

Macro and Socioeconomic Determinants of Turkish Private Savings

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This study investigates the effects on private saving rates of a number of macroeconomic and socio economic variables, by estimating an empirical private savings model for Turkey over the period 1975-2008. The following variables are found to increase savings: inflation, income level, terms of trade, real interest rates, credits, young dependency ratio, urbanization rate, economic crisis and political instability and the following variables are found to decrease it: financial depth, income growth, current account deficit, old dependency ratio and life expectations. Last but not least, we find that the private savings have strong inertia, and government savings tends to partially crowd out them. On the other hand, we also find that the female labor participation rate, the rate of self-employed employment and the rate of employment having university education decrease savings in Turkey after 1988.

1. Introduction

Notwithstanding the importance of international flows of capital, one of the most important determinants of a country's investment rate is its own saving rate. Therefore, understanding the savings behavior of an economy is very important for understanding economic growth.

Savings behavior has been the focus of many theoretical and empirical studies. The two major theories proposed to explain savings are "the permanent income hypothesis" (Friedman (1957)) and "the life-cycle hypothesis" (Ando and Modigliani (1963)). The permanent income hypothesis differentiates permanent and transitory components of income as determinants of savings. Permanent income is defined in

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terms of the long time income expectation over a planning period, and transitory income is the difference between actual and permanent income. The idea here is that transitory changes in income will not have a significant effect on consumption and savings. According to the life-cycle hypothesis, on the other hand, individuals spread their lifetime consumption over their lives by accumulating savings during earning years and maintaining consumption levels during retirement. The theory highlights the effects of demographic factors, such as the age profile of the population, on savings.

Empirical studies on savings behavior have tested the permanent income hypothesis (e.g. Kelley and Williamson (1968), Gupta (1970 a, b)), the life-cycle theory (Ando and Modigliani(1963)), and have explored the effects of many variables on the saving rate, including demographic factors such as age groups (Kelley and Williamson (1968)), birth rates (Leff (1969 and 1971)) and dependency ratios (Gupta (1971)), as well as financial variables such as interest rates (Ouliaris (1981)) and inflation rates (Koskela and Viren (1985)). Many studies have focused on analyzing savings behavior for groups of countries and regions (see, for instance, Edwards (1996), Dayal-Gulhati & Thimann (1997) and Metin-Ozcan and Ozcan (2000)), whereas some papers have focused on the determinants of savings in a single country (Ortmeyer (1985), Aron and Muellbauer (2000)). This latter approach is useful for providing a fuller picture of the determinants of the savings rate when a country has relatively strong data. Among developing countries, Turkey can be considered as a reasonably good choice in this respect, since it is one of the few countries for which the available data span a relatively longer time period and are more reliable. Moreover, understanding private savings in a developing country such as Turkey is particularly useful, since developing countries need to create the funds necessary for investment and to mobilize public and private savings for speedy development. In this respect, the current paper can provide some policy implications.

Tansel (1992) and Celasun and Tansel (1993) present two empirical models related to savings behavior in Turkey.² The former study

² Among the other empirical studies related to Turkey are Rittenberg (1988), which investigates financial liberalization and savings in Turkey, and Kumcu (1989) which analyzes the savings behavior of immigrant Turkish workers in W. Germany.

examines the relationship between household saving, income, and the number of children, and finds that at least in urban settings in Turkey (the data come from two major cities), children exert no significant influence on saving. Celasun and Tansel (1993) present econometric estimates for Turkish saving-investment behavior in the period 1972-88. Their estimation results highlight the significant impact of functional income distribution on private as well as on total domestic savings. They also find that financial liberalization affects private savings positively. In addition, the paper estimates models for private saving surplus and current (external) account deficit. In addition, IMF (2007) presents key determinants of private saving in Turkey for the 1980-2006 period, which used inflation-adjusted private and public saving rates from World Bank Saving Database. In addition, Rijckeghem and Ucer (2009) look into the evaluation and determinants of saving rate in Turkey, with particular focus on private saving, using both micro and macro level data. Also, Cilasun and Kirdar (2009), Yilmazer (2010) and Uysal *et al.* (2012) investigate Turkish households saving behavior. Lastly, World Bank (2011) lists determinants of saving in Turkey by using new annual series for savings, which were produced by The Ministry of Development.

Building on the previous literature, this paper investigates the effects on private saving rates of a number of policy and non-policy variables, including government policies, macroeconomic stability, income and financial variables as well as several life-cycle variables, for the period 1975-2008 in Turkey. The current study broadens Metin-Ozcan, Gunay and Ertac (2003), using a different dataset that spans a longer time frame. Metin-Ozcan, Gunay and Ertac (2003) studied the period 1968-1994, and used private and public saving rates given in the World Saving Database (WSD), which is the largest data set on aggregate saving measures assembled to date (see Loayza *et al.*, 1998a for a detailed description of WSD). The current study uses private and public saving rates obtained from State Planning Organization (SPO) database, and is different in the time aspect as well. In addition, the effects on savings of a number of new socioeconomic and education variables are explored.

The organization of the paper is as follows: Section 2 gives a brief overview of the policy environment and saving behavior in Turkey.

Section 3 summarizes the potential determinants of private savings and the related literature. Section 4 introduces the data, presents the empirical specification and the estimation results. Section 5 concludes.

2. Policy Environment and Savings Behavior in Turkey: 1975-2008

We first present a brief overview of the evolution of the Turkish economy in the focus period, to provide context for the analysis of savings. Turkey experienced a foreign-financed boom in the mid-1970s, and grappled with a severe debt crisis in 1978-80. The 1978-80 debt crisis mainly affected investment rather than saving, and the aggregate saving rate only fell from 20.9% to 17.3% (see Metin-Ozcan, Voyvoda and Yeldan (2001)). After the crisis, Turkey started to undertake some new economic policies, the basic characteristic of which was that market mechanisms and market prices governed the processes of economic decision. Starting from the 1980s, Turkey started to shift to free market conditions in the financial and external markets, as well as in the production factors (labor and capital) markets. During this period, the main policy goal was to decrease the external trade deficit. Therefore, governments placed considerable emphasis on increasing exports, adjusting exchange rates and macroeconomic policies accordingly.

The post-1980 reform caused a substantial rise in aggregate saving, which served two main purposes in this period: to reduce inflation and to lower domestic absorption, in order to make room for export expansion from existing productive capabilities. During the post-1980 period, the rise in aggregate saving was because of the public saving component, which overrode the decline in the private saving rate in this period. However, as the annual growth rate of the Turkish economy increased after 1985, public saving began to worsen and private savings recovered (see Figure 1). Public saving gap and domestic inflation increased in this era. Turkey faced huge external debt service, which widened fiscal deficits. Moreover, domestic borrowing resulted in higher interest rates, and hence larger volumes of interest payments by the public sector were observed. As a result, public saving started to decline and private investment began to rise, as is usually the case in response to increasing interest rates in countries like Turkey, where the amount of public debt is high. Interest rate and domestic inflation therefore became instrumental in boosting private savings (see Celasun

and Tansel (1993)). This process was one of the main reasons for the 1994 economic crisis in Turkey. In general, it is possible to state that Turkey showed an increasing trend in private savings during the 1980-1994 period (see Figure 1).

