The Evolution and Determinants of the Turkish Private Saving Rate:

What Lessons for Policy?

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Foreword

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Abstract[*]

This study looks into the evolution and determinants of the saving rate in Turkey, with particular focus on private saving. After a brief literature review, it starts by putting the Turkish saving rate in an international context, by comparing Turkey to several country sub-groups of interest (e.g., advanced countries, emerging Asia, emerging Europe and Latin America). The data shows that Turkey's private saving rate is low compared to other emerging market countries, but this is a recent phenomenon (other than in comparison with Asia) that reflects recent declines in the Turkish savings rate. Using previous econometric studies on the determinants of the private saving rate in Turkey and emerging markets in general, it explores possible reasons for this recent decline. Some micro evidence based on household surveys complements this macro national income accounts perspective. The balance of the evidence suggests that the recent decline in private saving can be explained by the recent rapid increase in credit along with sharp increases in housing prices. The report assesses the prospects by providing estimates of the positive impact of demographic trends on Turkey's future saving rate. The study concludes with policy prescriptions.

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INTRODUCTION

"The saving ratio is low in Turkey, and will probably stay low. We have a young population. We have about 15 million students. Our average age is around 28. […] This means we shall continue consuming. We also have a relaxed Mediterranean culture. It is difficult for us to save 30 percent like China, which has neither health, nor social security system. But with social security reform, we shall increase saving in the medium and longer term. […] Over the longer-term we will replace the current PAYG system with a more participatory system."

Minister Mehmet Simsek, answering the question on why saving is low in Turkey, Capital, Business Monthly, April 2008.

INTRODUCTION*

After decades of chronic macroeconomic instability, the Turkish economy underwent an impressive transformation in the aftermath of the February 2001 financial crisis. Thanks to a benign global environment, political stability and fiscal discipline, the economy expanded by over 6% p.a. during 2002-2007 as inflation decelerated to single digits, public debt declined and FDI inflows picked up sharply. But Turkey's private saving rate declined substantially during this period, which, with investment recovering from suppressed levels of the 1990s, resulted in a significant current account deficit (Figure 1). The latter rose to over 5% during 2005-2007, after averaging less than 1% during the 1990s.

Figure 1. Drivers of the Current Account (as % of GDP)

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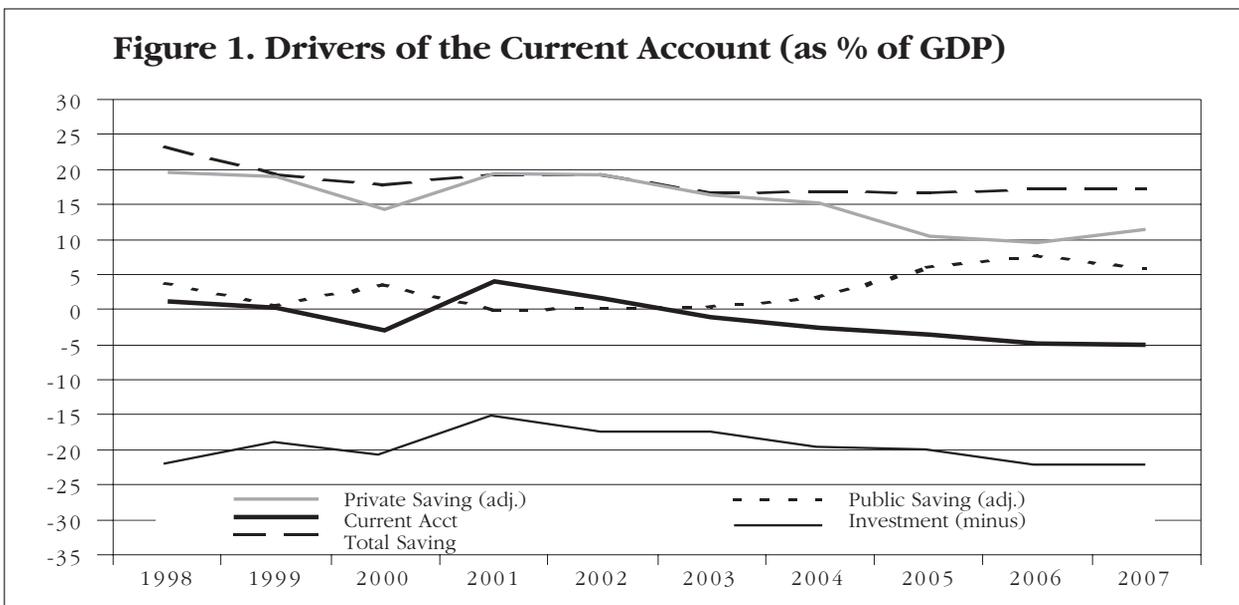
* *This report differs from its earlier versions in that it uses recently released SPO data on saving and investment for 1998-2007.*

But why should we be concerned at all? First, domestic saving is a way to accumulate wealth over time and raise living standards in the future. In essence, the choice is between consumption today and consumption tomorrow. The question, then, is whether there is any distortion to incentives to save that may cause sub-optimal saving, i.e., place an inordinate emphasis on consumption now, rather than later. It is somewhat difficult to argue that this is the case in Turkey, since real interest rates, an important parameter in this intertemporal decision, have been high—and remain high by international standards—and therefore policy interventions do not seem justified from this perspective.

A second, and a much more pertinent concern for Turkey, relates to the above-mentioned current account dynamics. That is, sustained low saving relative to investment translates into persistent current account deficits (CAD) and a steadily deteriorating international investment position.[1] This then leads to an increase over time in net factor payments to abroad (on account of interest and dividend repatriation), thereby sustaining the deterioration in the CAD, and creating a political backlash at some point. More imminently, the current account deficit is recognized as a key source of vulnerability, as it, by definition, signals reliance on foreign financing, or international investors' willingness to finance the deficit. In the event of capital outflows, such reliance on foreign capital forces an abrupt adjustment upon the economy, through a large depreciation and contraction in domestic demand.[2] These negative externalities may be a justification for policy intervention to raise the domestic saving rate. Moreover, home-grown domestic savings act as a catalyst for attracting FDI while strong reliance on external financing may erode competitiveness through an overvalued currency, providing additional motives for wanting to stimulate domestic saving (IMF, 2007).

Finally, a high saving rate may be instrumental in maintaining high growth rates through its impact on investment. In neoclassical growth models, high saving is associated with high growth in the transition to a new steady state, whereas in endogenous growth models, high saving can have a permanent impact on growth (see e.g. Barro and Sala-i-Martin, 1995). However, empirical evidence suggests that saving may have a limited effect on growth (e.g., Carroll and Weil, 1994; Rodrik,

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[1] Net international investment position is the difference between external assets and liabilities of a country, vis-à-vis non-residents, and is equal to cumulative current account balances, plus valuation changes on the stock.

