

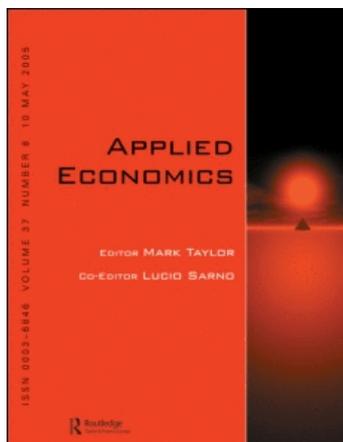
This article was downloaded by: [TÜBTAK EKUAL]

On: 12 January 2009

Access details: Access Details: [subscription number 772815468]

Publisher Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Applied Economics

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title-content=t713684000>

An analysis of the interaction among savings, investments and growth in Turkey

Nurhan Yenturk ^a; Burc Ulengin ^b; Ahmet Cimenoglu ^c

^a Department of Economics, Istanbul Bilgi University, Istanbul, Turkey ^b Faculty of Management, Istanbul Technical University, Istanbul, Turkey ^c PhD Yapi Kredi Bank, Istanbul, Turkey

First Published on: 10 December 2007

To cite this Article Yenturk, Nurhan, Ulengin, Burc and Cimenoglu, Ahmet(2007)'An analysis of the interaction among savings, investments and growth in Turkey',Applied Economics,99999:1,

To link to this Article: DOI: 10.1080/00036840601019000

URL: <http://dx.doi.org/10.1080/00036840601019000>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.informaworld.com/terms-and-conditions-of-access.pdf>

This article may be used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

An analysis of the interaction among savings, investments and growth in Turkey

Nurhan Yenturk^a, Burc Ulengin^b and Ahmet Cimenoglu^{c,*}

^a*Department of Economics, Istanbul Bilgi University, Istanbul, Turkey*

^b*Faculty of Management, Istanbul Technical University, Istanbul, Turkey*

^c*PhD Yapi Kredi Bank, Istanbul, Turkey*

Turkey has been implementing tight fiscal and monetary policies for years. These policies rely on the basic understanding that savings trigger growth and investments. However there are alternative theoretical discussions and empirical findings related to the interaction among these variables. In this study, while one of the purposes is to analyse the interaction among these variables for the Turkish case, the other is to try to bring an insight for other developing countries for the issues such as data production, econometric analysis, and as well as making policy suggestions in line with the evidence from the Turkish case. The findings of this study show that, it is the growth that induces both savings and investments. Hence, it is necessary to question policies that assume it is the savings triggering growth and investments.

I. Introduction

Turkey has been implementing tight fiscal and monetary policies for many years. Relying on the presumption that it is the savings that determine investments and growth, the policies of trying to generate public sector savings by putting constraints on public sector expenditures, decreasing tax rates in order not to hinder private savings, increasing public sector revenues via privatisation, and decreasing the deficits of the social security system have been implemented in recent years. In fact, in the post financial and capital account liberalization period in Turkey (from 1989 onwards), economic growth and sectoral distribution of investments have been basically determined by domestic demand and foreign savings.¹ Due to tight fiscal constraints, on the other

hand, it has been impossible to pursue growth policies that are based on inducing investments in human and physical capital.

The aim of this study is to analyse the interaction between savings, investments and growth in Turkey. The results of the analysis will help to shed on light policy proposals as to which growth strategies should be suggested primarily.

This study is aiming to make three major contributions to the existing literature. First of all, it suggests a simple methodology for producing time series data for private sector savings in developing countries similar to Turkey, in which there is simply no quarterly savings data released officially. Second, it is argued that the tight economic policies that are being implemented in most of the developing countries focusing on increasing savings may not

*Corresponding author. E-mail: acimenoglu@ykb.com

¹For a detailed discussion of these issues, please refer to Ulengin and Yenturk (2001), Yenturk (1998, 2003), Yenturk and Cimenoglu (2003).

have the desired impact on growth and investments. Third, in order to test the above argument, the interaction among savings, investments and economic growth in Turkey will be studied thoroughly, by employing a quarterly vector auto regression (VAR) model.

The first section of the study is devoted to the review of underlying theoretical discussions on the relationship among savings, investments and growth and related policy suggestions on this issue in the economic literature. In the second section, a summary of the findings of the empirical research on the relationship among savings, investments and growth will be presented. In the third section, the data for savings, investments and growth in Turkey will be presented. In Turkey, quarterly investment and economic growth data are readily and consistently available for long enough a time span that can be considered econometrically meaningful. However, it is not possible to argue that it is the case for savings data that are released only in annual frequency. Therefore, in the third section of the study, the methodology by which the quarterly savings data for Turkey have been produced will be introduced. In the fourth section, the interaction among the savings, investments and growth in Turkey will be analysed by using a VAR model that runs from 1989 up to the second quarter of 2003. In this section, the cointegrating relationships among the series will also be investigated, as well as employing a proper vector error correction (VEC) mechanism in order to comply the findings of the model for both the short and the long run. The final section will conclude.

II. Theoretical Underpinnings and Policy Implications of the Savings-Investments-Growth Relations

There is a vast literature on whether savings are influential on determining growth and investments, or savings are just a passive determinate of the relationship. Unlike the pre-Keynesian economists who thought that saving was the autonomous factor in the saving-investment pair, Keynes argued that saving was a passive determinate of the system. To put it another way, Keynesians regarded the investment as the key variable that determines savings and income level.

The neoclassicals, on the other hand, had a fairly standard view on the saving-investment relationship. Within this context, investment decisions of the firms depend on the aggregate income and the prevailing interest rate. Meanwhile, according to the life-cycle

and permanent income models of consumption, income and the interest rates are important factors in determining personal savings. Hence, in the first instance, income level and interest rates are assumed to determine both investments and household savings in the neoclassical school of thought, leaving the question of whether the investments determine savings or vice versa unanswered (Gordon, 1995).

Although in the extreme cases in both approaches – insensitiveness of saving function to changes in interest rates in the neoclassicals, and paradox of thrift in the Keynesiansthere – might be a two-way relationship between savings and investments, in the long-run, neoclassicals assumes that the investments are determined by saving propensities (Marglin, 1987). In case there is a change in propensities of saving, changes in interest rate or amount of savings will determine the warranted level of investment in response. The possibility of autonomous changes in propensities to invest is not considered. Structuralist school of macroeconomics, on the other hand, aims at reviving the traditional Keynesian view on the relationship between investments and saving, by combining the neo-Keynesian and Marxian perspectives on the issue. Structuralists are inclined to accept that investments autonomously stimulate output and saving. Among other factors, the analysis of the roles of distribution of income and developments in finance is crucial in this inclination (Gordon, 1995).