The 1994 crisis caused a significant shift in income distribution in Turkey. As real wages continued to decline, foreign capital inflows enabled the financing of the fiscal gap and the current account deficit. The cost of these adjustments to the Treasury, however, was the acceleration of the interest burden on its borrowing instruments. The interest rate and inflation rose more than 30% in real terms. Therefore, aggregate saving rate, especially private saving rate increased in 1994 (see Metin-Ozcan, Voyvoda and Yeldan (2001)). Hence, total domestic saving in Turkey has declined since 1988 and the decline in the saving rate was driven by the public sector during the period of 1988-2001 (World Bank, 2011).

After 1998, public disposable income could not offset the public spending and the inevitable need for public investments, consequently public savings turned to negative again. This rise in the public deficit was one of the main reasons for the instability in the Turkish economy, with adverse effects on the monetary balance and inflation. Private savings, on the other hand, increased during these years, and especially beginning from 2002, more than half of the private savings were transformed to investment (see Figure 1).

Turkey started to apply a new stabilization program to eliminate economic instability by making structural reforms in 2000. In the beginning, interest rates fell more than expected due to the high rate of exchange inflows, due to the fact that the Central Bank did not give any credit to the public. Decreasing interest rates and the Central Bank decision not to intervene led to a decline in individuals' saving trends. Hence, consumption increased and demand encouraged inflation. The decrease in private savings had positive effects on the public accounts and the public debts, but this situation also had some negative effects on the economy. For example, consumption and external debt increased. With this program, the goal was to increase the investment by decreasing the interest rates. Nevertheless, the investment of many

sectors did not increase, and the increasing consumption of individuals resulted in the decrease of individual's private saving rate.

Turkey faced another crisis in February 2001, which resulted in an immense capital outflows. Consequently, interest rates increased and while private savings reached its maximum level, public savings declined to a minimum in 2001. Beginning from June 2001, Turkey implemented an International Monetary Fund-led (IMF) Standby Program, which involved structural reforms. Nonetheless, the high consumption trend continued to be a basic problem for the Turkish economy due to the current account deficits caused by high exchange rates. After 2001, as private savings declined, public savings started to rise, going from negative to positive values in 2004. However, private savings fell drastically between 2004 and 2005 (see Figure 1), and the gap between them was almost closed in 2006. In sum, after 2001, the decline in the saving rate was driven by the fall in private saving, since this fall was greater than the increase in public saving. Mainly a rise in credit flows with reduced interest rates and inflation caused an increase in consumption; therefore, private saving declined (World Bank, 2011). Also, the Global Financial Inclusion Database announced its survey about 148 countries' saving tendency for 2010. According to this database, only 9.5% of people participating in the survey saved in Turkey, while this ratio is nearly 34% in the upper-middle income countries (Acar, 2012).

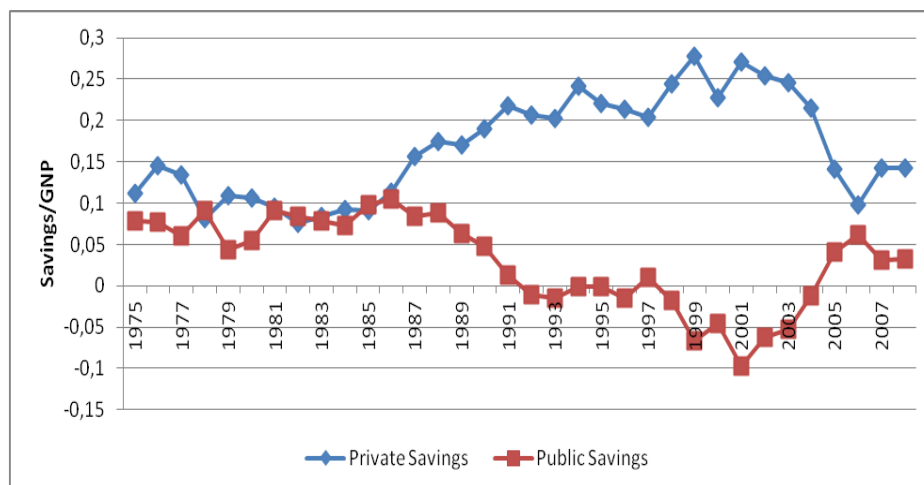


Figure 1. Trends in Private and Public Savings in Turkey over the period 1975-2008

3. Potential Determinants of Private Savings

Based on the theoretical and empirical literature on savings, the main potential determinants of savings can be grouped loosely under the headings of government policy variables, financial variables, income and growth variables, demographic variables, uncertainty variables and external variables, socioeconomic variables, and education and employment variables. In this section, we provide a summary of the theoretically-predicted effects of these variables on private savings, as well as presenting the results from previous empirical work that has studied these factors.

Economic theory models savings choice as an outcome of intertemporal utility-maximization by rational agents. The aforementioned “life-cycle approach” (Modigliani (1970), which is the main model used in studies of savings behavior, posits that individuals seek to smooth out consumption over time; saving in “good times” to consume in “bad times”. This precautionary motive for savings fundamentally affects saving behavior in the economy through a number of channels, which we discuss in detail in the following subsections, where a variety of policy and non-policy variables relevant to saving are outlined.

Inertia:

It is an empirical fact that saving rates generally show inertia, which means that they are serially correlated, even after controlling for other factors (Nola (2008)). The implication of inertia is that factors that affect saving rates will have larger impact in the long-term than in the short-term. In order to capture inertia, we include the lagged private saving rate in our empirical analyses.

Government Policies:

The actions of the government can influence the private savings rate through a multitude of channels. The effects of fiscal policy and especially public savings have been the foci of different theoretical approaches, predicting different outcomes. The neoclassical life-cycle model predicts that a decline in government savings will tend to raise consumption and lower national savings by shifting the tax burden from present to future generations. The Keynesian model, on the other hand, suggests that higher savings will result from a temporary reduction in public savings. The well-known Ricardian theory argues that an increase in government savings should have no effect on national savings, since it would be offset by a decline of equal magnitude in private saving (“Ricardian equivalence”).

