept and the variance had changed in MSIH-VARX models for every regime and so it provides more reliable results than the other specifications in the post-estimation statistics tests. The *MSIH (2)-VARX (2)* model represents 2 regimes in which the intercept and variance with two lags change. *GGDP* and *ROP* have been added to the model as external variables. In addition, *LR* linearity test and *Davies* test which are testing the linear model versus the nonlinear model was calculated. While *LR* statistics test the model with 2 regimes versus the linear model, it does not test the model with 2 regimes versus the model with 3 regimes. Thus, *Davies* test was developed and used for this purpose. This test suggests that the *MSIH(2)-VAR(2)* model is the most appropriate model. The MSIH(2)-VARX(2) model provided more appropriate estimation results for the explanation of the regimes in the Turkish economy and the responses shown to the shocks in different regimes. In other words, the nonlinear model is valid[4].

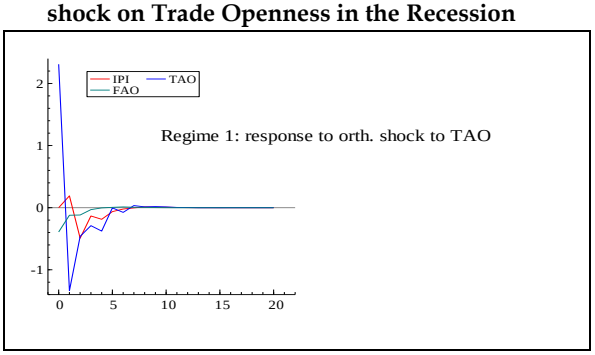
Appendix 3 shows smoothed and filtered regime probabilities. Smoothed probability is the optimal inference of the turning points on the regime at time *t* using the whole sample information. On the other hand, filtered probability is the optimal inference on the state variables at time *t* by using the information at the current period only. The periods for which smoothed probabilities of the economic variables are below 0.5

[4] Normal distribution of standard errors of the model and autocorrelation were also tested. The results and the tables can be supplied, if required.

signal a recession regime, whilst the periods for which the probabilities are above 0.5 identify an expansion regime (Hamilton, 1989). The growth rate of Turkey is illustrated in the top panel of Figure 2. The panel implies that the first regime represents "recession" and the second regime represents "expansion" in the whole sample period[5]. The probability of growth rate fell below 0.5 in regime 1 (recession) which was experienced caught in 1998, 2001 and 2008 (the first two are economic crises experienced in Turkey and the latter refers to the global crisis). The output decreased around the rates of 6 to 9.5 % in the 1994, 1998 and 2001 crises. While constant parameters belonging to both regimes take negative values in the recession; they take positive values in the expansion. This, having opposite signs in the two regimes, shows that the model has asymmetric structure and implies that it also has a nonlinear structure. The *MSIH(2)-VARX(2)* specification captures the asymmetry and the periods of crisis in the Turkish economy.

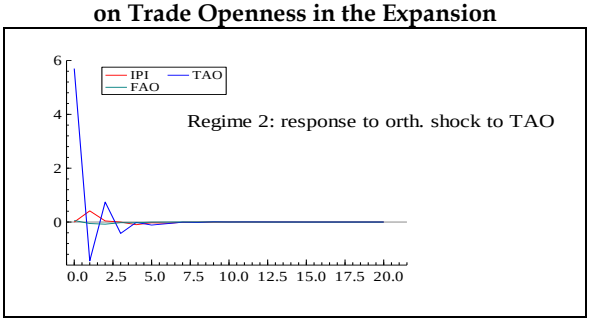
The estimated *MSIH (2)-VARX (2)* model examines the effects of the dynamics of each regime separately. The impulse response functions were employed to analyse the effects of shocks[6] on the growth rate of Turkey. The effects of *TAO* shock in Regime 1 are shown in the Figure 2. In the recession regime, the growth responds slightly positively to the shock in first two periods, but negatively after a while with a rapid decrease. In approximately seven quarters, the growth rate returns to the long-run equilibrium. This can be explained by the fact that the structure of the Turkish economy is highly imported input intensive. An increase in the foreign demand for domestic goods slightly induces domestic production and increases the growth in the first period. But increased production requires more imported input which leads to negative effects on the growth in the next periods. Because when the import increases for the aim of to sustain production, current account deficit occurs. The deficit begins with cyclical but in the long run it takes a structural form because it exists even at the high point of business cycle. This leads to country more fragile.