Growth is an important component of the investment-saving relationship. Theoretical discussions on this issue can be summarized as follows: In the neoclassical school of thought, physical capital investments have an impact on growth only in the steady state. In the more recent endogenous growth models, on the other hand, fixed capital investment triggers growth in the long run via its impact on physical and human capital, and technological development (Chenery *et al.*, 1986; Romer, 1986).

The interaction between the savings and growth is generally studied within the analysis of consumption functions. According to the Keynesian consumption function, a greater portion of the income will be saved as the income grows. Unlike the Keynesian approach, life-cycle hypothesis takes the future income into consideration as well. Accordingly, in the initial and final stages of her life, an individual earns only a small amount of income. After the schooling period, income level of the individual increases, before reaching to its maximum in the later stages of her working life. During the years of increasing income, savings of the individual increases, while in the remaining years, income decreases. With unchanged saving rates by age group, higher growth rates would result in higher aggregate savings, as the

rapid growth would drive up the savings of the working individuals who already have higher propensities to save, in comparison to the savings of the retired people whose propensity to consume is higher (Modigliani, 1966; Sachs and Larrain, 1993). However, Tobin (1967) noted that unchanged individual saving rates could only be consistent in this context, if the expectations of future income were not clear. If the working individuals correctly expect that their income will grow in the future, life-cycle hypothesis suggests that their consumption increases. This would lead to a decline in the savings of the working individuals, and consequently the positive effect of higher income on savings could be offset, meaning that the positive correlation between growth and savings might be invalidated. However, liquidity constraint may not allow borrowing today in expectation of an increase in future income, giving support to the argument that current income determines the level of savings (Sachs and Larrain, 1993; Masson *et al.*, 1998).

The view that the savings determine growth and investments is quite important in the sense that it leads to significant economic policy implications. Tight fiscal policies, in particular, are among the most important of these policy implications. The rationale behind tight fiscal policies is the assumption that the budget deficits mean negative public sector savings and such deficits lead to a decline in aggregate savings. If investments and growth are determined by savings, then, the immediate action should be curbing the budget deficits in order to increase aggregate savings.

The nature of the relationship between savings and investments does not only shape the policy of cutting budget deficits, but also determine how the budget deficit will be curbed. It is argued that if it is the savings that determine investments, and if investments are necessary for growth, then budget deficits should be reduced by cutting expenditures, not by increasing the taxes, as higher taxes would negatively affect private savings (Palley, 1996). The aforementioned reasoning leads to the argument that taxes should be cut in order to increase savings. Some of the advocates of this argument even say that the taxes on the high income groups should be cut primarily, as the saving propensities of higher income groups are higher than the rest of the society. The assumption that savings determine investments and growth also has implications on social security systems that are funded by the public sector. As the state-run social security institutions are assumed to have a negative impact on private savings, these institutions should be replaced by privatised pension schemes in order to

allow higher savings, and higher level of investments (Palley, 1996).

Hence, if it is accepted *a priori* that savings is the main determinant of the interaction among saving, investment and growth, then tight fiscal policies take the centre stage in economic policy making. However, if it is the investment that is the main determinant of the system, then economic policies should target increasing investments in physical capital. Finally, if the causality is from growth to savings and investments, then policies that focus on human capital, technological development and ideas should be promoted (Shmidt-Hebbel and Serven, 1997).

III. A Brief Review of the Empirical Studies on Saving-Investment-Growth Relationship

There is a vast literature that focuses on the interaction among savings, investments and growth, although varying in the countries that are included in the research, the periods under investigation, the econometric methods that are employed, or the hypotheses that are tested.

Feldstein and Horioka's seminal paper on the relationship between savings and investment was among the first to note that there was a large correlation between domestic savings and investments in 24 OECD countries that were investigated in the period 1960 to 1974 (Feldstein and Horioka, 1980). Many other studies that were inspired by Feldstein and Horioka's findings confirmed that savings and investments were closely correlated (Dooley *et al.*, 1987; Baxter and Crucini, 1993). In fact, the main interest of these studies was not solely detecting the relationship between savings and investments, but trying to find out whether an economy was open to international capital flows by means of testing this relationship.

Although they give valuable information as to whether savings and investments were correlated, the studies that have been mentioned earlier do not tell much about the direction of the relationship between these two variables. However, in the literature it is possible to find studies that have dealt with the causality between savings and investments as well. Most of these studies are interested in the direction of the relationship between savings and investments because the findings mainly determine the economic policy decisions. For instance, Palley (1996) employs a VAR analysis in detecting the relationship between savings and investments, unlike his precedents who employed classical time series analysis. Palley (1996) argues that, for the period 1947 to 1995 in the

United States (US), an analysis using quarterly data shows that investments are independent of savings. This finding questions the efficiency of saving enhancing policies. Instead, Palley argues, if it is desired to increase capital investments, the economic policy should then directly target investment promoting measures. On the other hand, (Argimon and Roldan, 1994) investigate the causality between savings and investments for France, Spain, Italy, Denmark and Belgium for the period 1960 to 1988, and find out that the causality is from savings to investments.

Gordon (1995) attempts to analyse the saving-investment interaction by including both the neoclassicals' and the structuralists' main variables. His findings for the US show that increasing private savings does only have a little impact on increasing investments. Instead, he argues that every attempt to promote investments will not only help increase investments but also positively effect savings. Schmidt (2001) conducts a test for causality between savings and investments for the US, the United Kingdom, Japan, France and Canada, by including the Johansen MLE approach to the (Feldstein and Bacchetta, 1991)'s methodology. According to his findings, policies that support savings only have limited impacts on investments.

Modigliani (1970) is the first study that investigates the saving-growth relationship across several countries. Following this seminal paper, many other studies included growth as one of the determinants of savings and found a close relationship between the two. Using a panel data set containing 21 developed and 40 developing countries over the period 1971 to 1993, Masson *et al.* (1998) found that there is positive and statistically significant relationship between income growth and private savings. Aside from these studies that focuses on the role of income growth in explaining savings, (Caroll and Weil, 1994) conducted a study investigating the causality between growth and savings for a wide range of countries. They concluded that while growth was causing an increase in savings in the Granger sense, the reverse causality could not be detected.

Similarly, (Loayza *et al.*, 2000) argue that income growth led to an increase in private savings, and this was more evident in developing countries when compared to industrial countries. Accordingly, in developing countries a doubling of income per capita was estimated to raise the long run private saving rate by 10% points of disposable income. Examining the dynamic relationship between economic growth, the investment rate and the saving rate using annual time series data for a large cross section of countries, (Attanasio *et al.*, 2000) also found that growth Granger causes savings.