There is also a considerable amount of empirical work that has studied the relationship between public and private savings. For example, Nicholas (2007) finds that higher government expenditure is associated with lower domestic savings in South Africa, while Pradeep and Pravakar (2009) show that the private savings rate is affected by the public saving rate in Bangladesh. Similarly, Bhandari *et al.* (2007) find that government expenditures have a negative impact on private saving. Empirical studies generally find that the Ricardian equivalence hypothesis does not hold fully, although some offsetting exists—that is, the crowding out is only partial³. If there is only partial crowding out, an increase in government savings can help raise national saving (Dayal-Gulati and Thimann (1997)). IMF (2005) and IMF (2007) show that an increase in government saving is associated with lower private saving,

³ See Corbo and Schmidt-Hebbel (1991) for a detailed survey.

but offsets are far from complete for developing countries. In the particular case of Turkey, IMF (2007) and Metin-Ozcan, Gunay and Ertac (2003) both find evidence for crowding out. IMF (2007) places this offset at -0.7, suggesting that an increase in government saving would fail to rise overall saving by a large amount in Turkey. Also, World Bank (2011) implies that there is no empirical evidence for full Ricardian equivalence in Turkey. Moreover, Holmes (2006) finds low levels of substitutability for the entire Organisation for Economic Cooperation and Development (OECD) panel. On the other hand, Kelly and Mavrotas (2003) investigate the determinants of private saving in Sri Lanka and they find some evidence in support of the Ricardian equivalence hypothesis.

Since precautionary motives are primary determinants of savings, government-run social security programs can also influence private savings decisions. World Bank (2011) states that Turkish households have a strong precautionary motive for savings. The life-cycle model predicts that high social security benefits will tend to lower private saving rates, primarily via the weakened motive for retirement and precautionary savings (see Evans (1983)). Empirically, Feldstein (1980, 1995) finds a significant negative impact of pensions systems on private savings, and Edwards (1995) finds social security schemes to have a significant impact on private saving in developing countries.

Income and Growth Variables:

The relationship between savings and income as well as savings and growth is frequently discussed in the macroeconomics literature. According to subsistence-consumption theories, countries with higher income levels tend to have a higher saving rate, which is a prediction that has been strongly supported empirically (Edwards (1996), Dayal-Ghulati and Thimann (1997), Loayza, Schmidt-Hebbel and Serven (2000), Metin-Ozcan and Ozcan (2000), Metin-Ozcan, Gunay and Ertac (2003), Ismihan *et al.* (2005), World Bank (2011)). Rijckeghem and Ucer (2009) show that income has statistically significant positive effects for both 2004 and 2005 in Turkey. Moreover, Carroll *et al.* (1993) and Carroll and Weil (1994) indicate that incomes have often risen before savings rates rather than after, suggesting a causality that runs from income to savings.

Regarding the effect of income growth, however, the theory is less clear: The life-cycle approach suggests that savings of active workers relative to the dissavings of people out of the labor force will increase in response to an increase in income growth, causing a rise in aggregate savings. On the other hand, according to the permanent income hypothesis, increased growth would also imply higher anticipated future income, creating incentives to dissave against future earnings. Empirically, the study of growth and savings involves an endogeneity problem, since saving affects growth via its impact on investment and capital accumulation and in turn, growth affects savings through the above-mentioned channels. Many studies have found evidence for a “virtuous circle” going from higher growth to higher savings and to even higher growth (Modigliani (1986), Collins (1989)). In studies employing instrumental variable techniques and various causality tests to overcome the endogeneity problem, the result has been maintained (see Edwards (1996)). Carroll *et al.* (1993) and Carroll and Weil (1994), for example, find that income and savings growth are highly correlated and growth indeed drives savings rather than the other way around. Similarly, Nicholas (2007), Attanasio *et al.* (2000) and Bhandari *et al.* (2007) find that growth and savings are positively related. Growth was also found to have a positive and significant effect for East Asian countries in the pre-crisis period of 1970-1995 (see Thanoon and Baharumshah, 2005). In the case of Turkey, IMF (2007) finds that Turkey has a statistically significant and large positive growth coefficient on savings, but Metin-Ozcan, Gunay and Ertac (2003) did not find a statistically significant effect. We explore this issue for Turkey again with the new dataset in this paper.

Financial Variables:

One major financial variable that can influence savings is the real interest rate. Theoretically, the effect is ambiguous, since a change in the interest rate entails opposing substitution and income effects. Specifically, the income effect will cause an incentive to dissave, whereas the intertemporal substitution effect will lead to higher savings, since it increases the opportunity cost of consumption. Empirically, the majority of studies have found only a weak interest elasticity of private savings (Boskin (1978), Giovannini (1983), McKinnon (1991), Metin-Ozcan and Ozcan (2000)), suggesting that the two effects neutralize

each other. There are some studies that find a positive effect of real interest rates for both developed and developing countries (Koskela and Viren (1982), Balassa (1992), Masson et al. (1998), Nicholas (2007)), whereas some find a small negative effect (Thanoon and Baharumshah (2005) for East Asian countries) and some find no effect (Bhandari *et al.* (2007) for South Asia). Although IMF (2007) and Metin-Ozcan, Gunay and Ertac (2003) find no statistically significant effect of the real interest rate for Turkey, World Bank (2011) implies that the fall in the interest rate decreased private saving.

Variables that capture the degree of development of the financial sector can also be relevant for savings, especially for a developing country like Turkey, which has experienced a process of financial liberalization.⁴

One such variable is financial development/depth, proxied by the degree of monetization of the economy, i.e. the M2/GNP ratio, where M2 represents money plus quasi-money. The sign of this variable has been found to be positive across empirical studies (see Edwards (1996), Dayal-Gulhati & Thimann (1997), Loayza, Schmidt-Hebbel and Serven (2000), Metin-Ozcan and Ozcan (2000), Thanoon and Baharumshah (2005), Metin, Gunay and Ertac (2003)). World Bank (2011) refers that financial markets are critical in channeling private savings and policies should target both improvements in the saving rate and financial deepening for Turkey to benefit from saving in the economy. Another important factor is borrowing constraints, which can increase the motive for precautionary savings and savings for purchases such as houses/cars.⁵ Rijckeghem and Ucer (2009) imply that an increase in consumer credit has caused a reduction in savings in Turkey after 2001. We would therefore expect a relaxation of the borrowing constraint to

⁴ Aron and Muellbauer (2000) show the importance of financial liberalization in private saving behaviour. Similarly, Bhandari *et al.* (2007) find that the level of financial development have a positive effect on private saving in South Asia. Indirectly, financial liberalization could also affect savings through its effect on growth. If savings and growth are highly positively correlated in the long run, financial liberalization can have an indirect long-run impact on savings. Ucal *et al.* (2010) analyzes whether and to what extent the inflow of FDI is affected before and after the occurrence of a financial crisis in developing countries.

⁵ Akkoyunlu (1998) thoroughly discusses the effects of housing wealth on Turkish consumption and saving.

have a negative impact on savings (see Metin-Ozcan, Gunay and Ertac (2003)).