[2] For more on this, the readers should refer to the well-known literature on "sudden stops" and "current account reversals".

2000). For example, Rodrik (2000) concludes that, "while growth transitions lead to sustained increases in saving rates, saving transitions tend to result only in temporary increases in growth." Thus, growth may *drive* rather than follow high saving.[3]

The report is structured as follows. We start with a brief review of the theoretical literature and its predictions for the effect of key variables on the saving rate, such as growth prospects, liquidity, interest rates, terms of trade, public saving and demographics, and then summarize main findings from the empirical literature on the effect of these key variables (Section 2). We then proceed to establish the relevant stylized facts for Turkey (Section 3), and ask why the saving rate has fallen dramatically during the last boom episode, by examining the "usual suspects", suggested by the theoretical and empirical literature (Section 4). In Section 5, we calculate, using three methods, the increase in saving likely to result from Turkey's projected improved demographics (i.e., a substantial decline in the youth dependency ratio over the next few decades). Section 6 presents the result of research based on household data from the household budget surveys of 2004 and 2005, where we check changes over time in saving rates across demographic groups and estimate equations of household saving. In Section 7, we surmise on policy measures that could help to raise the national saving rate. Section 8 concludes.

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[3] *This conclusion is based on event-studies as well as Granger causality tests for a sample of 20 countries that experienced saving transitions since the 1960s (a sustained increase of 5 percentage points or more in the ratio of national saving to national income) and a sample of 18 countries that experienced growth transitions (defined as a sustained increase in the growth rate of 2.5 percentage points or more).*

LITERATURE REVIEW:
ON THE MICRO AND MACRO
DETERMINANTS OF PRIVATE SAVING

LITERATURE REVIEW: ON THE MICRO AND MACRO DETERMINANTS OF PRIVATE SAVING

In this section, we review both the theoretical and empirical literature on the determinants of the saving rate to set the stage for the discussion to follow in the remainder of this report. We first review the main theories of household saving and their predictions for the effect of key macroeconomic and demographic variables on household saving. We then report findings from available comprehensive studies as well as some more recent ones of particular interest.

Private saving is the sum of household and corporate savings. The literature on corporate saving is less well-developed, and in fact, most studies of private saving hardly refer to corporate saving. Because data is not publicly available on corporate saving in Turkey, we concentrate on total private and household saving in this report.

2.1. Theories of household saving

Modern consumption theory starts with the presumption that consumers like to smooth out consumption over time, whether over the life-cycle (Modigliani-Brumberg, 1954) or in the face of temporary fluctuations to income (the permanent income hypothesis of Friedman, 1957). Models have become increasingly realistic over time, with the recognition of a precautionary saving motive (for risk-averse consumers), liquidity constraints, and hyperbolic discounting. "Buffer-stock saving" models, which combine a precautionary saving motive with impatient consumers, fit many stylized facts well.[4] We discuss these various models briefly below, with special focus on what they may have to say on factors at play in the case of Turkey, notably demographic transition; terms of trade; government saving; growth; interest rates; liquidity, in particular the role of revolving credit; and wealth effects.

Life-cycle saving (Modigliani-Brumberg, 1954): This theory suggests that consumers smooth consumption over a life-time. As a result saving will be high when incomes are high (during working-age), and there will be dissaving after retirement.[5] In the absence of a bequest motive, saving of any individual is zero

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[4] *The literature on household saving is well-developed, and can be found in standard textbooks such as Romer (2001).*

[5] *In the presence of social security arrangements, private pension schemes, or family support networks, income is smoother over a life-time than it would be in the absence of these schemes. This obviates the need for saving and dissaving over the life-cycle. On this basis, we would expect higher saving in rural areas and in the informal sector.*

over a life-cycle. And in the absence of growth or demographic change, aggregate saving will be zero as well. Yet, growth and changes in the population structure have implications for aggregate saving. If productivity growth makes the young richer than the old, saving by the young (who now need to finance higher consumption after retirement) will be greater than dissaving by the old. Thus, *aggregate* saving will increase with **growth.** This is referred to as the Modigliani's "aggregation effect". This feature of life-cycle saving is often invoked to explain the strong empirical correlation between growth and saving.

Similarly, aggregate saving is affected by **demographic transition**, i.e. the decline in mortality and fertility rates. Life-cycle theories predict a rise in saving as the **youth-dependency** ratio declines in the latter stages of demographic transition (Lee and Mason, 2006). There are three phases in demographic transition. Early on, mortality falls, which leads to more surviving children. This can cause saving to decline. In the intermediate phase, as fertility continues to decline, the youth-dependency ratio declines. The resources that are freed as a result (and which could be saved or consumed) are called the *first demographic dividend*.[6] In the late phase, an older working-age population, which also faces greater longevity and can no longer rely on children to take care for them in old age, saves to accumulate assets for retirement, unless it believes government will provide for its needs. This increase in saving is called the *second demographic dividend*.[7] In Section 5 of the report, we use these predictions to extrapolate the Turkish saving rate into the future.

The life-cycle hypothesis also predicts that windfall gains on wealth (e.g., a rise in the stock market or housing prices) will be consumed over the remainder of the life-time. This wealth effect is in theory different for housing and financial assets, and depends on age, being stronger for the elderly for whom the windfall would be consumed in fewer years. Some have suggested that *housing wealth isn't wealth*

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[6] *Formally, if adults with households with fewer children have more resources available over a life-time, and these additional resources are consumed by the adults themselves (rather than on children's education for example), consumption smoothing implies that consumption will also be higher after retirement, and hence saving for retirement will have to be higher (Attanasio, Banks, Meghir and Weber, 1999; Scholt, Seshadri, and Khitatrakun, 2006; Skinner, 2007). While such persons will spend more (and dissave more) after retirement, this effect will not be felt until later, and savings increases during the transition. A caveat here is that parents may well use these resources for their children (e.g. education) rather than themselves, that is, they would tend to substitute the quality of children for quantity. In that case there would be no need for greater retirement saving to allow consumption smoothing.*

[7] *Formally, children are a substitute for monetized saving, because they make transfers to their parents in old age (the household demand model; see Schultz, 2004). This means that adults who have fewer children now need to provide for their retirement themselves. Such adults will dissave more after retirement, but this effect again will not be felt for a while, so that aggregate saving increases in the transition. The impact on saving is accentuated as the result of greater longevity, which implies a need for higher assets to finance retirement.*

(Buiter, 2006), because cashing in on this wealth requires downsizing to smaller or less well-located housing. Only those "long" housing, in the sense that they (plan to) use less housing services than they own, are better off when house prices increase (e.g., the elderly). Families who don't own their home, or who plan to purchase a larger home, are worse off. These implications are testable in the Turkish case by comparing saving of households who own their home with those who don't. Economy-wide, there will only be a positive effect of higher house prices on consumption, if households are, on average, "long" housing.