Finally, there are many studies investigating the relationship between growth and investments. While some of them claims that it is the growth that stimulates investments (Blomstroem *et al.*, 1996), there are also studies arguing that fixed capital investments lead to economic growth. (De Long and Summers, 1991), for instance, point out that the investment ratio exerts a major influence on income growth. Moreover, they argue, processes that lead to an increase in physical capital would also help human capital development. The robust nature of relationship between growth and investments are also presented in (Khan and Reinhart, 1990), and (Levine and Renelt, 1992). On the other hand, there is a vast literature that draws attention to the role of investments in economic growth in Asian tigers, and South Korea in particular (Westphall *et al.* 1988; Amsden, 1993, 1994; Pack and Page, 1993; Chang, 1994).

The empirical studies on Turkey regarding the estimation of savings or investments point out that growth plays an important role in explaining the changes in both savings and investments. Turel (1993) for instance, argues in his paper covering the period 1980–1992 that the factors explaining the private saving rate are permanent and temporary income. Yenturk (1998), Celasun and Tansel (1993), Conway (1990), Annad *et al.* (1990) and Akinci (1993), are among the studies that employ growth as an explanatory variable for estimating investment equations. Meanwhile, Yildirim (2001) finds that savings and investments were cointegrated in Turkey. Cimenoglu (2002), on the other hand, argues that domestic investments and savings were closely correlated during the period 1962 to 2000.

IV. Savings-Investments and Growth in the Turkish Economy: the Analysis and the Data

Although there are studies on Turkey investigating the relationships among savings, investments and growth using simple correlation and cointegration techniques, there are no studies that analyse the causality among these variables. In fact, one can easily note that there are only a few studies on savings in Turkey, when compared to other countries. The reason behind this phenomenon is the difficulty in obtaining savings data in Turkey. The only time series data on savings that is produced and published in Turkey is the annual data of the State Planning Organization (SPO) on both private and public sector domestic savings. However, these data date only back

to 1962, and this makes them inappropriate for using in econometric investigations due to lack of sufficient number of observations, especially considering the structural changes in the Turkish economy in between 1962 and today. Moreover, data for the savings of households and corporate sector in Turkey are not released at all.

One of the contributions of this study is to attempt solving the problem mentioned earlier by trying to construct quarterly saving data for Turkey. Relying on the basic principles of open economy macroeconomics, we attempted to construct a savings series using national income accounts and balance of payments figures, which are readily available in quarterly frequency for Turkey. This approach has been also used by Palley (1996), Bosworth and Collins (1999), Loayza *et al.* (2000), Schmidt (2001) and in many other studies. According to this approach, savings can be calculated as the sum of investments and current account balance. The reasoning behind this approach is presented below by using the simple national income and balance of payments identities:

$$Y = C + I + G + X - M \quad (1)$$

where, Y represents gross domestic product, C represents private consumption expenditures, G represents public sector consumption expenditures, I represents investments, X represents exports and M represents imports.

$$DY = Y + NY + NCT \quad (2)$$

where DY represents gross disposable income, NY represents net income transfers of nonresidents and NCT represents net current transfers of nonresidents. Hence one can have the expression below using (1) and (2),

$$DY = C + I + G + X - M + NY + NCT \quad (3)$$

Meanwhile, it is possible to write the current account balance as follows:

$$CAB = X - M + NY + NCT \quad (4)$$

where CAB stands for current account balance. Inserting Equation 4 in Equation 3:

$$DY = C + I + G + CAB \quad (5)$$

It is possible to end up with Equation 5. Moreover, one can express savings as the difference between gross disposable income and total consumption expenditures.

$$S = DY - C - G \quad (6)$$

where S stands for gross national savings. Substituting Equation 5 for DY in Equation 6, one can reach to the equivalence below:

$$S = C + I + G + CAB - C - G = I + CAB$$

or (7)

$$S - I = CAB \quad \text{and} \quad S = I + CAB$$

Hence, by using the simple national income and balance of payments equations, savings can be calculated as the sum of investments and current account balance, as is evident from Equation 7. Using the aforementioned reasoning, we have constructed a quarterly saving data for Turkey in this study, which, in our knowledge, is the first research that has been conducted for Turkey using the quarterly saving data.

Turkey has been running huge public sector deficits in the last decade. Hence, in a study that focuses on savings in a country like Turkey, it is more convenient to use the private savings. In the economic literature, it is also very common to use private savings and private investments in analysing relationship between savings and investments (Loayza *et al.*, 2000; Schmidt, 2001). In the Turkish case, statistics show that the corporate sector firms have been drifting away from their fields of operation due to attractive yields offered by the government debt instruments, especially in the latter half of the 1990s (ISO, 2000). This fact also makes it more meaningful to concentrate on the relationship between private savings and private investments. Therefore, in this study, aside from constructing a savings series, data for private savings have been calculated as well. However, derivation of the private savings was not as straight forward as the calculation of overall savings.

Calculation of the private sector savings may seem to be a simple subtraction of public sector savings from total savings. However, as was discussed thoroughly in (Loayza *et al.*, 2000), it is very important to decide how to define the public sector in making this simple calculation. The definition of the public sector may either be limited to the central government, or may be expanded to include all public entities. This issue did not create a significant problem in the Turkish case, as until very recently,² only the financial accounts of the central government were being released on a quarterly basis. The data for the overall public sector were only released in annual frequency. Therefore, in this study, public sector will refer specifically to the central government consolidated budget balance.

Consequently, private sector's gross savings have been calculated by deducing consolidated budget

²The financial accounts of the overall public sector are being released on a monthly basis since February 2004.

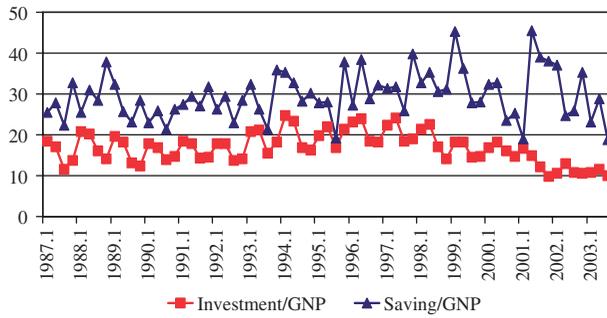


Fig. 1. Private sector savings and investments: January 1987 to February 2003

balance from overall gross savings. Therefore, it is impossible to argue that quarterly private sector savings data that will be used in this study exactly represent the actual private sector savings. But still, it may comfortably be argued that the best proxy for the actual quarterly private sector savings have been calculated using all of the available data, which is consistent in itself and in line with the practices in the economic literature. We have also checked the correlation between the savings data that we have constructed and that is being released by the SPO on annual basis. Accordingly, the correlation between our data and the SPO's data for total savings for the period 1987 to 2002 is calculated to be 74.1%. The similar correlation for private savings, on the other hand, is found to be 70%. The decline in the correlation coefficient can be attributed to the difference in the definition of the public sector between this study and the SPO's calculations.