Stock market development can also be used as a proxy for financial development, since it provides an alternative means for increasing capital and it gives individuals the opportunity to diversify their risks and potentially increase their savings. Levine and Zervos (1998) and Bonser and Dewenter (1999) used the market size (the ratio of market liberalization to nominal GDP), the ratio of the liquidity of the market to the size of the economy (Value Traded/GDP) and the turnover ratio (Value Traded/Market Capitalization), in order to measure the development of the stock market.⁶ Levine and Zervos (1998) found that there is a positive relation between the size of the stock markets and private savings. Bonser and Dewenter (1999) obtained the same result, but they also stated that neither the growth of the stock market nor the shrinking of the stock market has a one-to-one relation with the saving rate. We use all of the above measures for financial development in our analyses.

Demographic Variables:

Life cycle and precautionary saving theories emphasize the effects on savings of “demographic variables”, such as the urbanization ratio, the age distribution of the population and life expectancy.⁷

Since individuals aim to smooth out consumption over their lifetime, they will save when they expect future income to be low and dissave when they anticipate it to be high. This implies that people who are out of the labor force will dissave, either against future earnings (as in the case of the very young) or against previously accumulated savings (as in the case of the old), whereas active, productive workers will have positive savings (Modigliani (1970)). Therefore, the age composition of the population is expected to influence private savings.

These insights have been captured in empirical work with different variables. It has been shown that savings rates increase in response to an

⁶ Here, the market values of firms were defined as market capitalization.

⁷ In fact, these variables are sometimes termed life-cycle variables.

increase in the share of the working population relative to that of retired persons (see Lahiri (1989), Edwards (1996), Dayal-Gulati and Thimann (1997), Loayza, Schmidt-Hebbel and Serven (2000)). Many studies have used the young and old dependency ratios (YD and OD, respectively), where a decline in savings would be expected in response to an increase in the value of either of these variables. In fact, many researchers have projected a downward trend in the saving rate, as populations age, birth rates decline and life expectancy increases (see, for instance, Masson, Bayoumi and Samiei, 1995). However, an increase in life expectancy can also lead individuals to increase precautionary savings, since they expect a longer retirement period (Doshi (1994)). In general, it is well-documented in the literature that demographics can significantly affect savings (see, Rossi (1989), Attanasio and Browning (1995)). Pradeep and Pravakar (2009), for example, find that dependency ratio is one of the main determinants of the total savings rate in Bangladesh. Thanoon and Baharumshah (2005) find that the dependency ratio for East Asian economies has a negative influence on the saving ratio, but that demographics explain only the longer-term trends in savings and not short-term fluctuations. On the other hand, Bhandari *et al.* (2007) cite that dependency ratio has no noticeable impact on private saving in South Asia. Also, IMF (2007) and Metin-Ozcan, Gunay and Ertac (2003) state that YD and OD has a negative relation with saving rate in many studies, but they emphasize these variables were not significant in the Turkey-specific studies due to the lack of variance in the series. The current study addresses this issue with the new dataset. Moreover, in Turkey, although World Bank (2011) emphasizes that higher YD ratios decreases savings, households with higher OD ratios save more because old people have higher health risks and consequently higher health expenditure.

Another relevant demographic variable is the urbanization ratio, defined as the percentage of the total population living in urban areas. This variable is also expected to have a negative impact on saving, since rural societies face greater volatility of income, and urbanization reduces the need for precautionary saving. However, Bhandari *et al.* (2007) and Metin-Ozcan, Gunay and Ertac (2003) find no significant effect of this variable on private saving in South Asia and Turkey, respectively.

Uncertainty Variables:

Uncertainty about the future influences savings rates, since it creates a motive for precautionary savings for hedging risk.

Macroeconomic uncertainty is usually proxied by the inflation rate in empirical studies. Using different groups of countries, Koskela and Viren (1985), Masson, Bayoumi and Samiei (1998), and Gupta (1987) find that savings increase as the inflation rate increases. Nicholas (2007) finds a positive but statistically insignificant effect for South Africa, whereas IMF (2005) and Metin-Ozcan, Gunay and Ertac (2003) find a significant effect for Turkey. Both World Bank (2011) and Rijckeghem and Ucer (2009) imply that the large decline in inflation in Turkey after the 2000s led to a drop in private saving in Turkey. Political instability, which creates an uncertain economic environment for agents, would also be expected to influence savings positively. We capture this effect in our analyses by controlling for changes in government. It is also possible to obtain a proxy for uncertainty at the individual level by the extent of government-run social security and insurance programs and/or the urbanization ratio –implying decreased volatility of income.⁸

External Variables:

External variables such as terms of trade and the current account deficit might be relevant for savings for an open economy. Terms of trade is a critical variable, particularly for the oil exporters (Ostry and Reinhart (1992), Dayal-Gulati and Thimann (1997), Loayza, Schmidt-Hebbel and Servén (2000)). Improvements in the terms of trade increase saving through their positive effect on wealth and income (Fry (1986), Masson, Bayoumi and Samiei (1995), Nicholas (2007)). For Turkey, Metin-Ozcan, Gunay and Sertac (2003) find a similar effect but IMF (2007) does not. World Bank (2011) implies that terms of trade are expected to increase private savings, potentially through promoting exports and a subsequent positive impact on income and growth. In fact, deterioration in terms of trade was one of the reasons of declining in the Turkish

⁸ Note that these variables were discussed under different headings above. Since many variables have multiple effects, the same variable could be categorized in multiple headings and a strict categorization is not possible.

private saving rate between 2003 and 2007, due to the sharp increase in energy prices (Rijckeghem and Ucer (2009)). As for the current account deficit, the standard view is that an increase in the current account deficit would be met by a partial decline in private saving, since external saving may tend to act as a substitute for domestic private saving (Loayza, Schmidt-Hebbel & Serven (2000)). Thanoon and Baharumshah (2005) also showed a significant negative effect of foreign savings on domestic savings rate.

Socioeconomic Variables:

Brenner, Dagenais and Montmarquette (1994) find that the increasing divorce rate, the rise in women's participation in the labor force and the increases in investment in women's education led to a decline in the saving rate during the 1970s and the 1980s in the US. Hence, private savings might fall, but women's investment on human capital is going up. However, World Bank (2011) and Uysal *et al.* (2012) imply that households in which more women work save more in Turkey, therefore, the female labor force participation rate has positive and significant effects on saving rates.