Figure 2 - Impulse Response Function to a shock on Trade Openness in the Recession



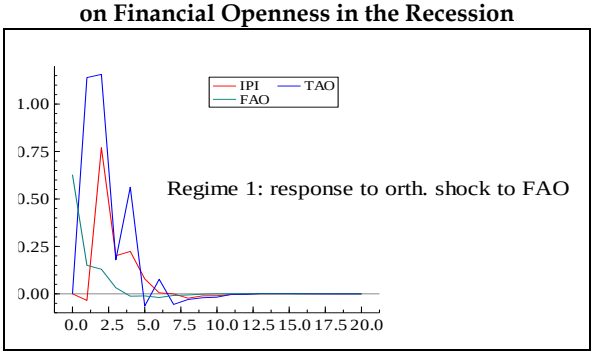
The effects of trade openness shock in Regime 2 (expansion) are shown in Figure 3. The response of the growth rate to a shock in trade openness is different than that of the same shock in the recession regime. While the growth responds negatively to the shock in trade openness in the recession regime and decreases rapidly, in an expansion regime it does not always respond negatively and the effect of the shock is not very deep. Although it responds by decreasing for a while (only 1 quarter) in the expansion period, it does not drive the growth rate into negative values. The economy appears to be more resistant in the face of shocks in expansion periods compared to the recession periods. On the other hand, the effects of the shocks in recession periods take a much longer time than in expansion periods. The effect of the shock on the growth dies out in almost two quarters in the expansion period.

Figure 3 - Impulse Response Function to a shock on Trade Openness in the Expansion



The effects of *FAO* shock in Regime 1 are shown in Figure 4. The growth rate responds to the shock positively in first three quarters with a rapid increase. Then, it reacts negatively by following a fluctuating path. In the recession regimes, financial capital inflows affect the growth positively, though for a short period of time. The short-run financial flows help the economy to recover to a certain extent in the crisis period. The growth will exhibit the dynamics of recession periods as financial investment leaves the country at the end of 3 quarters. The financial openness shock is more effective than the trade openness shock in the recession regime of the economy.

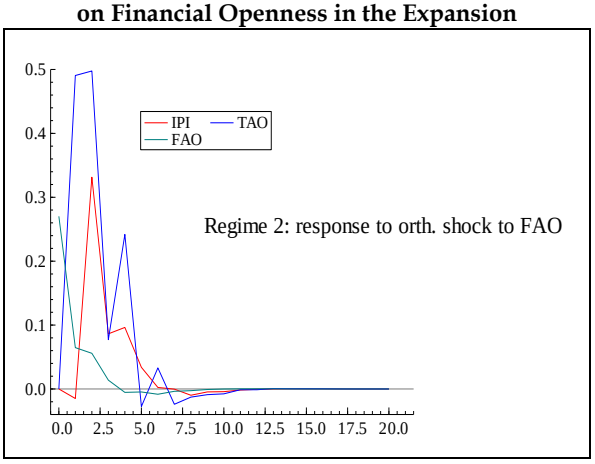
Figure 4 - Impulse Response Function to a shock on Financial Openness in the Recession



[5] Statistical properties of the smoothed and predicted errors can be supplied, if required.

[6] The nonlinear model does not provide the effects of shocks of exogenous variables, therefore we only present the effects of trade and financial openness on the growth.

Figure 5 - Impulse Response Function to a shock on Financial Openness in the Expansion



The effects of the shock in financial openness on the growth rate of Turkey are displayed in Figure 5 in the expansion period. The response of Turkey's growth rate to the shock is very similar to the response in the recession period. The effect of the shock dies out after eight quarters in the expansion period. The growth follows a fluctuating path against the shock in the financial openness. While financial capital inflow provides a relieving effect initially in the economy (the period when growth responds positively to the shock), growth shows negative effects in the following periods. When the length of fluctuating cycle can be explained by capital inflow, it is seen that one period lasts 3 months. This can be explained by the duration of capital inflow in the country.