In this study, along with private sector savings, private sector investments and gross national product (GNP) series are also used. Both the investments and the GNP series are being released by the State Institute of Statistics (SIS). The quarterly data for these variables start from the first quarter of 1987, as there are no other data available for the GNP from expenditures side before that date. The series are extended up to the second quarter of 2003.

The quarterly investments and savings for private sector in Turkey are depicted in Fig. 1. From the figure, it can be observed that private savings exhibit a considerably volatile pattern. The reasons behind this volatility may be both the instability of the Turkish economy, and the seasonal fluctuations in the current account and consolidated budget data from which the private saving series are derived. Within the period under consideration, it is observed that current account balance yields a surplus in summer months, and consolidated budget balance produces a substantial deficit in the last quarters of each year. These factors result in significant

fluctuations in the private sector savings series. This problem has been tackled with properly before conducting econometric analysis, as will be presented in the following section.

V. Econometric Analysis

In this section of the study, the interaction among savings, investments and economic growth will be investigated. However, the task will not solely be checking whether there is a relationship among these variables, but also will be investigating the direction of the relationship, if there exists any at all. The data used are quarterly and span the period beginning from the first quarter of 1989 up to the second quarter of 2003. The measures of the variables are investment as a share of GNP, savings as a share of GNP and GNP growth rate. As noted in the previous section, the produced savings and investment data exhibit severe fluctuations. In order to avoid these fluctuations all the series are smoothed using moving averages. In order to achieve the variance stationarity, logarithmic transformation is applied to the variables INV/GNP that represents investments as a share of GNP, and SAV/GNP that stands for savings as a share of GNP.

In order to properly specify the VAR model that will be used in this study, variables are tested for unit roots. The Augmented Dickey-Fuller (ADF) and KPSS test are carried out. The maximum lag in the ADF test is determined by minimizing Schwartz information criteria pairing down the model starting with a maximum lag of eight. The test results for all variables in levels and first differences are given in Table 1. Both unit root test results point to nonstationary variables in levels. As for the first differences of the variables, all seem stationary. Depending on these findings, we conclude that each variable is well approximated by an $I(1)$ process. In order to account for probable seasonality in the data, seasonal unit root test, HEGY, is employed and no seasonal roots is detected.

The cointegration between INV/GNP, SAV/GNP and the GNP growth rate (will be referred to as GNP hereafter) is tested to capture possible long run relation among the variables. Results from the application of Johansen's maximum likelihood procedure are summarized in Table 2. The VAR model consists of four lags on INV/GNP, SAV/GNP, GNP and a constant. Four lags are used to remove the autocorrelation in the residuals. One of the estimated eigenvalues is clearly larger than zero. Both the trace test and max-eigenvalue test reject the null of

Table 1. KPSS and ADF test statistics

	INV/GNP	SAV/GNP	GNP
KPSS			
Levels	0.69	0.51	0.72
First differences	0.27	0.05	0.11
ADF			
Levels	-0.84(1)	-1.68(4)	-2.04(9)
First differences	-3.11(0)	-6.98(3)	-4.53(8)

Notes: The critical value of the ADF test at 5% level is -2.92. The critical value for the KPSS test at the 5% level is 0.46.

no cointegrating vector at the 95% level, indicating that there is one cointegrating vector.

The estimated cointegrating vector is,

$$\frac{INV}{GNP} = -8.072 + 3.26 \times \frac{SAV}{GNP} + 0.055 \times GNP \quad (8)$$

All variables have expected signs and are significant at 5% level. Equation 8 shows that there exists a relationship among the variables that are used in the model in the long run in such a way that rises in the savings and the GNP growth increases the investments. The direction of this relationship will be studied in a detailed fashion in the rest of this section.

As an initial step, a VEC model with eight lags was estimated. Using multivariate version of the Schwartz criteria, the optimal lag length was set as four. Ljung-Box Q -statistics for 12th order serial correlation fails to reject serially uncorrelated residuals. Joint Residual heteroskedasticity test also fails to reject homoskedastic residuals ($\chi^2=152.09$, $p=0.5735$). Multivariate normality of the residuals is tested by Jarque-Bera statistics ($\chi^2=32.89$, $p=0.1337$) and it has been observed that the residuals were normally distributed. The presented test results indicate that four lags seem adequate to capture the dynamics in the data. Table 3 presents the VEC estimation results.

In order to detect the short run relationship among the variables that are used in the model, Granger Causality tests are run. The results of these tests are presented in Table 4. Accordingly, it can be argued that in the short run, a change in the GNP growth rate Granger causes investments. Test results indicate that there are no other causalities among the variables. To put it in another way, depending on the findings presented in Table 4, it is possible to argue that there are no short-run relationships either between investments and savings or between savings and the GNP growth rate.

In order to analyse the interaction among the variables used in the model, impulse response

functions of each variable to a one SD shock is presented in Fig. 2. The first column in the figure presents responses of the variables to a one standard deviation INV/GNP shock. An unexpected rise in INV/GNP is followed by a protracted rise in itself. SAV/GNP responds with an initial decline, and after four quarters it exhibits a prolonged rise. In response to a surprise increase in INV/GNP, the GNP growth rate temporarily increases before it declines.

In the second column of Fig. 2, SAV/GNP innovations are used to identify the response of the system. An unexpected increase in SAV/GNP is followed by an extended rise in INV/GNP after two quarters. SAV/GNP stays positive and high after the initial shock on itself. In response to a surprise increase in SAV/GNP, the GNP growth rate temporarily declines and after four quarters starts to increase, showing dying fluctuations.

In Fig. 2, the third column presents responses of variables to a one-SD shock in the GNP growth rate. Accordingly, INV/GNP increases in response to a GNP growth rate shock. This increase has fluctuations and the magnitude of fluctuations slowly declines. The response that SAV/GNP exhibits to a one SD shock in the GNP growth rate is very similar to that of INV/GNP. GNP growth rate, on the other hand, responds positively to an unexpected rise in itself. However, this response dies off slowly over time.

To sum up, Fig. 2 shows that the GNP growth has a significant positive impact both on savings and investments in Turkey. This impact is apparently stronger on investments than savings. GNP growth rate, on the other hand, is determined to a great extent by the shocks given on it.