Education and Employment Variables:

Denizer, Wolf and Ying (2002) have analyzed the effect of educational attainment and occupation on savings rates. Their idea was that individuals with higher educational attainment should have lower saving rates because they are more likely to be wage earners than individuals with lower educational attainment. Similarly, individuals with lower educational attainment might be more likely to be self-employed, so they should save more. Similarly, Morisset and Revoredo (1995) argue that education and saving would be negatively correlated with less need for precautionary saving among the more educated in the short run. However, in the long run positive relations between education and savings might be seen. They showed that for each percentage point increase in education stock, the saving rate increases 0.37 percent, but it takes more than five years for this positive effect for 74 countries panel model. World Bank (2011) finds positive relationship between education levels and saving rates. Contrary to Yilmazer (2010) and Cilasun and Kirdar (2009), Rijckeghem and Ucer (2009) show saving rates and

education level have a negative relation in Turkey.⁹ On the other hand, households in which the head is an employer or is self-employed save more in Turkey (World Bank, 2011). Similarly, Rijckeghem and Ucer (2009), Yilmazer (2010) and Uysal *et al.* (2012) find that being self-employed and saving rates have positive relation in Turkey.

4. Empirical Analysis

Data:

We start by describing the variables in our dataset and the notation we use in our empirical analysis. *S* is defined as the private saving rate ($S = \text{Private Savings}/\text{GNP}$), while *GS* represents the public saving rate ($GS = \text{Public Savings}/\text{GNP}$). *M2* indicates the ratio of money plus quasi-money to GNP, REALTD^{10} is the real interest rate on savings deposits. *CR* denotes credit to the private sector (end of period), expressed as a percentage of GDP. *TT* stands for the terms of trade, proxied by the ratio of nominal exports to nominal imports. *CAD* represents the current account deficit ratio, calculated as the difference between imports and exports over GNP. Data on private savings, public savings, *M2* and GNP were taken from the Turkish State Planning Organization (SPO), data for credit and trade data were obtained from the database of the World Bank (WB).

LY and *DLY* are income and growth variables respectively, the former representing the level and the latter the growth rate of GNP. *LY* was calculated by the logarithm of the GNP. *INF* is the inflation rate, measured by the annual change in the GDP deflator, which was obtained from the WB database. In addition, we constructed two dummy variables, one to represent political instability and the other to capture the effects of Turkish crisis years on the private saving rate. The political instability variable, *POLINS*, is a dummy that takes on the value of 0 if there has been no government change in a given year, 1 if there has been one government change, and 2 if there has been more

⁹ Yilmazer (2010) and Cilasun and Kirdar (2009) find that savings increase with education.

¹⁰ REALTD was calculated by $r = (n+1)/(i+1) - 1$ formula. *n* is nominal interest rate on saving deposits, taken from SPO and *i* is the inflation rate, measured by the annual change in the GDP deflator, taken from WB.

than one change. The crisis dummy, DUMMY, on the other hand, takes on the value of 1 in the years of economic crisis and zero otherwise.

Among the demographic/life-cycle variables, YD and OD are age dependency ratios, the former defined as the ratio of the population younger than 15 to the total population, and the latter defined as the ratio of the population older than 65 to the total population. UR is the urbanization ratio, which expresses the percentage of the population living in urban areas. LEX denotes life expectancy at birth. All data for the demographic/life-cycle variables were obtained from the United Nations (UN) database.

Among the socioeconomic variables, FLP is the female labor participation rate, defined as the ratio of the total female labor force to the female non-institutional civilian population. WUDR is the rate of women having a university degree, defined as the ratio of the total number of women having university degree to the female non-institutional civilian population and DR is divorce rate. These variables were obtained from the Turkish Statistical Institute (TSI).

The data for the stock market are only available from 1988 on for Turkey. MC represents the capitalization rate of the listed firms, defined as the ratio of the market capitalization to the GDP (the market values of firms capture market capitalization). In addition, ST shows the total stock value traded rate that is the ratio of total value traded to GDP, and SM is the turnover ratio, defined as the ratio of total value traded relative to market capitalization. All data for the stock market variables were obtained from the World Bank database.

All data for the education and employment variables also start from the year 1988 (taken from the TSI database). Here, PE represents the rate of employment having primary education, defined as the ratio of working population having primary education to the non-institutional civilian population. SE, HE, and UE are the rates of employment having secondary, high school and university education, respectively, all defined as ratios to the non-institutional civilian population. On the other hand, WE, SEMP and EMP denote the rates of wage earner employment, self-employed employment and employer employment

respectively, again defined with respect to the non-institutional civilian population.

Unit Root Tests

The Augmented Dickey-Fuller (ADF) (1981) tests are applied to study the unit roots in the variables. For a given variable and null order, two values are reported in each cell. The first value is the ADF statistics and the second value in the parenthesis is the longest significant lag with significant t-value. Four lags are allowed in each variable's ADF regression. All regressions include a constant term. 'C' denotes the constant term, 'C,T' denotes the constant term and time trend, and 'N' implies that the constant term and time trend are not included. If variables are in their log levels, the sample is 1975-2008 ($t = 34$). If variables are in their first differences, the sample is 1976-2008 ($t = 33$). If variables are in their second differences, the sample is 1977-2008 ($t = 32$). The ADF tests suggest that UR, M2 and LY variables are I(2); S, GS, INF, DLY, CR, REALTD, YD, OD, DR, WUDR, ST, SE, HE, UE, WE, EMP, variables are I(1) and LEX, TT, CAD, DUMMY, POLINS, FLP, MC, SM, PE, SEMP are I(0).

Table 1. Augmented Dickey-Fuller (ADF) Test Statistics

<i>Variables</i>	<i>I(0)</i>	<i>I(1)</i>	<i>I(2)</i>
<i>S</i>	-1.51(0) ^C	-5.55(0)* ^C	
<i>GS</i>	-1.55(0) ^C	-5.78(0)* ^C	
<i>M2</i>	1.26 (0) ^{C,T}	-0.19 (1) ^C	-11.78(0)* ^C
<i>INF</i>	-2.42(0) ^{C,T}	-5.22(1)* ^C	
<i>LY</i>	-2.64(4) ^{C,T}	-1.79(0) ^{C,T}	-5.07(0)* ^C
<i>DLY</i>	-1.59(0) ^{C,T}	-5.16(0)* ^C	
<i>CR</i>	-1.07(0) ^{C,T}	-4.47(0)* ^C	
<i>REALTD</i>	-2.09(0) ^{C,T}	-5.86(0)* ^C	
<i>YD</i>	-1.49(0) ^C	-5.20(0)* ^C	
<i>OD</i>	1.12(0) ^N	-6.67(0)* ^C	
<i>LEX</i>	-4.51(0)* ^{C,T}		
<i>UR</i>	-2.17(1) ^{C,T}	-2.20(0) ^{C,T}	-5.15(0)* ^C
<i>TT</i>	-3.30(0)** ^C		
<i>CAD</i>	-3.82(0)* ^C		
<i>DUMMY</i>	-4.52(0)* ^C		
<i>POLINS</i>	-6.57(0)* ^C		
<i>DR</i>	-1.82(0) ^{C,T}	-5.34(0)* ^C	
<i>FLP</i>	-3.93(0)** ^{C,T}		
<i>WUDR</i>	-1.34(4) ^{C,T}	-6.26(1)* ^{C,T}	
<i>MC</i>	-3.42(0)** ^C		
<i>ST</i>	-2.83(0) ^{C,T}	-5.47(0)* ^C	
<i>SM</i>	-2.76(0)** ^C		
<i>PE</i>	-2.56(0)** ^N		
<i>SE</i>	-2.19(0) ^C	-3.72(0)** ^C	
<i>HE</i>	-1.75(0) ^{C,T}	-5.56(0)* ^C	
<i>UE</i>	0.30(2) ^{C,T}	-5.33(1)* ^{C,T}	
<i>WE</i>	-1.03(0) ^{C,T}	-4.44(0)* ^C	
<i>EMP</i>	-2.52 (0) ^{C,T}	-3.91(0)* ^C	
<i>SEMP</i>	-3.80(1)* ^N		

Note: The critical values are from MacKinnon (1991, Table 1). Here and elsewhere in this article, *, ** and *** denoterejection at the 1%, 5% and 10% level critical values respectively.