4. Conclusion and Discussion

The external dynamics considered in this paper - namely trade and financial openness, oil prices, and growth rate of Germany - initially explain 29 % of economic growth in Turkey, according to the results of the linear estimation method. This percentage climbs to 51 % in the long-run. The highest effect was observed in the trade openness: 16 % in the first period, decreasing to around 13 % in the long run. Oil prices explain around 9 % of the growth of industrial production in the first period, but in the long-run this percentage increases to 23 %. The effects of financial openness and growth of the most important trade partner remain relatively limited. In the long-run, both of these dynamics explain around 7 % of industrial production growth. These findings imply that in the long-run one third of Turkey's growth performance is dependent on oil prices and imports and exports.

However, the results of the nonlinear model turned out to reflect the dynamics of growth in Turkey better than the linear model. The effects of trade openness on growth are different in terms of duration in the recession and the expansion periods. The effect of foreign trade share on the growth of industrial production suddenly turns into a negative effect and remains in the negative region until it disappears in around 7 periods. However, the positive effect in the expansion period only lasts around 2.5 periods. We observed no effect on the financial openness in the expansion period, but in the recession period there is a negative effect which lasts 3 periods. Interestingly, the direction of the effects of financial openness and trade openness on growth does not differ very much between the expansion and recession periods, but the amplitude of it differs. The magnitude of the effect in the recession period is almost twice as high as in expansion, as the need for financial resources in recession periods is severe.

Developing countries are almost equally as prone to external dynamics that are not under the control of domestic economy policymakers as they are to internal dynamics. As a matter of fact, open developing economies are simultaneously experiencing advantages and disadvantages of open economy policies. Trade openness explains a significant part of economic growth in Turkey but this is only a part of the reality. Trade openness, i.e. foreign trade share in GDP, includes both exports and imports. A positive effect of trade openness arises not only from the contribution of exports, but also from imports of intermediate inputs and raw materials that are used in the domestic production process. In fact, the latter seem to play a greater role in the recent increasing growth performance of Turkey. In other words, the growth in Turkey is dependent on imported input and this has some ramifications in terms of both deficits and the poor quality of domestic value added creation.

The current account balance deterioration accompanied the recent growth performance of Turkey. This, in turn, caused the deterioration of financial deficit, which is covered by financial capital inflows into the country. Financial capital movements facilitated imports of intermediate inputs not only by providing such a mechanism, but also by causing the revaluation of local currency and thereby a decrease in the real prices of imported inputs. In this global environment, new investment decisions are also easier to make due to free capital movements across borders. Thus, it is not surprising to obtain a positive effect of financial openness on growth.

It is very well known fact that such a growth policy - i.e. relying on a high amount of imported inputs and financial inflow - creates a fragile macroeconomic structure given the poor quality domestic value added creation. Any minor development that makes financial capital insecure results in a sudden outflow and a crash of the economy. The observed declines of GDP in 1998, 2001, and 2008 in Turkey can be explained on the grounds of this fragility. Therefore, the growth performance of an economy dependent not only on imported inputs but also on financial inflows, like Turkey, seems to be fragile, and in the long-run the sustainability of the expansion of the economy is insecure. These results show that openness is both an opportunity and a threat at the same time for a developing country like Turkey. Therefore, managing the threats created by a global economic environment seems to be equally as important as managing the opportunities.

References

Aizenman, J., 2002, 'Financial opening: evidence and policy options', *NBER Working Papers* No. 8900, National Bureau of Economic Research.

Arora, V., & Vamvakidis, A.,2004, 'How much do trading partners matter for economic growth? '*IMF Working Paper*, WP/04/26.

Balassa, Bela and associates, 1971, *The Structure of Protection in Developing Countries*, John Hopkins University Press, Baltimore.

Balassa, B., 1978, 'Exports and economic growth: further evidence', *Journal of Development Economics,* 5, pp. 181-189.

Barro, R. J., and Sala-i-Martin, X., 1995, *Economic Growth*, McGraw-Hill, Inc., Singapore.

Bhagwati, J., 1988, *Protectionism*, MIT Press, Cambridge, MA.