Permanent-income hypothesis or PIH (Friedman, 1957): In this theory, consumption equals permanent (as opposed to current) income, which takes into account longer-term income expectations, and hence is relatively smooth. Transitory income shocks have only a small impact on consumption, and are mostly absorbed as saving or dissaving.

A well-known testable implication of the permanent income hypothesis is that movements in saving should anticipate movements in income (Campbell, 1987), i.e. people should save when they expect their incomes to decline in the future, and dissave (or save less) when they expect them to increase. This follows directly from the consumption smoothing motive, i.e. high saving today being necessary to allow consumption to remain unchanged when incomes fall in the future. Brought to the data, the implication is that saving will decline when **consumer confidence** is high. We will use this approach later in the Turkish context. Furthermore, when current **growth** is considered an indication of future growth, people will expect future income to be greater than income today, and will dissave, following the same argument as above. Put differently, growth today and in the future will raise permanent income (and consumption) more than it raises current income, *depressing* saving. This logic applies to workers with a substantial fraction of their working life ahead of them. For *older* workers, permanent income will not change much in response to higher growth, resulting in little change in consumption. For those workers, growth in current incomes then *increases* saving (Jappelli and Pagano, 1997, provide a good exposition; see also Carroll and Weil, 1994).

The PIH also suggests that effects of changes in the **terms of trade** (hence in incomes) on consumption will be smoothed over time, if these changes are

expected to be temporary, and will be absorbed as changes in saving. For example, saving will decline in response to a temporary negative terms of trade shock, but then recover after the shock is over. In contrast, consumption fully responds to a permanent decline in the terms of trade, with no impact on saving.

The PIH, under certain assumptions, implies "Ricardian equivalence"—the idea that private saving will offset changes in **public saving** one for one. If public saving increases because of higher taxes (or lower transfers), but this is expected to lead to lower future taxes, agents' life-time budget constraint, and hence consumption is unaffected and private saving (disposable income less consumption) declines. If public saving increases because of lower spending and this cut in spending is expected to be permanent, agents have higher life-time resources and increase private consumption by an amount equal to the reduction in public spending. Private saving again declines. According to the theory, agents also adjust their bequests to offset the effect of future taxes on future generations (Barro, 1974). However, the PIH only holds in the absence of liquidity constraints, when agents are risk-neutral (or are able to insure against risk at actuarial cost), government spending is unproductive, taxes are lump-sum and agents plan to leave bequests. It also requires changes in government spending to be permanent, and changes in taxes not to lead to offsetting changes in spending over time. These assumptions are rarely met in the real world, but Ricardian equivalence is such a persuasive theoretical concept that it often surfaces as an explanation for the inverse relationship between public and private saving rates.[8]

The impact of changes in the **real interest rate** is typically studied in a simple two-period version of this model, in which agents either borrow or lend in a first period as a function of the path of their labor income (e.g., borrowing if incomes are increasing) and interest rates. While one might intuitively think that increases in interest rates will lead to increases in saving, this is not necessarily the case because changes in interest rates have both a substitution and an income effect. An increase in interest rates makes delaying consumption more attractive (the substitution effect). This effect goes in the same direction for lenders and borrowers, that is, both will tend to save more (borrow less) in the initial period when interest rates increase. This is the effect one intuitively expects.

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[8] When these assumptions are not met (e.g. when there is precautionary saving and taxes are a function of income), a cut in taxes today financed by future taxes will lead to some increase in consumption today (and the offset between public and private saving will be less than one for one). This is due to the fact that income taxes reduce the volatility of future (after-tax) income, therefore reducing the need for precautionary saving. Similarly, when some households plan not to leave bequests, they will raise their consumption in the face of a tax cut, which is to be financed by higher taxes on future generations.

But there is also an income effect on consumption, which affects borrowers and lenders differently. The income effect of an increase in interest rates is positive for those lenders, who now earn more interest income and hence can consume more in both periods, and negative for borrowers, who have to pay more interest. Overall, the impact of an increase in interest rates on consumption in the initial period is uncertain for lenders, and negative for borrowers (they will consume less and borrow less). Another interesting aspect is the responsiveness of saving to interest rates at low levels of income. Increasing saving in response to higher interest rates is difficult when incomes are already near subsistence since first period consumption cannot be compressed (Ogaki, Ostry, Reinhart, 1996). Intertemporal substitution is almost impossible and the substitution effect non-existent.[9]

Precautionary saving: In this theory, households save because they are risk-averse, i.e. the greater the uncertainty about future income, the greater the saving (see Romer, 2001 for a good exposition). **Inflation** is often used, in studies of private saving, as a proxy for uncertainty about future income. Rural incomes may be more uncertain than urban ones, in which case precautionary saving would fall with urbanization. Precautionary saving incidentally is one reason for not observing a rundown of wealth to zero during old age (in addition to a bequest motive): wealth (in the form of home ownership, for instance) is insurance against a catastrophic event. Since people do not know when they will pass away, on average people die leaving bequests.

Liquidity constraints: In this theory, households save more when they are liquidity-constrained. Liquidity constraints act both directly to restrict consumption below what consumption smoothing implies, and indirectly, as the possibility of the liquidity constraint becoming binding in the future makes shifting resources to the future (saving) more desirable. A relaxation of liquidity constraints makes higher consumption in the present possible, but at the expense of lower consumption in the future. Liquidity constraints are captured by the amount of **credit** available in the economy, and sometimes by variables such as loan-to-value ratios for home purchases.[10] The amount of credit available in the economy is likely influenced by

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9   *In technical terms, the marginal utility of income is very high around subsistence levels, hence the willingness to substitute consumption over time is very low. With consumption tracking income closely, there is also no income effect.*

10   *See e.g. Jappelli and Pagano (1994).*

housing prices, if higher collateral improves access to credit (e.g., through home equity loans). Households may wish to access additional credit resulting from higher house prices (i.e., withdraw equity from their homes) if they were credit-constrained before.

Buffer-stock saving: Such models combine a precautionary saving motive, impatience and sometimes a liquidity constraint (Deaton, 1991; Carroll, 1992, 2001, 2004). Households target a wealth/permanent income ratio to act as a buffer in case of adverse income developments. More patient households and households which are more risk-averse or face higher uncertainty target a higher wealth/income ratio. Factors that reduce the need for precautionary wealth—such as lower uncertainty or a **relaxation of liquidity constraints** or a **positive shock to wealth**—lead to dissaving, until the new target wealth is reached. After the target is reached, precautionary saving continues as before. These factors therefore have only a temporary effect on saving, albeit one that could last several years (Carroll, 2001; Carroll et. al., 2006).