For a more detailed analysis of the interaction among the variables, the decompositions of the forecast error variance of SAV/GNP, INV/GNP and GNP growth rate for forecast horizon up to six years are presented in Table 5. The upper panel of Table 5 gives the variance decomposition of INV/SAV. For forecast horizons up to one year, INV/GNP is influenced mainly by itself. At medium to long term forecasting horizons, the influence of SAV/GNP and GNP growth rate on INV/GNP increases sharply. The middle panel of Table 5 exhibits the variance decomposition of SAV/GNP. Up to 2 years SAV/GNP is mainly influenced by itself, after two years the influence of the GNP growth rate increases sharply. It is evident that INV/SAV has a limited role in determining SAV/GNP. The lower panel of Table 5 shows the decomposition of the forecast error variance of output growth. At short to long term forecasting horizons, GNP growth rate is mainly

Table 2. Cointegration tests

Hypothesized no. of CE(s)	Eigen-value	Trace statistic	5% Critical value	1% Critical value
Unrestricted co-integration rank test				
None*	0.355311	32.14934	29.68	35.65
At most 1	0.104302	7.127068	15.41	20.04
At most 2	0.014774	0.848408	3.76	6.65
Hypothesized no. of CE(s)	Eigen-value	Max-Eigen statistic	5% Critical value	1% Critical value
None*	0.355311	25.02227	20.97	25.52
At most 1	0.104302	6.278660	14.07	18.63
At most 2	0.014774	0.848408	3.76	6.65

Table 3. VEC estimation results

	Dependent variables		
	D(SAV/GNP)	D(SAV/GNP)	D(GNP)
ECM	0.029509**	0.043456*	-0.712013
D(SAV/GNP(-1))	0.465559**	-0.538626*	-5.501725
D(SAV/GNP(-2))	0.189550	0.310270	2.871284
D(SAV/GNP(-3))	0.015490	-0.252228	3.743912
D(SAV/GNP(-4))	-0.313760**	0.036725	1.215429
D(INV/GNP(-1))	0.091935	0.046352	3.202120
D(INV/GNP(-2))	-0.031691	0.087807	-2.970374
D(INV/GNP(-3))	0.081488	0.062396	0.840098
D(INV/GNP(-4))	0.029102	-0.386821**	-0.048801
D(GNP(-1))	0.002934*	-0.010171**	0.518702**
D(GNP(-2))	0.000618	0.003289	0.146814
D(GNP(-3))	-0.003793*	0.001277	-0.002661
D(GNP(-4))	-0.002547	-0.000941	-0.571044**
C	-0.005422	-3.09E-05	0.034096
R-squared	0.727593	0.561787	0.730404
SE equation	0.021967	0.049185	1.743133
F-statistic	8.218393	3.944603	8.336176
Schwarz SC	-4.064440	-2.452393	4.683322
Det. residual covariance		3.37E-06	
Schwarz criteria		-0.761967	

Notes: *Denotes 10% level of significance. **Denotes 5% level of significance

Table 4. VEC pairwise Granger causality/block exogeneity wald tests dependent variable: D(LINV/GNP)

Excluding	Chi-sq.	SD	Probability
D(LSAV/GNP)	4.306500	4	0.3661
D(GNP)	13.46744	4	0.0092
All	23.22210	8	0.0031
Dependent variable: D(LSAV/GNP)			
D(LSAV/GNP)	3.234043	4	0.5195
D(GNP)	6.950909	4	0.1385
All	12.03224	8	0.1498
Dependent variable: D(GNP)			
D(LINV/GNP)	0.362598	4	0.9854
D(LSAV/GNP)	0.781667	4	0.9409
All	1.354840	8	0.9949

driven by itself, whereas SAV/GNP and INV/GNP have negligible effects on the GNP growth rate.

Evaluation of the variance decomposition analysis together with impulse response functions leads us to some important findings. First of all, GNP growth rate is almost completely determined by itself. In other words, savings and investments do not seem to have any significant impact on the economic growth. Considering that among the targets of any economic programme, a high and sustainable growth rate is among the most important ones, the finding that savings and investments do not have a significant impact on the growth rate leads to important policy implications, as will be discussed in the concluding section.