Blankenau, W., Kose, M.A., and Yi, K.M., 2001, 'Can world real interest rates explain business cycles in a small open economy?', *Journal of Economic Dynamics and Control* Vol.25, pp. 867-889.

Broda, C., 2004, 'Terms-of-trade and exchange rate regimes in developing countries', *Journal of International Economics* Vol. 63, pp.31–58.

Brown, S. and Yucel, M., 1999, 'Oil prices and US aggregate economic activity: A question of neutrality' *Federal Reserve Bank of Dallas,* 1999Q2, pp. 16-23.

Calderon, C., Loayza, N., Hebbel, K.,2004, 'External conditions and growth performance', *Central Bank of Chile Working papers*, No. 292.

Calderon, C., Loayza, N., Hebbel, K., 2005, 'Does openness imply greater exposure?', *World Bank Policy Working Papers*, No.3733.

Calvo, G., Leiderman, L., Reinhart, C.M., 1993,'Capital inflows and real exchange rate appreciation in Latin America: the role of external factors', *Imf Staff Papers*, Vol. 40, pp.108–151.

Chow, P., 1987, 'Causality between exports growth and industrial development', *Journal of Development Economics,* Vol.26, pp. 55-63.

Cieslik, A., Tarsalewska, M., 2011, 'External openness and economic growth in developing countries', *Review of Development Economics,* 15, pp. 729-744.

Collier, P., Dehn, J., 2001, 'Aid, shocks, and growth', mimeo. *World Bank*, October 2001.

Deaton, A., Miller, R., 1996, 'International commodity prices, macroeconomic performance and politics in Sub-Saharan Africa', *Journal of African Economies,* 5, pp. 99–191**.**

Dollar, D., 1992, 'Outward-Oriented developing economies really do grow more rapidly: evidence from 95 ldcs, 1976-1985', *Economic Development and Cultural Change*, 40, pp. 523–544.

Easterly, B., Kremer, L., Pritchett, L. Summers, 1993, 'Good policy or good luck?: country growth performance and temporary shocks', *Journal of Monetary Economics*, 32, pp.459-483.

Edwards, S., 1992, 'Trade orientation, distortions and growth in developing countries', *Journal of Development Economics*, 39, pp. 31-57.

Edwards, S., 1993, 'Openness, trade liberalization and growth in developing countries', *Journal of Economic Literature*, 31, pp.1358-93.

Edwards, S., 1998, 'Openness, productivity and growth: what do we really know?', *Economic Journal,* 108, pp.383-398.

Edwards, S., 2001, 'Capital mobility and economic performance: are emerging economies different?', *NBER Working Papers*, No. 8076.

Esfahani, H.S., 1991, 'Exports, imports, and economic growth in semi-industrialized countries'. *Journal of Development Economics*, 35, pp.93–116.

Feder, G., 1982, 'On exports and economic growth', *Journal of Development Economics*, 12, pp.59–73.

Frankel, J.A., and Romer, D., 1999, 'Does trade cause growth?', *American Economic Review*, 89, pp. 379-399.

Gisser, M., and Goodwin, T., 1986, 'Crude oil and the macroeconomy: tests of some popular notions', *Journal of Money, Credit and Banking,* 18, pp.95–103.

Greenaway, D., Wyn, M., Wright, P., 1998, 'Trade reform, adjustment and growth: what does the evidence tell us?', *Economic Journal*, 108, pp.1547-1561.

Grossman, G.M., and Helpman, E., 1991, 'Quality ladders in the theory of growth', *Review of Economic Studies*, LVIII, pp. 43-61.

Hamilton, J. D., 1989, 'A new approach to the economic analysis of nonstationary time series and the business cycle', *Econometrica*, 57, pp. 357-84.

Helpman, E., and Krugman, P.R., 1985, *Market structure and foreign trade*, MIT Press, Cambridge.

Hoeven, R. and Lubker, M., 2006, 'Financial openness and employment: the need for coherent international and national policies', *Working Paper*, 75, Policy Integration Department International Labour Office, Geneva.

Hoffmaister, A., Roldos, J., Wickham, P., 1998, 'Macroeconomic fluctuations in Sub-Saharan Africa', *IMF Staff Papers*, 45.