Buffer-stock saving models match certain features of the data well, notably the close correlation between consumption and income growth; the fact that most households save little, and that wealth is concentrated; and the correlation between wealth holdings and uncertainty. The buffer-stock model of saving seems to explain saving behavior for ages between mid-20s to mid-40s (Gourinchas and Parker, 2002).

Hyperbolic discounting: Hyperbolic discounting refers to a situation where people simultaneously use a *high* discount rate for discounting the near future and a *low* discount rate for discounting the distant future, i.e. they act impatient when discounting the near future, but patient when discounting the far future. For instance, when offered the choice between $50 now and $100 a year from now, many people will choose the immediate $50. However, given the choice between $50 in five years, or $100 in six years, almost everyone will choose $100 in six years, even though that is the same choice seen at five years' greater distance. This also means preferences are dynamically inconsistent: After 5 years, people will reverse their preferences, prefering $50 in year five over $100 in year six. Hyperbolic discounting helps to explain seemingly irrational behavior, such as procrastination and impulsive behavior (lack of self-control). Importantly in our context, it also helps to explain over-use of credit card (over-use in the sense that

people will eventually regret having taken on credit) and helps to explain why widespread availability of credit cards reduces saving even of those who are not liquidity-constrained (i.e., those who have financial assets) in the first place (Laibson, 1997).

Habit persistence: When real income increases (decreases), spending may not rise (fall) immediately; or when taxes increase, reducing disposable income, spending may not decline (Carroll, Overland and Wei, 2000). Habit persistence explains the stylized fact of sluggishness in consumption. Persistence in consumption habits causes a temporary decline in saving in case of a temporary negative shock (as under the PIH), but also implies a reduction in saving which persists for some time in the case of a permanent negative shock (unlike under the PIH where saving does not respond to a permanent shock). Persistence in consumption habits is also consistent with the correlation between growth and saving because growth in incomes is not immediately followed by growth in spending. Habit persistence also implies a negative relationship between public and private saving, when private consumption is persistent in the face of a change in taxes. Thus, an increase in taxes (an increase in public saving), which reduces disposable income, will be associated with a reduction in private saving if consumption is persistent.

2.2. Empirical findings on determinants of saving

Several researchers have developed the insights gained from the household saving theories into an empirically-motivated macro literature, focusing on the determinants of both within—and cross-country variance across saving rates. The most comprehensive effort to date on saving is by the World Bank "Saving Across the World." The project aimed to explain the variation in savings rates across countries; to establish the direction of causality between saving and growth (the above-mentioned study by Rodrik, 2000 forms part of the study); and to draw policy implications on how to raise national saving rates. The study includes an overview chapter (Loayza, Schmidt-Hebbel, and Servén, 2000a; henceforth LSS), which reviews earlier studies in the literature, as well as a comprehensive panel-data analysis of determinants of private saving, covering 150 countries over the period 1965-1994, and estimated with system GMM (Loayza, Schmidt-Hebbel, and Servén, 2000b). Private savings data in this study is inflation-adjusted, as it should be.

Another comprehensive panel-data study on (national) saving is provided by IMF (2005). Two studies focus specifically on Turkey, by Ozcan, Gunay, and Ertac (2003) (henceforth OGE) covering the period 1968-1994, and by IMF (2007) covering the period 1980-2005. Both studies report results for unadjusted and inflation-adjusted private saving rates, but we focus on the latter below. In what follows, we draw extensively on the overview chapter in LSS and literature review in IMF (2007), as well as the subset of results of LSS for developing countries and the subset of results for IMF (2005) for emerging markets.

Income

All studies reviewed above as well as those contained in the various literature surveys find this variable to be an important determinant of savings. Higher GDP per capita is associated with a higher saving/GDP ratio in these studies.

Growth

Studies typically find a statistically positive and significant effect for real per capita GDP growth on savings. This is the case for the panel-data studies of LSS, IMF (2005) as well as several earlier studies.[11] The findings of a positive coefficient on growth are consistent with various theories (e.g, Modigliani's aggregation effect, habit formation). Other methods confirm this finding as well. Carroll and Weil (1994) provide evidence based on US household data that predictable growth in earnings is associated with higher saving among the young. This is the opposite of what one would expect for the young, and the authors suggest that habit formation along with uncertainty about future earnings is responsible for this result. Rodrik (2000) studies "growth transitions", that is transitions from low to high growth rates, and finds that "growth transitions tend to be followed by significant, and *sustained*, improvements in saving performance." He does not, however, specify the mechanism by which growth may be driving saving. For Turkey, studies differ in their findings, with no statistically significant effect in OGE, but a statistically significant and large positive coefficient in IMF (2007).

Terms of trade

Studies consistently find a positive coefficient on terms of trade improvements

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[11] *This is however not the case for all studies, for example Haque, Pesaran and Sharma (1999). See Loayza et. al. (2000a), De Serres and Pelgrin (2002), and IMF (2007) for surveys of results of a large number of panel-data studies.*

(LSS, IMF (2005), and all studies reviewed therein). As noted in the theoretical literature above, this is what one would expect when terms of trade movements have a temporary nature. OGE finds this result for Turkey,[12] but it is not confirmed in IMF (2007).

Inflation

A few studies find a positive coefficient on inflation (LSS; Masson, Bayoumi, and Samiei, 1998). Inflation is a measure of uncertainty, and this result is interpreted as being consistent with a precautionary motive for saving. OGE and IMF (2005) also find this effect for Turkey.

Credit

Credit tends to be statistically significant in empirical studies, but they differ on the specific form —*level* of credit/GDP vs. *change* in credit/GDP— which turns out to be pertinent. For instance, LSS find a statistically significant role for the level of credit/GDP, whereas IMF (2005) finds a role for its change. Finding a role for the level implies that liquidity constraints matter for saving, whereas finding a role only for the change in credit/GDP ratio implies that liquidity constraints do not matter, other than when they change. The first result is consistent with standard models of liquidity constraints, whereas the second result is what one would expect from buffer-stock saving models (Carroll, 2008, emphasizes this point). In that case, a relaxation of liquidity constraints means target wealth can be less, and wealth will be drawn down in the transition to a new steady state. After reaching that new steady state, saving recovers.

For Turkey, studies vary in their findings. OGE found a role for the level of credit/GDP ratio in a restricted regression which excluded, inter alia, government saving and inflation. IMF (2005) found that the coefficient on the change in credit/GDP ratio was not statistically significant. We believe this latter result could be caused by multi-collinearity however, since variables highly correlated with credit, such as public savings and inflation, are controlled for in the regression (an issue we turn to in Section 4 below).