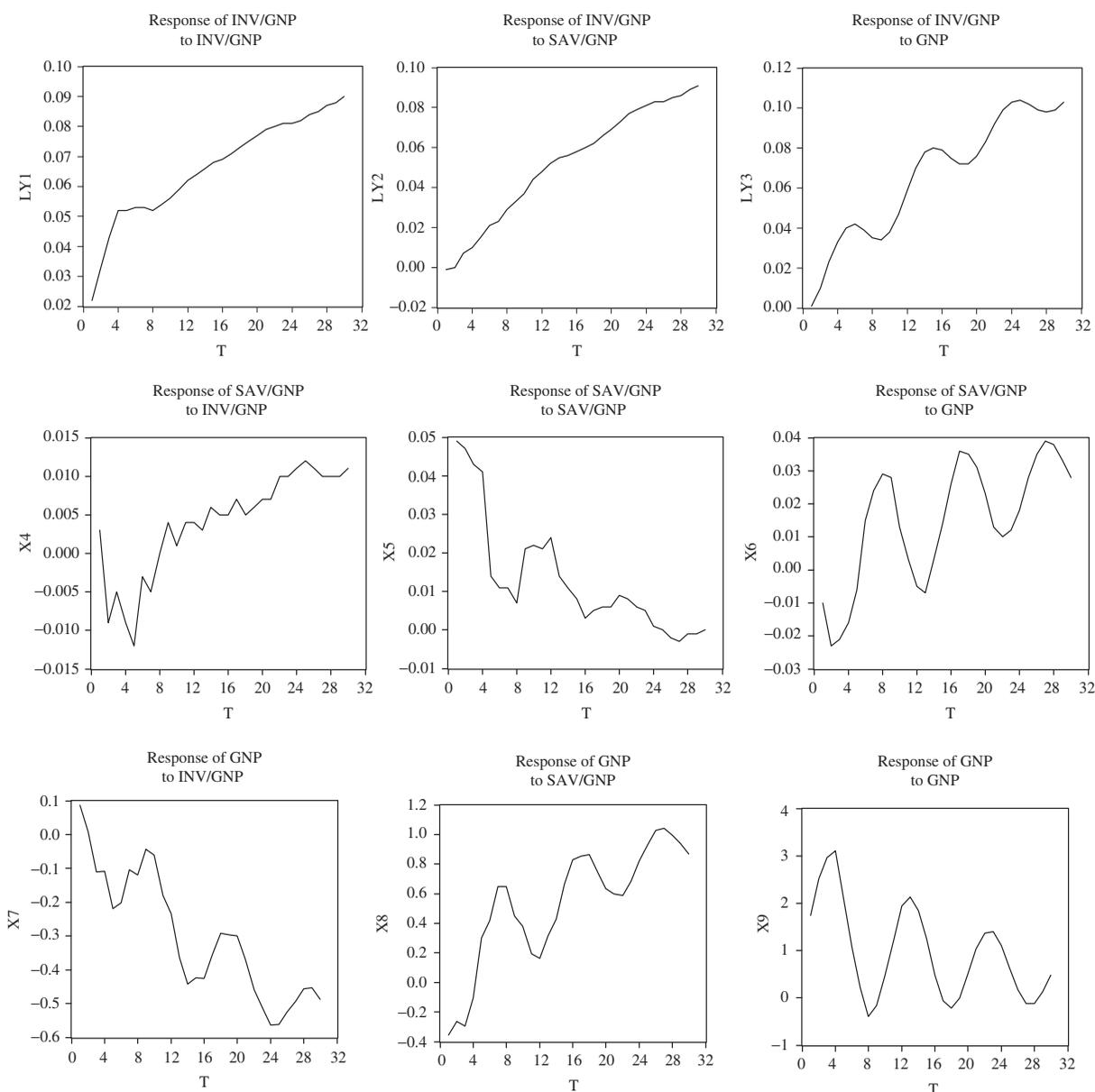


Fig. 2. Responses of variables to one-standard deviation shocks-generalized

Second important finding of the analysis above is that economic growth has a significant impact on the determination of both savings and investments. Savings are also found to be reacting to changes in savings itself. The impact of economic growth on investments is evident both in the short and the long run.

The third finding that should be stressed is related to the relationship between savings and investments. In the medium to long-run, while savings play an important role in the determination of investments, investments does not have such an impact on savings.

Consequently, all of the above findings lead us to the conclusion that the economic growth is the most

critical variable that has been used in this study. While the economic growth affects both the investments and savings, economic growth can only be stimulated by the exogenous shocks given to it.

VI. Conclusion

According to the findings of this study that are relevant for the short run, the only causality in the Granger sense has been detected from the GNP growth to investments. No other causality relationship has been detected among the variables.

Table 5. Variance decomposition of INV/GNP, SAV/GNP and GNP growth rate

Period	SE	L(INVGNP)	L(SAV/GNP)	GNP
Variance decomposition of L(INVGNP)				
1	0.021967	100.0000	0.000000	0.000000
2	0.040621	96.14073	0.211632	3.647636
3	0.062982	86.86209	2.334541	10.80337
4	0.087494	80.35890	3.474287	16.16682
8	0.159648	67.55070	11.54267	20.90662
12	0.227099	59.46726	21.08775	19.44499
16	0.314702	48.80999	25.29482	25.89519
20	0.391169	45.99288	28.78905	25.21808
24	0.478128	42.02102	31.22196	26.75703
Variance decomposition of L(SAV/GNP)				
1	0.049185	0.360474	99.63953	0.000000
2	0.070028	1.785829	94.63219	3.581981
3	0.083177	1.572836	93.62322	4.803944
4	0.093923	2.219220	93.38540	4.395377
8	0.107498	3.229465	75.68288	21.08766
12	0.122453	2.853186	71.24962	25.89720
16	0.128322	3.205832	67.13775	29.65642
20	0.145678	3.194666	52.89204	43.91329
24	0.150151	4.673103	50.27494	45.05195
Variance decomposition of GNP				
1	1.743133	0.246247	4.322936	95.43082
2	3.075147	0.079767	2.130901	97.78933
3	4.288394	0.107339	1.545251	98.34741
4	5.332261	0.111380	1.032730	98.85589
8	6.019841	0.401617	3.985004	95.61338
12	6.549088	0.556480	4.359272	95.08425
16	7.541708	1.633382	5.978250	92.38837
20	7.767258	2.184245	9.881496	87.93426
24	8.458566	3.138713	11.15313	85.70815

In the medium-to-long term, on the other hand, the impulse response functions that have been presented above show that changes in the GNP growth rate are influential in explaining the changes in the private sector savings in Turkey. While the GNP growth causes an increase in the private sector savings, the reverse causality is found to be very limited.

Impulse response functions also reveal that the GNP growth rate has a considerable impact on private sector investments in Turkey. Interpreting the impulse response functions together with the variance decomposition analysis shows that private sector's investments and savings do not have any significant impact on the growth rate, and that the GNP growth rate is mostly determined by exogenous shocks given on it.

Tight fiscal policies that have been implemented in Turkey for a considerably long period of time relied on the understanding that savings determine growth and investments. However, findings of this study highlight the importance of growth policies in determining savings and investments; and hence

challenge the basic arguments of tight fiscal policies. In this study, while it was impossible to detect a causality running from savings to growth, it was also not possible to find causality from investments to growth. One of the main reasons of this latter phenomenon is thought to be the excess capacity in the Turkish manufacturing industry. In the case of excess capacity, the biggest incentive for investments turns out to be achieving a growth rate that will bring the economy to full capacity. The need for new investments that will enlarge the existing capacity emerges only after the existing capacity is almost completely utilized.

In developing countries like Turkey, where increasing private sector savings do not help initiating growth and investments, and where there is excess capacity, the issue of choosing and implementing the appropriate growth policies emerges as one of the hottest debate topics. The vast literature on growth strategies shows that, depending on the economic and financial environment and level of development of a country, different growth policies may be proposed to

different countries.³ However, starting with the 1980s, a set of policies that is called as the Washington Consensus started to appear frequently on the mainstream economic literature. These policies compromised the suggestions of the IMF, World Bank and the World Trade Organization, and were being proposed to an increasing number of developing countries. In an attempt to integrate to the global economy, most of the developing countries had to implement these policies.

Evaluating the economic policies that have been implemented in Turkey after 1980, one can easily notice that the suggestions of the Washington Consensus have been quite seriously taken into consideration. It is even plausible to argue that in the post-1980 period, Turkey has implemented almost all of the policies that could have been proposed within the framework of the Washington Consensus. Therefore, it is obvious that Turkey needs to have alternative growth policies at this point of time. Within this perspective, growth policies that focus more heavily on human capital, technological innovation, research and development and ideas should be discussed and implemented.

The most important constraint on the implementation of this kind of growth policies is the financial one. When the post-1989 financial and capital account liberalization period in Turkey is analysed, it can be seen that a portion of the resources that helped finance the rapid economic growth and associated increases in savings and investments, were acquired either in the form of foreign borrowing or in the form of capital inflows in the domestic financial markets. However, it should be noted that in the 1990s, most of the international resources that the developing countries could have attracted had short term, and even speculative nature. Meanwhile, the argument that the growth policies that rely on short term capital inflows created fragilities in the domestic economy in the medium term and resulted in economic crises has gained a lot of support in the economic literature.⁴ Hence, a growth strategy that relies on short term international capital inflows is definitely not a viable alternative.