The Empirical Specification for Private Savings:

In line with the potential savings determinants outlined in Section 3, the general private saving equation including all relevant variables is constructed as follows:

$$S_t = C + \beta_0 S_{t-1} + \beta_i X_t \quad i = 1, 2, \dots \dots i$$

In this setting, the subscript ' t ' and C denote time and the constant term respectively, whereas X denotes all variables stated in Section 3. Our dependent variable for the private saving equation is S , which represents the private saving rate and S_{t-1} denotes the lagged dependent variable.

Estimation Results for the Private Saving Rate:

We have a set of annual data covering 1975 through 2008, and also another set of annual data covering only 1988 through 2008. Our estimation framework can be traced from the following regression results. The first column of Table 2 shows the estimates for the 1975-2008 period. In this estimation we include all the saving determinants that are available in this period as well as a dummy variable capturing the years of economic crisis in Turkey in the same period. The second column of Table 2 uses the same variables as column one, but the 1988-2008 time period. Then a set of new explanatory variables, that are available only in the 1988-2008 sample period, is added one after the other to the regression. The estimation results obtained with each addition are shown on the columns of Table 3 and 4. The results for the newly added variables are written on the bottom of the columns that are added.

The OLS estimation results of the full model in which we include all savings determinants as well as a dummy variable capturing the years of economic crisis in Turkey for the 1975-2008 periods and 1988-2008 periods are presented in Table 2.

Table 3 and Table 4 in the Appendix show the OLS estimation results for the 1988-2008 period because we do not have data for the stock market variables, socioeconomic variables and education and employment variables for the pre-1988 years. When we analyze the basic private savings estimation results presented in the tables, we can get some insight into the determination of private saving rates in Turkey, and about whether they fit the theoretical predictions that were discussed earlier. The results outlined below sometimes go against what was found in our previous work (Metin-Ozcan, Gunay and Ertac (2003)), which is due to the use of the different savings dataset with a longer time span in this paper. We mention these differences below, for comparison.

Table 2. Estimation Results of the Private Saving Model with the Economic and Demographic Variables

	1975-2008	1988-2008
<i>C</i>	-0.116 (-0.226)	-0.747 (-1.284)
<i>S(-1)</i>	0.612* (4.157)	1.051** (4.394)
<i>M2</i>	-0.431** (-2.349)	-0.967** (-4.181)
<i>INF</i>	0.044*** (1.781)	0.068** (3.486)
<i>GS</i>	-0.531* (-3.255)	-0.304 (-1.961)
<i>LY</i>	0.092*** (1.958)	0.211** (3.706)
<i>DLY</i>	-0.344*** (-2.058)	-0.893** (-4.219)
<i>CAD</i>	-0.666* (-3.495)	-0.987** (-3.708)
<i>TT</i>	0.002 (0.055)	0.027 (0.433)
<i>REALTD</i>	0.419 (1.316)	0.655*** (2.142)
<i>CR</i>	0.274*** (1.819)	0.751** (2.966)
<i>DUMMY</i>	0.017 (1.476)	0.033** (2.971)
<i>POLINS</i>	0.011*** (1.935)	0.015** (3.184)
<i>YD</i>	2.992* (2.234)	6.006** (3.597)
<i>OD</i>	-3.743 (-1.366)	-7.957*** (-2.632)
<i>LEX</i>	-0.017* (-3.312)	-0.021** (-3.961)
<i>UR</i>	0.249 (0.751)	-1.162 (-1.682)
<i>R²</i>	0.969	0.992

Note: t-statistics in parentheses. (*) indicates statistical significance. Here and elsewhere in this article, *, ** and *** denote rejection at the 1%, 5% and 10% level critical values respectively.

Inertia:

The presence of inertia in private saving rates in Turkey is clearly evident in the empirical results given in Table 2, as the coefficient of the lagged private saving rate is positive and statistically significant. The coefficients of the lagged saving rate are 0.612 and 1.051 for the 1975-2008 period and the 1988-2008 period respectively, implying that the long-term impact of the factors that affect the private saving rate is greater than the short-term impact. This result on persistence is consistent with the findings of previous research (Loayza *et al.*, (2000) and Metin-Ozcan, Gunay and Ertac (2003)).

Government Policies:

Table 2 shows that although there is a negative relation between the public saving rates (GS) and the private saving rates as expected, offsets are not complete. Therefore, this result indicates that the “Ricardian Equivalence” hypothesis does not hold fully (see Metin-Ozcan, Gunay and Ertac (2003) and World Bank (2011)).

Income and Growth Variable:

Our analysis in Table 2 reveals that the level of income and private savings have a positive relationship as expected (Edwards (1996), Dayal-Ghulati and Thimann (1997), Loayza *et al.*, (2000), Metin-Ozcan and Ozcan (2000), Metin-Ozcan, Gunay and Ertac (2003), Rijckeghem and Ucer (2009), World Bank (2011)). However, the growth rate of income is negative and statistically significant (see Table 2)¹¹. This indicates that, the “virtuous circle” prediction discussed earlier does not seem to hold for Turkey, possibly due to the lack of a sustained and stable phenomenon of growth in the economy.

Financial Variables:

The coefficient for the money to GNP ratio is negative and statistically significant. This finding does not confirm the prediction that an increase

¹¹ Metin-Ozcan, Gunay and Ozcan (2003) had found insignificant and different signs of coefficients for the growth rate of income.

in “financial depth”, as proxied by the increase in the M2/GNP ratio, is likely to be very important in a country like Turkey, which is undergoing a financial liberalization process.

The coefficient for the real interest rate (on saving deposits) is insignificant with positive sign for the 1975-2008 period, but significant and positive for the pre-1988 period (Table 2). This finding fits the results of many previous empirical studies mentioned earlier and our previous research (Metin-Ozcan, Gunay and Ertac (2003)), which found an insignificant but positive impact of the real interest rate.