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[12] *It may be worthwhile adding that OGE considers various definitions for government, with implications for the coverage of private saving. They find a statistically significant effect for the terms of trade in the specification where government is defined as central government, but not where government is defined as the non-financial public sector.*

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Gross and Souleles (2002) provide additional detail on the role of credit. They find that increases in credit limits lead to an immediate rise in debt, and that, consistent with the buffer-stock saving hypothesis even people starting well below their credit limit, respond to the increase in limits.

Real interest rate

Knowing the impact of real interest rates is crucial for informing policy on stimulating saving (for instance, to answer questions, such as whether raising the after-tax rate of return through tax measures would succeed in raising private savings). As noted before, its impact is ambiguous in theory and depends on the relative magnitude of the substitution and income effects. The real interest rate does not have a statistically significant effect in most studies (LSS and studies cited therein and in IMF, 2007). An exception of a study which finds a positive coefficient is Masson et. al. (1998). Both studies on Turkey also do not find a statistically significant coefficient on the real interest rate.

Further insights are gained by Ogaki, Ostry, and Reinhart (1996), who study the intertemporal rate of substitution (the willingness to substitute consumption over time) at different levels of income. The authors find evidence that the intertemporal rate of substitution is low at low levels of income. The authors' interpretation is that, saving cannot respond positively to interest rates in poor countries, because first period consumption cannot fall below subsistence levels.[13] This provides an explanation for the lack of responsiveness of saving to interest rates in episodes of "financial liberalization" (freeing of deposit rates) in low-income countries as well as for the statistical insignificance of the real interest rate in panel data studies focusing on developing countries.

Wealth

Wealth is not studied explicitly in the panel-data studies reviewed so far, but other studies are available. These studies suggest the existence of a wealth effect on consumption.[14] Studies find a medium-term marginal propensity to consume out of housing wealth in the range of 0.04-0.10 and 0.04-0.07 for stock market wealth. As expected, the effect is stronger for the elderly. Studies disagree on whether the effect is stronger for housing or financial wealth.[15] It is also not clear how long the

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[13] *The marginal utility of income is very high around subsistence levels, hence the willingness to substitute consumption over time is very low.*

[14] *Carroll et. al. (2006); Funke (2002), and Sierminska and Takhtamanova (2007) provide good overviews.*

[15] *For instance, Ludwig and Sløk (2002) estimate a larger effect of stock wealth than housing wealth in a panel of 16 OECD countries, whereas Carroll et. al. (2006) and Sierminska and Takhtamanova (2007) find the opposite.*

wealth effect lasts. Some studies find that the wealth effect of stock market prices disappears over 1-3 years (as cited in Funke, 2002). We are not aware of any study on the role of the wealth effect in Turkey.

Government saving

An increase in government saving is associated with lower private saving in all panel-data studies (LSS, IMF, 2005; all studies reviewed in LSS and IMF, 2007). However, offsets are far from complete for developing countries. For instance, LSS and IMF (2005) find offsets of -0.5 and -0.2, respectively, so that a one percentage point increase in public saving succeeds in raising total saving by 0.5-0.8 percentage point. The (partial) offsets could reflect Ricardian effects (e.g., a reduction in private saving in anticipation of lower future taxes), but as discussed in the literature review above, might also be the result of a multitude of factors such as habit formation (e.g., unchanged consumption levels despite higher taxes), the effect of goverment borrowing on credit availability to the private sector and real interest rates, or a reduced need for private saving in response to the introduction of programs such as social security or unemployment insurance funded by social security taxes.

OGE (in one specification[16]) and IMF (2007) also find offsets to public saving for Turkey. Both studies find very high long-run coefficients on public saving, that is, very high offsets by private of public saving, on which we say more below in Section 4. OGE finds a long-run coefficient on public saving of -1.2 (implying private saving falls more than public saving rises) and IMF (2007) finds -0.7. These findings, taken at face value, suggest that an increase in government saving will fail to raise overall saving by much in Turkey.

Demographics

Many studies find evidence of an impact of the youth and old-age dependency ratios (the ratio of the young or old to working-age population). For the youth-dependency ratio, LSS estimates that a 1 percentage point reduction in this ratio is associated with a 0.3 percentage point increase in the saving rate in the short-run (0.5 percentage points in the long-run[17]). The corresponding figures are 1.4 and 2.8 for the old-age dependency ratio. These variables were not significant in the Turkey-specific studies, but this is not too surprising, given the lack of variance in the series.

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[16] *The specification that excludes growth, credit and the current account, and defines government as the non-financial public sector.*
[17] *Long-run coefficient is calculated as the short-run coefficient divided by one minus the coefficient on lagged saving.*

TURKISH SAVING RATE IN INTERNATIONAL AND HISTORICAL CONTEXT

TURKISH SAVING RATE IN INTERNATIONAL AND HISTORICAL CONTEXT

In this section, we provide estimates of the evolution of Turkish national, private and public saving rates, with particular focus on recent developments, and then make some international comparisons. We show that the Turkish domestic and private saving rates are low in international comparisons, but that this reflects for the most part an unfavorable comparison with China and East Asia, as well as strong cyclicality in Turkey's private saving rate, in particular during the latest growth phase from 2002 through 2006.

3.1. The Turkish Context

In this section we track national, private and public saving as a percentage of GDP, since 1987. Comparisons over time are complicated by the fact that NIA data were revised in 2007 for the period 1998-2007, but not earlier. For earlier years we used SPO data based on the 1987 NIA revision.[18] Box 1 describes how SPO constructs the various saving series and also discusses possible measurement error in the series.

The series for private and public saving also require inflation adjustment. We make this adjustment following the World Bank methodology (see Appendix I). Inflation adjustment is required, because in times of high-inflation (inflation averaged some 70% in the 1990s, but then decelerated gradually to less than 10% in 2007), private saving overstates the amount of asset accumulation, because the underlying assets are being eroded by inflation. At times of disinflation, this by itself causes an illusory decline in the raw private saving data (since private saving was never that high to begin with). Public saving, conversely, are understated in the absence of adjustment, as inflation erodes the real value of public debt.

Figure 2 shows that total saving has been on a downward trend since 1998 and that there have been wild swings in the private and public saving rates. Inflation-adjusted private saving was on average 17.3% of GDP between 1998-2004, after which it declined sharply to 10% in 2005-06. The drop from peak to trough

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18 The new National Income Accounts (NIA) data raises nominal GDP by some 30%.

between 2001-06 was 9% of GDP. Inflation-adjusted private saving then increased in 2007 to 11.4% of GDP. Private and public saving rates are practically mirror images of each other.

Figure 3 provides longer-term trends for total saving and inflation-adjusted private and public saving since 1987. The figure is based on SPO data based on the 1987 revision for data up to 1997 and the 2007 revision thereafter. That means there is a break in the data in 1998, given important revisions to investment, current account, and GDP in the 2007 NIA revision. It reveals a downward trend in total saving driven by declining public saving until 2001 and private saving thereafter. Private inflation-adjusted saving is clearly below its long-term historical average in 2005-06 (10% versus 17.1% average for 1987-2004, and inflation-adjusted public saving above its historical average (6.3% versus 4%)).