Within the last couple of years in Turkey, the priority among the economic policies has been given to rolling over the public debt. In order to do this, the Washington Consensus proposes to achieve a large primary surplus in the public finances and use this surplus in paying the interest on the existing debt stock. This has exactly been what is done, lately in Turkey. However, it is necessary to note that, even in the countries that implemented very tight fiscal policies, it has not been possible to alleviate the concerns regarding the public debt stock with this kind of policies. Argentina, for instance, is a vivid example showing that years and years of large primary surpluses may not be sufficient enough to achieve public debt sustainability.⁵

At this point, the main problem is that trying to yield a primary surplus that is even quite large for a developed country makes it impossible to implement growth policies focusing on improvements in human capital and technology. Instead of trying to yield a large primary surplus, supporting the poorest of the society, financing expenditures on education, health, technology, research and development, and going on with public sector infrastructure investments may very well stimulate the growth, which would eventually lead an increase in savings and investments.

It is possible to implement a mix of economic policies that would both prioritize economic growth and not neglect public debt obligations. If the credibility of the policies that are implemented is high, even without a substantially high primary surplus, by shifting resources to growth-promoting policies that are noted earlier, economic growth can be accelerated and public debt may be sustained at the same time. It should be kept in mind that without credibility, even a very large amount of primary surplus would not be sufficient enough to ensure the sustainability of the public debt. To put it in another way, while it is possible to end up with a debt crisis even with a substantial primary surplus, it may very well possible to rollover the public debt with a much smaller primary surplus.

³ For a detailed review of the growth strategies, please refer to Rodrik, 2003.

⁴ For a detailed review of how speculative capital inflows and their reversals lead to economic crises, please refer to Reinhart and Végh (1995), Rebelo and Végh (1995), Kaminsky *et al.* (1997), Goldfajn and Valdés (1997), Calvo and Végh (1997), Eichengreen *et al.* (1998), Yenturk (1999), Kaminsky and Reinhart (1999), Rodrik and Velasco (1999), Mussa *et al.* (2000), Uलगin and Yenturk (2001), Edwards (2001a, b), Corsetti *et al.* (2001), Cimenoglu (2002), Stiglitz (2002a), Stiglitz (2003), Yenturk and Cimenoglu (2003).

⁵ Although Argentina achieved a balanced budget, and even in some years budget surpluses, lack of financial resources to support economic growth has been argued to be the main reason of the crisis in 2001 (Eichengreen, 2001; Rodrik, 2002; Stiglitz, 2002b, c).

References

- Akinci, A. (1993) *Iktisatta Yatirim Davranisi ve Turkiye'de Ozel Sektor Yatirimlerini Etkileyen Faktorler (Investment Behaviour and the Factors that Affect Private Sector Investments in Turkey)*, Turkiye Kalkinma Bankasi Press, Istanbul.
- Amsden, A. (1993) Structuralist Macroeconomics underpinning of effective industrial policy: fast growth in the 1980s in five Asian countries, UNCTAD Discussion Paper, No. 57.
- Amsden, A. (1994) The East Asian Miracle, *World Development*, **22**, 615–69.
- Annad, R., Chhibber, A. and Wjinbergen, S. (1990) External balance and growth in Turkey, in *The Political Economy of Turkey: Debt, Adjustment and Sustainability* (Eds) T. Aricanli and D. Rodrik, Macmillan, London.
- Argimon, I. and Roldan (1994) Saving, investment and international capital mobility in EC countries, *European Economic Review*, **38**, 59–67.
- Attanasio, O., Picci, L. and Scorcu, A. (2000) Saving, growth and investment, *Review of Economics and Statistics*, **82**, 182–211.
- Baxter, M. and Crucini, M. (1993) Explaining saving-investment correlations, *The American Economic Review*, **83**, 417–36.
- Blomstroem, M., Lipsey, R. E. and Zejan, M. (1996) Is fixed investment the key to economic growth?, *Quarterly Journal of Economics*, **111**, 269–76.
- Bosworth, B. and Collins, S. M. (1999) Capital flows to developing economies: implications for saving and investment, *Brookings Papers on Economic Activity*, **1**, 143–80.
- Calvo, G. A. and Végh, C. A. (1997) Inflation stabilization and BOP crises in developing countries, in *Handbook of Macroeconomics*, (Eds) J. B. Taylor and M. Woodford, Chap. 24, North Holland Press, Amsterdam, Netherlands.
- Caroll, C. and Weil, D. N. (1994) Saving and Growth: a reinterpretation, *Carnegie-Rochester Series on Public Policy*, **40**, 133–92.
- Celasun, M. and Tansel, A. (1993) Distributional effects and saving investment behavior in a liberalized economy: the case of Turkey, *METU Study in Development*, **20**, 269–99.
- Chang, H. (1994) *The Political Economy of Industrial Policy*, St. Martin Press, London.
- Chenery, Y. H., Robinson, S. and Syrquin, M. (1986) *Industrialization and Growth, A Comparative Study*, Oxford University Press, New York.
- Conway, P. (1990) The record on private investment in Turkey, in *The Political Economy of Turkey* (Eds) T. Aricanli and D. Rodrik, Macmillan, London.
- Corsetti, G., Pesenti, P. and Roubini, N. (2001) The role of large players in currency crises, National Bureau of Economic Research Working Paper, No. 8303.
- Cimenoglu, A. (2002) International capital flows and their impact on the turkish economy, Doctoral dissertation, Istanbul Technical University, Istanbul.
- De Long, J. B. and Summers, L. H. (1991) , Equipment investment and economic growth, *Quarterly Journal of Economics*, **106**, 445–502.
- Dooley, M., Frankel, J. and Mathieson, D. J. (1987) International capital mobility, what do saving-investment correlations tell us?, *IMF Staff Papers*, **34**, 503–30.
- Edwards, S. (2001a) Capital mobility and economic performance: are emerging economies different?, National Bureau of Economic Research Working Paper, 8076.
- Edwards, S. (2001b) Does the current account matter?, National Bureau of Economic Research Working Paper, No. 8275.
- Eichengreen, B. (2001) Crisis prevention and management: new lessons from Argentina and Turkey, Background paper for World Bank Global Development Finance, 2002.
- Eichengreen B., Masson, P., Bredenkamp, H., Johnston, B., Hamann, J., Jadresic, E. and Otker, I. (1998) Exit strategies: policy options for countries seeking greater exchange rate flexibility, IMF Occasional Paper, No. 168.
- Feldstein, M. and Horioka, C. (1980) Domestic saving and international capital flows, *The Economic Journal*, **90**, 314–29.
- Feldstein, M. and Bacchetta, P. (1991) National saving and international investment, in *National Saving and Economic Performance* (Eds) B. D. Bernheim and J. B. Shoven, University of Chicago Press, Chicago, pp. 201–20.
- Goldfajn, I. and Valdes, R. O. (1997) Capital flows and the twin crises: the role of Liquidity, IMF Working Paper, No. 87.
- Gordon, D. (1995) Putting the horse (back) before the chart: disentangling the relationship between investment, and saving, in *Macroeconomic Policy After Conservative Era, Studies in Investment, Saving and Finance* (Eds) G. Epstein and H. Gintis, Cambridge University Press, Cambridge, UK.
- Istanbul Sanayi Odasi (Istanbul Chamber of Industry) (2000) 500 Buyuk Sanayi Sirketi Anketi (Survey of Top 500 Industrial Companies), ISO Journal, No. 425.
- Kaminsky, G. and Reinhart, C. (1999) The twin crises: the causes of banking and balance of payments problems, *American Economic Review*, **89**, 473–500.
- Kaminsky, G., Lizondo, S. and Reinhart, C. (1997) Leading indicators of currency crises, IMF Working Paper, No. 79.
- Khan, H. S. and Reinhart, C. (1990) Private investment and economic growth in developing countries, *World Development*, **18**, 19–27.
- Levine, R. and Renelt, D. (1992) A sensitivity analysis of cross-country growth regressions, *American Economic Review*, **82**, 942–63.
- Loayza, N., Schimdt-Hebel, K. and Serven, S. (2000) What drives private savings around the world?, *Review of Economics and Statistics*, **82**, 165–81.
- Marglin, S. (1987) Investment and accumulation, in *New Palgrave Dictionary of Economics*, Vol. II (Ed.) J. Eatwell, Macmillan, London.