IMF 1997, *World Economic Outlook*, IMF, Washington DC.

IMF 2003, Fund assistance for countries facing exogenous shocks, *Policy Development and Review Department,* IMF.

Jung, W. and Marshall, P., 1985, 'Exports, growth and causality in developing countries', *Journal of Development Economics,* 18, pp. 1-12.

Klein, M.Wand Olivei, G., 1999,'Capital account liberalization, financial dept and economic growth', *NBER Working Papers* No. 7384.

Kose, M.A., 2002, 'Explaining business cycles in small open economies: how much do world prices matter?' *Journal of International Economics*, 56, pp.299-327.

Levine, R., and Renelt, D., 1992, 'A sensitivity analysis of cross-country growth regressions', 82, pp. 942-963.

Levine, R, Loayza, N., Thorsten, B., 2000, 'Financial intermediation and growth: causality and causes', *Journal of Monetary Economics*, 46, pp. 31-77.

List, F., 1841, *The national system of political economy,* Lippincott Co., Philadelphia.

Lucas, Robert E., 1988, 'On the mechanics of economic development', *Journal of Monetary Economics*, 22, pp. 3-42.

Mathieson, D. J. and Rojas-Suares, L., 1994, 'Capital controls and capital account liberalization in industrial countries', in: L. Leiderman and A. Razin (Eds) *Capital Mobility: the impact on consumption, investment and growth*, Cambridge University Press, Cambridge.

Mendoza, E.G., 1995, 'The terms of trade, the real exchange rate, and economic fluctuations', *International Economic Review,* 36, pp. 101-107.

Michaely, M., 1977, 'Exports and growth', *Journal of Development Economics,* 4. pp. 49-53.

Miller, S. M. and Upadhyay, M. P., 2000, 'The effects of openness, trade orientation, and human capital on total factor productivity', *Journal of Development Economics*, 63, pp.399-423.

OECD 1998, *Open markets matter: the benefits of trade and ınvestment liberalization*. OECD, Paris.

Rodriguez, F. and Rodrik, D., 1999, 'Trade policy and economic growth: a skeptic's guide to the cross national evidence' *NBER Working Paper*, No: 7081.

Rodrik, D., Subramanian, A., Trebbi, F., 2002, 'Institutions rule: The primacy of ınstitutions over geography and ıntegration in economic development', *NBER Working Paper*, 9305.

Rodrik, D., 2007, O*ne economics many recipes, globalization, ınstitutions, and economic growth*, Princeton University Press, New Jersey.

Romer, P. M., 1986, 'Increasing returns and long run growth', *Journal of Political Economy*, 94, pp.1002-37.

Romer, P. M., 1992, 'Two strategies for economic development: using ideas and producing ideas', *World Bank Annual Conference on Economic Development*, Washington, DC, The World Bank.

Rotemberg, J. and Woodford, M., 1996, 'Imperfect competition and the effects of energy price increases', *Journal of Money, Credit and Banking*, 28, pp.549–577.

Sachs, J.D., and Warner, A., 1995, 'Economic reform and the process of global integration', *Brooking Papers of Economic Activity*, pp.1-95.

Singh, A., 2003, 'Capital account liberalisation, free long-term capital flows, financial crises and economic development', *Eastern Economic Journal*, 29, pp.191-216

Tornell, A., Westermann, F., Martinez, L., 2004, 'The positive link between financial liberalization, growth and crises'. *NBER Working Paper*, No. 10293.

UNCTAD. 2002, *The least developed countries report 2002: escaping the poverty trap*, United Nations Conference on Trade and Development, Geneva.

United Nations. 2002, *Finaloutcome of the international conference on financing for development*, United Nations, New York.

Utkulu, U., and Özdemir, D., 2004, 'Does trade liberalization cause a long run economic growth in Turkey', *Economics of Planning*, 37, pp.245–266.

Vamvakidis, A., 1998, 'Regional integration and economic growth', *World Bank Economic Review*, 12, pp. 251-270.

Wacziarg, R., 2001, 'Measuring dynamic gains from trade'. *The World Bank Economic Review,* 15, pp.393-429.