Box 1. Data Issues

Turkish National Income Accounts have been revised in early 2008 (the "2007 revision"). New series (1998-present) replaced outdated old series (1987-2006). The NIA now provide only GDP not GNP or GNDI (gross national disposable income). Data on saving and its composition were made available by SPO at end-2008. SPO's methodology takes the NIA data as a basis, and makes a number of adjustments.

SPO uses the following accounting identities to calculate national saving and its components, private and public saving:

National saving
$S = I$ (including change in stocks) + CA.

I is gross investment and CA the current account balance. CA in turns equals (X-M)+ NFI+Tr. X-M is the balance on goods and services, NFI, net factor income, and Tr, current transfers from abroad. SPO obtains data on I and (X-M) from the NIA, and data on NFI and Tr from the BoP (converted into Lira) and makes some adjustments to I. Notably, SPO adjusts the part of investment corresponding to government investment, to include personnel expenditures associated with investment (classified by TurkStat as government consumption). We constructed our own series for total investment using readily available data from the NIA and BoP (using monthly average exchange rates), without the adjustments made by SPO in order to gauge the importance of these adjustments. We found only small differences for total saving for the period 1998-2007 (Box Figure 1).

Private and *public* saving
$S^G = I^G$ (including change in stocks) + Government Balance
$S^P = S - S^G = I^P$ (including change in stocks) - Government Balance + CA

The equation for public saving, S^G, follows from Government Balance = Revs - Trans - C^G - I^G, where Revs are revenues, Trans are transfers to the public including interest, and C^G is government consumption, since S^G = Revs - Trans - C^G. Note that public saving is *not* equal to the government balance, contrary to common belief.

SPO uses general government (budgetary central government plus extrabudgetary funds and revolving funds plus social security agencies, including unemployment fund plus local governments) as its basis in calculating the government balance. As a result of this choice of definition, private saving will include the saving of public enterprises, as is customary. It then makes some adjustments to the raw data. The adjustments to the government balance include removing items classified "above the line" in the fiscal accounts, but which do not affect wealth. A recent example is the treatment of revenues from sales of GSM licenses in 2007, which were classified as capital transfers by Treasury, and removed by SPO from the general government balance. Government investment, I^G, refers to general government investment; hence state enterprise investment is classified as part of private investment, consistent with the definition of private saving. As noted above, SPO also adjusts the NIA data for I^P and I^G. Our own series for S^P and S^G using NIA and Treasury data for the fiscal balance, without adjustments, shows some differences with SPO, notably in 2002, 2006, and 2007 (Box Figure 1).

How much difference do the new NIA data make? To answer this question we compare SPO data for the period 1998-2006 based on the old and new NIA data. It turns out the differences are substantial. Revised data shows a sharper decline in the private saving rate in 2003 and 2004, and higher private saving for 2006 than earlier SPO data (see Box Figure 2). These differences reflect in part the reduction in government saving as a percent of GDP, which resulted from the upward revision in GDP (government investment and government balance were not revised in nominal terms other than small changes in 2006), but also large downward revisions in private investment as a share of GDP.

Box Figure 1. Domestic Savings: Comparison of SPO data and readily available data (based on 2007 NIA)

Legend:
- - - - - Private Savings (readily available data)
- – – – Private Savings (SPO)
- ——— Total Savings (readily available data)
- ◆ Total Savings (SPO)
- ——— Public Savings (readily available data)
- ——— Public Savings (SPO)
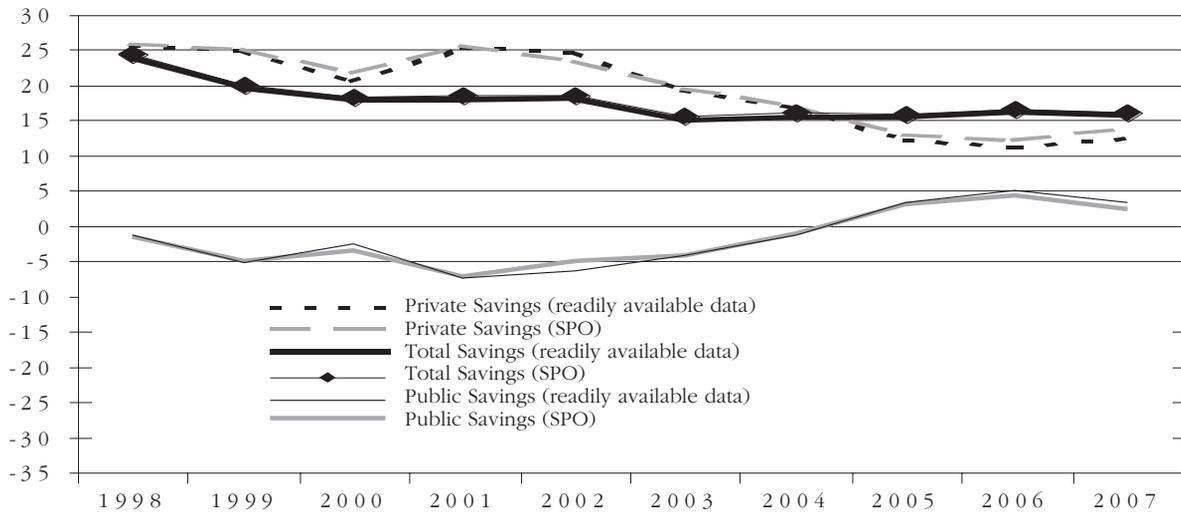
Box Figure 2. Domestic Savings: Comparison of SPO data based on 1987 and 2007 NIA