- Masson, P. R., Bayoumi, T. and Samiei, H. (1998) International evidence of the determinants of private saving, *The World Bank Economic Review*, **12**, 483–501.
- Modigliani, F. (1966) The life-cycle hypothesis of saving, the demand of wealth, and the supply of capital, *Social Research*, **33**, 160–271.
- Modigliani, F. (1970) The life-cycle Hypothesis of saving and inter-country differences in the saving ratio, in *Induction, Trade and Growth* (Ed.) W. Eltis, Clarendon Press, Oxford.
- Mussa, M., Masson, P., Swoboda, A., Jadresic, E., Mauro, P. and Berg, A. (2000) Exchange rate regimes in an increasingly integrated world economy, IMF Occasional Paper, No. 193.
- Pack, H., Page, J. M. (1993) Accumulation, exports and growth in the high performing asian economies, Background Paper for World Bank Development Report, 1993.
- Palley, T. (1996) The Saving-investment nexus: why it matters and how it works, Center for Economic Policy Analysis Working Papers, No. 1.
- Rebelo, S. and Végh, C. A. (1995) Real effects of exchange rate based stabilization: an analysis of competing theories, National Bureau of Economic Research Working Paper, No. 5197.
- Reinhart, C. and Végh, C. A. (1995) Do exchange rate based stabilizations carry the seeds of their own destruction?, Unpublished Working Paper, IMF.
- Rodrik, D. (2003) Growth Strategies. Working Draft for Publication in (Eds) P. Aghion and S. Durlauf, *Handbook of Economic Growth*, North Holland Press, forthcoming; available at: <http://ksg.home.harvard.edu/~drodrik.academic.ksg/papers.html>
- Rodrik, D. (2003) Introduction: What Do We Learn From the Country Narratives? in *In Search of Prosperity: Analytic Narratives on Economic Growth* (Ed.) D. Rodrik, Princeton University Press, Princeton, USA.
- Rodrik, D. and Velasco, A. (1999) Short-term capital flows, National Bureau of Economic Research Working Paper, No. 7364.
- Romer, P. (1986) Increasing returns on long-run growth, *Journal of Political Economy*, **4**, 1002–17.
- Sachs, J. D. and Larrain, B. (1993) *Macroeconomics in the Global Economy*, Harvester and Wheatsheaf, New York.
- Schmidt, M. B. (2001) Saving and investment: some international perspectives, *Southern Economic Journal*, **68**, 446–56.
- Schmidt-Hebbel, K. and ve Serven, L. (1997) *Saving Across the World*, World Bank Discussion Papers, No. 354.
- Stiglitz, J. (2002a) *Globalization and its Discontents*, Penguin Books, London.
- Stiglitz, J. (2002b), Argentina, Shortchanged, *The Washington Post*, 5 December, available at: <http://www.globalpolicy.org/soecon/bwi-wto/imf/2002/0512shortchange.htm>
- Stiglitz, J. (2002c) Lessons from Argentina's Debacle, *Straits Times*, 1 October, available at: <http://www.globalpolicy.org/soecon/bwi-wto/imf/2002/0110stiglitz.htm>
- Stiglitz, J. (2003) Dealing with debt: how to reform the global financial system: how to reform the global financial system, *Harvard International Review*, **25**, 54–9.
- Tobin, J. (1967) Life cycle saving and balance growth, in *Ten Economic Studies in the Tradition of I. Fisher* (Ed.) W. Fellner, John Wiley and Sons, New York.
- Turel, O. (1993) 1980–1992 Doneminde Türkiye'de Finansal Yapı ve Politikalar (Financial Structure, & Policies in Turkey in 1980–1992), in *Türkiye'de Kamu Maliyesi, Finansal Yapı ve Politikalar (Public Finance and Financial Structure and Policies in Turkey)* (Eds) I. Onder and O. Turel, Tarih Vakfı Yurt Press, Istanbul.
- Ulengin, B. and Yenturk, N. (2001) Impacts of capital flows on aggregate spending categories: the case of Turkey, *Applied Economics*, **33**, 1321–8.
- Westphall, L. E., Rhee, Y. W. and Garry, P. (1988) Korean industrial competence: where it came from?, World Bank Staff Working Paper, No. 469.
- Yenturk, N. (1998) Ajustement et accumulation: la turquie (adjustment and accumulation: Turkey), *Canadian Journal of Development Studies*, **19**, 55–78.
- Yenturk, N. (1999) Short-term capital inflows and their impact on macroeconomic order: Turkey in the 1990s, *Developing Economies*, **37**, 89–113.
- Yenturk, N. (2003) *Korlerin Yuruyusu: Türkiye Ekonomisi ve 1990 Sonrasi Krizler, (The Parable of the Blind: The Turkish Economy ve Crises in the post-1990 Period)* Istanbul Bilgi University Press, Istanbul.
- Yenturk, N. and Cimenoglu, A. (2003) Uluslararası Sermaye Hareketlerinin Gelisimi ve Türkiye Ekonomisinin Krizleri Uzerindeki Etkisinin Modellemesi, (Developments in the International Capital Flows and the Modelling of their Impact on the Crises of the Turkish Economy) in Yenturk N. *Korlerin Yuruyusu: Türkiye Ekonomisi ve 1990 Sonrasi Krizler*.
- Yildirim, J. (2001) Saving-investment correlation: evidence from Turkey, *Yapi Kredi Economic Review*, **12**, 35–42.