We find significantly positive coefficients for the borrowing constraint in Table 2. These results suggest that the relaxation of credit constraints does not lead to a significant decrease in the private saving rate in Turkey. This result is not consistent with Metin-Ozcan, Gunay and Ertac (2003). Also, the estimation results in Table 3 show that although financial development, as measured by stock market development, does not show a positive effect on the private savings in Turkey, only turnover ratio leads to an increase in private savings, with a statistically insignificant coefficient.

Demographic Variables:

According to Table 2 results, only two of the demographic variables (OD and LEX) have negative coefficients, as expected, but only the coefficient of life expectancy is statistically significant for the 1975-2008 period. However, three of the demographic variables (OD, LEX and UR) reduce private savings in Turkey after 1988, but the coefficient of urbanization rate is statistically insignificant.¹²

Uncertainty Variables:

The estimation results in Table 2 show that, as expected, inflation has a significant positive coefficient, as in our previous finding (Metin-Ozcan, Gunay and Ertac (2003)). This result is not surprising because Turkey

¹² Metin-Ozcan, Gunay and Ertac (2003) had found insignificant and negative coefficients for the YD and UR, a negative and significant coefficient for LEX, and insignificant positive coefficients for private savings and OD.

has struggled with high inflation for decades. World Bank (2011) and Rijckeghem and Ucer (2009) show that the large decline in inflation during the 2000s was important for the drop in private saving in Turkey. On the other hand, the coefficient for the crisis dummy and the coefficient of political instability are positive, which supports our expectations about the impact of these variables.

External Variables:

Among the external variables, we observe that although the terms of trade (TT) is insignificant, it increases the private savings in Turkey (see Table 2), in line with the results of Metin-Ozcan, Gunay and Ertac (2003) and World Bank (2011). On the other hand, the regression results in Table 2 show that CAD has statistically significant negative effect on the private saving, in contradiction with the result of Metin-Ozcan, Gunay and Ertac (2003).

Socio-Economic Variables:

The results in Table 3 show that the rise in the rate of women having a university degree and the divorce rate decreases private savings insignificantly in Turkey after 1988. The female labor participation rate also has a negative relation with private savings in Turkey, unlike in World Bank (2011) and Uysal *et al.* (2012).

Education and Employment Variables:

Table 4 shows that the increase in the rate of self-employed employment leads to a significant decrease in private savings in Turkey for the post-1988 period contrary to the findings of Rijckeghem and Ucer (2009), Yilmazer (2010), Uysal *et al.* (2012) and World Bank (2011). On the other hand, the rate of employment having university education and private savings have negative relations, as in Rijckeghem and Ucer (2009).

6. CONCLUSION

This paper examines the empirical determinants of private savings for Turkey. The current study broadens Metin-Ozcan, Gunay and Ertac (2003), using a different savings dataset that spans a longer time period. One main conclusion of our analysis is that in Turkey, private saving rates display strong inertia and they are highly serially correlated. Therefore, the effects of a change in any given saving determinant are fully realized in the longer term than the short-term (less than a year period).

Another main finding is that the government savings-to-GNP ratio has a negative impact on the saving rate, confirming the hypothesis that government savings will tend to crowd out private savings.

Income level has a positive and significant impact on the private saving rate, which supports some evidence that more advanced countries will tend to save a higher percentage of their GDP. The growth rate of income, however, is statistically significant but negative. Therefore, we do not find support for the hypothesis that there is a virtuous circle going from faster growth to increased saving to even higher growth. Our result using the degree of monetization of the economy as a financial depth/development measure for Turkey does not suggest that countries with deeper financial systems will tend to have higher private saving rates. The hypothesis that inflation would capture macroeconomic volatility and create a precautionary motive for saving is supported by our analysis, where inflation has a significant effect. Turkish economy has started to liberalize beginning from 1988 and accordingly stock market has started to develop. This situation has not led to a big positive impact on the private savings in Turkey as expected in our analysis. On the other hand, the loosening of the borrowing constraints, as measured by the credit to the private sector, has led to a rise in private savings in Turkey.

We have also investigated whether external factors influence private saving or not, since Turkey is an open economy. The first potential external factor influencing private saving is terms of trade and we found that terms of trade shocks have a positive but insignificant effect on

private savings in Turkey. Also, the current account deficit seems to have a significantly negative effect on savings in Turkey.

As for demographic variables, the old dependency ratio and life expectancy has a negative impact on the private savings in Turkey.

Furthermore, it is important to investigate how socioeconomic, education and employment variables influence private savings in Turkey. The data provide some results that support our predictions and some that do not. The increase in the rate of self-employed employment and the rate of employment having university education, for example, decrease private savings. Also, the rise in the female labor participation rate leads to a decrease in private savings contrary to our predictions in Turkey since 1988.

The empirical findings presented here indicate a number of variables that are crucial in affecting private savings in Turkey. They clearly indicate the role of policies pursued by the country and the complexity of the relationship between saving and other variables that affect saving.

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APPENDIX

Table 3. Estimation Results of the Private Saving Model with the Economic, Demographic, Financial and Socio-Economic Variables for the 1988-2008 period