World Bank,2000, 'Entering the 21st century', *World Development Report 1999/2000*, Oxford University Press, New York.

World Bank. 2004a, Global monitoring report; policies and actions for achieving the millenium development goals and related outcomes, *The International Bank for reconstruction and Development*, Washington, D.C.

World Bank, 2004b, *World Development Indicators*.

Yanıkkaya, H., 2003, 'Trade openness and economic growth: a cross-country empirical investigation', *Journal of Development Economics*, 72, pp.57-89.

Yücel, F., 2009, 'Causal relationships between Financial development, trade openness and economic growth: the case of Turkey'. *Journal of Social Sciences*, 5, pp. 33-42.

Appendices

Appendix 1

A1: Variables used in the study

Variables	Symbols
Industrial Production Index*	*IPI*
Trade openness (1995=100)**	*TAO*
Financial openness (2005=100)***	*FAO*
Growth rate of Germany	*GGDP*
World oil price index	*ROP*

*Quarterly Industrial Production Index has been used to reflect the growth rate. The correlation between growth rate of Industrial Production Index and growth rate of GDP was calculated as 0,8. The serial has reflected the growth rate because logarithmic value of Industrial Production Index was used and the first difference was calculated.

**There have been many methods for calculating trade openness rate in literature; however, the most commonly used method is 'trade density' in terms of serving the aim. Trade density rate has been calculated as dividing the sum of import and export by GDP (import+export)*100/GDP)). In this study, trade openness rate was calculated as trade density by referring the Aizenman (2004b:1)'s paper.

***Financial openness rate was obtained by dividing total of gross private capital inflow and gross private capital outflow by GDP by referring Aizenman (2004b:1)'s paper ((Gross Private Capital Inflow + Gross Private Capital Outflow))*100/GDP).

Seasonally adjusted series were used in the series of oil prices and growth rate of Germany. The series were purified from seasonality by using TRAMO-SEATS seasonal adjustment method for other series without seasonal adjustments.

Appendix 2

A2:Unit Root Tests

		ADF	**DF-GLS**	**PP**
Level	**Variables**			
Intercept Only	IPI	-0.968 (1)	-0.091 (1)	-0.635 (3)
	TAO	-0.7339(1)	0.713 (2)	-0.675 (2)
	FAO	-6.26949 (0)*	-6.30425 (0)*	-6.2694 (0)*
	ROP	-0.289 (2)	0.057 (2)	0.11 (11)
	GGDP	-0.642555(1)	0.722 (1)	-0.380 (4)
Intercept and Trend	IPI	-3.191(1)	-3.029 (1)	-2.628 (0)
	TAO	-2.092 (2)	-2.106 (2)	-2.244 (2)
	FAO	-6.272422 (0)*	-6.3128 (0)*	-6.2724 (1)*
	ROP	-2.540 (2)	-2.164 (2)	-2.365 (8)
	GGDP	-3.100 (1)	-3.069 (1)	-2.827 (4)
Difference				
Intercept only	ΔIPI	-6.998 (0)*	-5.360 (0)*	-6.826 (5)*
	ΔTAO	-11.362 (0)*	-4.775 (1)*	-11.293 (1)*
	ΔFAO	-12.55444 (0)*	- 11.969(0)*	-20.531 (13)*
	ΔROP	-8.316 (1)*	-8.364 (1)*	-6.957 (26)*
	ΔGGDP	-5.934 (0)*	-4.696 (0)*	-5.928 (2)*
Intercept and Trend	ΔIPI	-6.930 (0)*	-6.520 (0)*	-6.743 (5)*
	ΔTAO	-11.306 (0)*	-5.261 (1)*	-11.24 (1)*
	ΔFAO	-12.47321 (7)*	-12.366 (0)*	-20.348 (13)*
	ΔROP	-8.383 (1)*	-8.247 (1)*	-9.346 (31)*
	ΔGGDP	-5.893 (0)*	-5.514 (0)*	-5.887 (2)*

Notes (1) ***,**,* denotes significance at the 1%, 5% and 10% levels, respectively.

(2) Figures in paranthesis are the number of lags used.

Appendix 3

A3:. Smoothed and Filtered Regime Probabilities