Legend:
- - - - - Private Savings (SPO 2007 NIA)
- – – – Private Savings (SPO 1987 NIA)
- ——— Total Savings (SPO 2007 NIA)
- ——— Total Savings (SPO1987 NIA)
- - - - - Public Savings (SPO 2007 NIA)
- ——— Public Savings (SPO 1987 NIA)
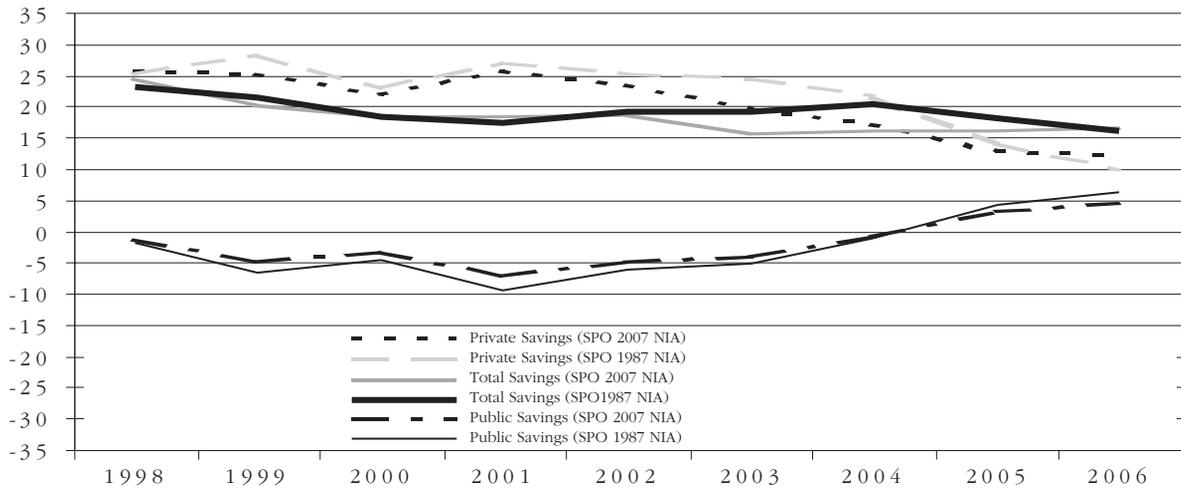
A final caution on the data: By construction, total saving is a residual and private saving is a double residual. Substantial measurement error affects these residuals in particular through inventory investment and government investment. Under the new NIA, the measurement error is much reduced, thanks to more accurate measurement of changes in stocks. Nevertheless, measurement error may still be present, in particular for earlier years, where appropriate adjustments to government investment and the government balance may not have been carried out. Such measurement error will not only lead to inappropriate conclusions on the level of private and public saving, but will also affect regression analyses containing both variables, since measurement error imparts a negative correlation between the variables given the residual nature of private saving.

Figure 2. Unadjusted and Adjusted Savings Rates, new National Accounts Data (as % of GDP)
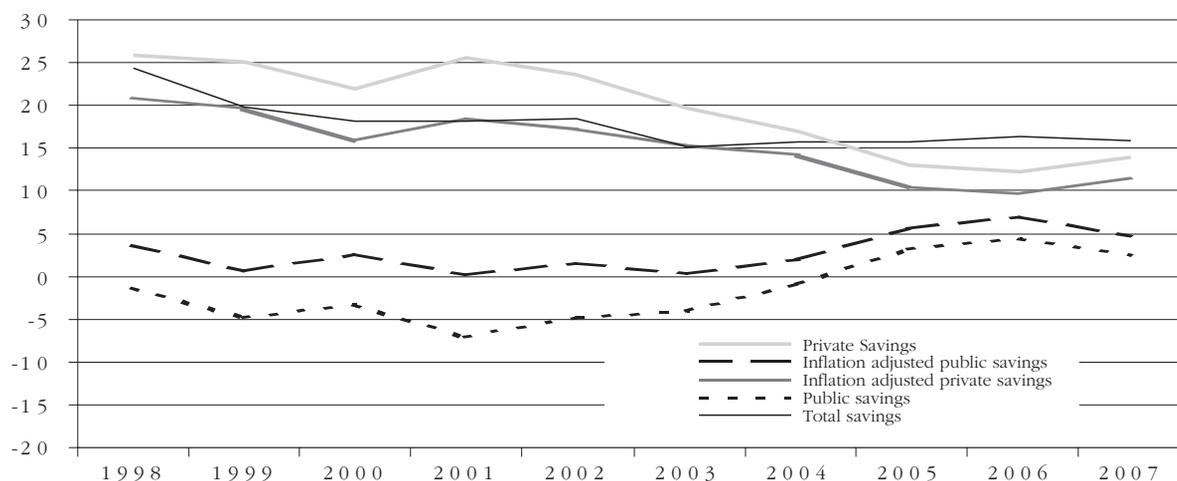
Figure 3. Unadjusted and Adjusted Savings Ratios, 20 year perspective, SPO data (as % of GDP)
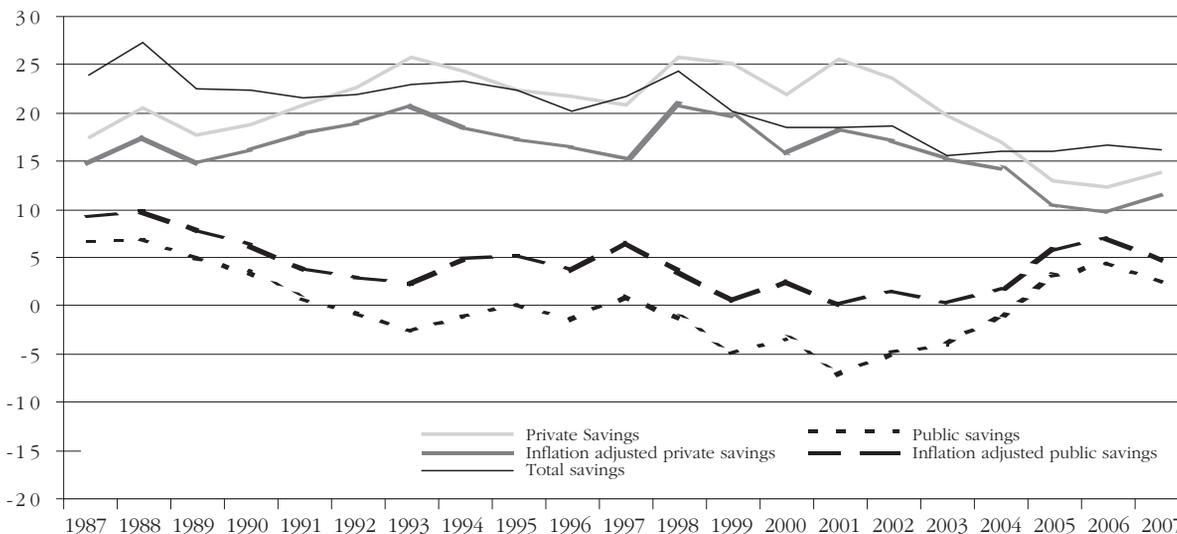
While we do not know the breakdown between household and corporate saving, we can confirm that household saving followed the trend in total private saving based on household budget survey data (see Section 6 below). This data also exhibits a large decline in the saving rate in 2004, with household saving declining from 17 percent of disposable income in 2004 to 10 percent in 2005.[19]

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[19] *Data is not publicly available on corporate saving in Turkey, though the CBT does compile data on this. There is reason to believe that corporate saving may have declined with the sharp reduction in interest rates. Corporates in the past were known to invest heavily in government securities, because of their high return.*