		MC	SM	ST	DR	WUDR	FLP
C	-0.747 (-1.284)	-0.645 (-0.985)	-0.774 (-1.176)	-0.613 (-0.962)	0.237 (0.272)	-1.352 (-1.651)	-0.872 (-1.754)
S(-1)	1.051** (4.394)	1.200** (3.343)	1.100** (3.709)	1.042** (4.123)	-0.025 (-0.032)	0.947** (3.683)	1.161** (5.444)
M2	-0.967** (-4.181)	-1.090** (-3.368)	-1.016** (-3.527)	-0.918** (-3.637)	-0.779*** (-3.160)	-0.858** (-3.406)	-1.001** (-5.090)
INF	0.068** (3.486)	0.073** (3.189)	0.070*** (3.119)	0.065*** (3.059)	-0.046 (-0.559)	0.043 (1.416)	0.069** (4.177)
GS	-0.304 (-1.961)	-0.353 (-1.883)	-0.307 (-1.756)	-0.333 (-1.982)	-0.090 (-0.439)	-0.143 (-0.656)	-0.401*** (-2.779)
LY	0.211** (3.706)	0.277 (2.195)	0.224*** (3.061)	0.239** (3.387)	-0.124 (-0.513)	0.206** (3.667)	0.218** (4.525)
DLY	-0.893** (-4.219)	-1.012** (-3.334)	-0.959** (-3.287)	-0.844** (-3.635)	-0.371 (-0.893)	-0.824** (-3.754)	-0.939** (-5.187)
CAD	-0.987** (-3.708)	-1.004** (-3.443)	-1.056*** (-3.045)	-0.846*** (-2.521)	-1.498** (-3.461)	-1.015** (-3.830)	-1.541** (-3.756)
TT	0.027 (0.433)	0.066 (0.706)	0.040 (0.520)	0.030 (0.458)	-0.075 (-0.823)	0.011 (0.178)	-0.085 (-0.979)
REALTD	0.655*** (2.142)	1.036 (1.453)	0.736 (1.836)	0.783 (2.157)	-1.109 (-0.867)	0.421 (1.112)	0.771*** (2.875)
CR	0.751** (2.966)	0.931 (2.293)	0.856 (2.198)	0.658 (2.243)	0.356 (0.991)	0.630 (2.278)	0.824** (3.767)
DUMMY	0.033** (2.971)	0.044 (2.028)	0.035*** (2.583)	0.041*** (2.599)	-0.013 (-0.381)	0.027 (2.130)	0.031** (3.217)
POLINS	0.015** (3.184)	0.018*** (2.372)	0.015*** (2.846)	0.014*** (2.951)	0.009 (1.781)	0.012*** (2.456)	0.016** (4.051)
YD	6.006** (3.597)	7.454*** (2.477)	6.466*** (2.923)	6.288** (3.494)	-3.157 (-0.474)	5.658** (3.355)	7.246** (4.511)
OD	-7.957*** (-2.632)	-10.669 (-1.916)	-8.798 (-2.191)	-8.817*** (-2.609)	11.712 (0.825)	-7.349*** (-2.410)	-10.383** (-3.504)
LEX	-0.021** (-3.961)	-0.025*** (-2.657)	-0.021** (-3.319)	-0.020** (-3.603)	-0.011 (-1.334)	-0.016*** (-2.632)	-0.026** (-4.656)
UR	-1.162 (-1.682)	-1.933 (-1.304)	-1.309 (-1.517)	-1.786 (-1.638)	2.878 (0.983)	-0.596 (-0.682)	-0.336 (-0.434)
Related Variable		-0.046 (-0.604)	0.005 (0.394)	-0.044 (-0.769)	-0.143 (-1.412)	-2.255 (-1.039)	-0.514 (-1.613)
R ²	0.992	0.993	0.993	0.994	0.995	0.994	0.996

Note: t-statistics in parentheses. (*) indicates statistical significance. Here and elsewhere in this article, *, ** and *** denote rejection at the 1%, 5% and 10% level critical values respectively.

Table 4. Estimation Results of the Private Saving Model with the Economic, Demographic, Education and Employment Variables for the 1988-2008 period

		PE	SE	HE	UE	WE	SEMP	EMP
C	-0.747 (-1.284)	-0.677 (-1.081)	-0.716 (-1.052)	-0.868 (-1.695)	-1.089 (-1.636)	-0.708 (-1.046)	0.077 (0.285)	-0.379 (-0.508)
S(-1)	1.051** (4.394)	1.335*** (2.853)	1.091** (3.321)	1.243** (5.101)	0.884*** (3.075)	0.989*** (2.826)	1.109* (12.262)	0.995** (3.864)
M2	-0.967** (-4.181)	-1.182*** (-3.062)	-0.942** (-3.265)	-1.207** (-4.714)	-0.817*** (-3.002)	-0.891*** (-2.367)	-1.015* (-11.627)	-0.961** (-3.995)
INF	0.068** (3.486)	0.100 (2.063)	0.077 (1.693)	0.069** (4.064)	0.045 (1.525)	0.062 (1.925)	0.075* (10.072)	0.056 (2.222)
GS	-0.304 (-1.961)	-0.511 (-1.550)	-0.349 (-1.297)	-0.262 (-1.897)	-0.135 (-0.598)	-0.260 (-1.099)	-0.452* (-6.934)	-0.208 (-1.049)
LY	0.211** (3.706)	0.267*** (2.699)	0.226*** (2.353)	0.221** (4.437)	0.193** (3.280)	0.201*** (2.779)	0.222* (10.380)	0.210** (3.572)
DLY	-0.893** (-4.219)	-1.073** (-3.191)	-0.893** (-3.686)	-1.107** (-4.767)	-0.791** (-3.407)	-0.838*** (-2.714)	-0.952* (-11.866)	-0.933** (-4.144)
CAD	-0.987** (-3.708)	-1.224*** (-2.827)	-1.009*** (-3.155)	-1.134** (-4.518)	-0.948** (-3.549)	-0.951*** (-2.875)	-1.217* (-11.089)	-1.011** (-3.634)
TT	0.027 (0.433)	0.016 (0.250)	0.016 (0.185)	0.062 (1.052)	0.017 (0.280)	0.028 (0.394)	-0.043 (-1.595)	-0.002 (-0.033)
REALTD	0.655*** (2.142)	1.039 (1.669)	0.751 (1.344)	0.739*** (2.721)	0.374 (0.916)	0.595 (1.463)	0.741* (6.386)	0.477 (1.246)
CR	0.751** (2.966)	1.074 (2.060)	0.753*** (2.594)	0.941** (3.713)	0.601 (2.070)	0.689 (1.900)	0.810* (8.464)	0.674*** (2.416)
DUMMY	0.033** (2.971)	0.044 (2.288)	0.031 (1.837)	0.043** (3.662)	0.027 (2.170)	0.030 (1.807)	0.039* (8.975)	0.034*** (2.921)
POLINS	0.015** (3.184)	0.018*** (2.579)	0.015*** (2.706)	0.018** (3.936)	0.013*** (2.737)	0.013 (1.997)	0.014* (8.382)	0.014*** (3.057)
YD	6.006** (3.597)	8.095*** (2.387)	6.325*** (2.639)	7.188** (4.361)	5.173*** (2.806)	5.686*** (2.570)	6.439* (10.188)	5.472*** (2.960)
OD	-7.957*** (-2.632)	-11.848 (-1.890)	-8.828 (-1.683)	-9.496** (-3.370)	-6.412 (-1.912)	-7.484 (-1.955)	-8.673* (-7.592)	-6.605 (-1.870)
LEX	-0.021** (-3.961)	-0.026*** (-2.633)	-0.022*** (-2.357)	-0.025** (-4.598)	-0.017*** (-3.006)	-0.019*** (-2.922)	-0.028* (-11.413)	-0.021** (-3.901)
UR	-1.162 (-1.682)	-1.526 (-1.712)	-1.173 (-1.480)	-1.290 (-2.127)	-0.524 (-0.568)	-1.036 (-1.147)	-1.439** (-5.434)	-1.722 (-1.755)
Related Variable		-0.624 (-0.723)	-1.157 (-0.221)	2.630 (1.513)	-3.315 (-1.030)	-0.352 (-0.283)	-1.675** (-5.043)	2.387 (0.837)
R ²	0.992	0.993	0.993	0.995	0.994	0.993	0.999	0.994

Note: t-statistics in parentheses. (*) indicates statistical significance. Here and elsewhere in this article, *, ** and *** denote rejection at the 1%, 5% and 10% level critical values respectively.