3.2. The International Context

We now turn to international comparisons. Figure 4 shows that Turkey's national saving rate has been low over the past decades, by emerging market standards. A closer look at the breakdown however (Figure 5), shows that this is largely a reflection of very high and rising saving rates in Asian and Middle-East economies. Interestingly, Turkey's national saving rate is comparable to that in Central and Eastern Europe (chart includes Turkey) and is not much lower than that in the EU, or the Western Hemisphere countries.[20]

The Turkish national saving rate is also about the same as in the Western Hemisphere *before* the recent increase in commodity prices, which greatly benefited most of the commodity-exporting countries there, thereby increasing their savings. As discussed in the theoretical survey above, the latter becomes the typical response to a positive but transitory shock to income. Differences with Middle-East economies are, as for the Western Hemisphere countries, also readily explained by terms of trade improvements. It is interesting to observe that Turkey's saving rate is similar to that in Eastern European countries, which have also experienced "credit booms" of late, and are in the EU-"convergence club". From this perspective, the main question therefore is why the Turkish saving rate is so much less than the Asian saving rate. Though this is a big puzzle that is yet to be answered fully satisfactorily, high Asian saving are often attributed to demographic factors, the precautionary saving motive, high productivity growth, and high returns to investment (see Box 2).

Figure 4. National Saving Rates (as % of GDP)

Legend: World; Advanced Countries; Other emerging Market and Developing Countries; Turkey

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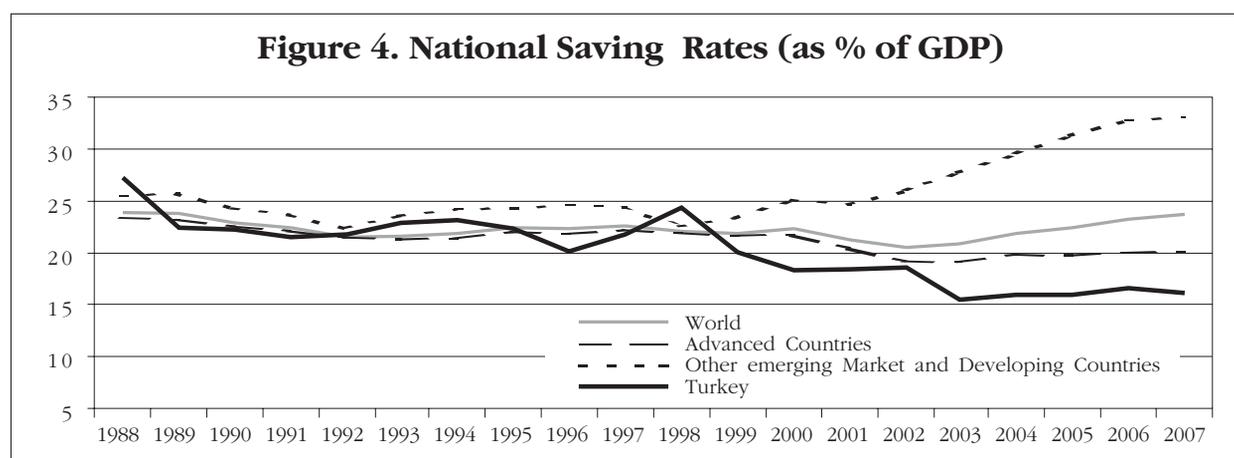
[20] *According to 2005 WDI data, Turkey has a lower domestic saving rate than the median, ranking 96th out of 171 countries. It has a saving rate similar to that of Italy, Costa Rica, Chile, Pakistan, Israel, Poland, France, and higher than in Bulgaria, Hungary, Greece, UK, US, Iceland, Lebanon, and most African countries. Countries with higher saving rates include all of Asia, oil-exporters, Switzerland, Netherlands, Czech Republic, Ukraine, Argentina, Canada, Germany, and Egypt. This statistic also suggests that Turkey's saving rate is low, but not exceptionally so according to international comparisons.*

Box 2. The Chinese Saving Rate

What accounts for the large saving rates of the Asian economies, notably China? One answer is **demographics**. China, owing to its "one-child" policies dating from 1970, is now further advanced in its demographic transition, which has been suggested as a major reason underlying the increase in its saving rate:

> "The individual saving rate has increased since the introduction of the One Child Policy. This has been partially attributed to the policy in two respects. First, the average Chinese household expends fewer resources, both in terms of time and money, on children, which gives many Chinese more money with which to invest. Second, since young Chinese can no longer rely on children to care for them in their old age, there is an impetus to save money for the future." (Naughton, 2007).

The population pyramid for China indeed shows that youthful cohorts are relatively small (see figure). Old age cohorts (65 years and older), on the other hand, are small for both China and Turkey (7-8% of the population). So in what follows we focus on the youth dependency ratio alone.

Box Figure 3. China: 2008

Source: US. Census Bureau, International Database
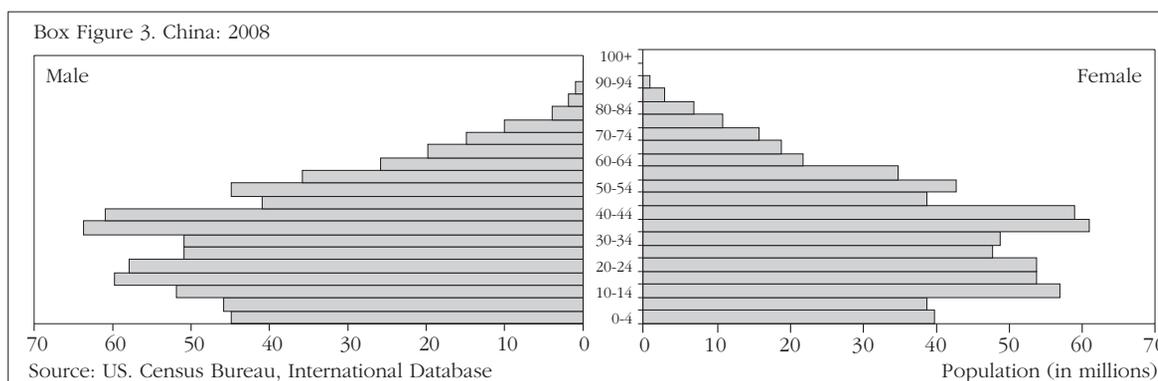
But how much might this effect account for the high Chinese saving rate? Empirical studies generally find an economically and statistically significant *negative* effect of the youth (under 15) dependency ratios on saving. The above-cited study of Loayza, Schmidt-Hebbel, and Luis Servén (2000b) found that short—and long-term coefficients on the youth-dependency ratio are 0.3 and 0.5, respectively. That is, an increase in the youth-dependency ratio of 1 percentage point leads to about a 0.5 percentage point decline in private saving/GDP in the long run. Therefore, if the above result were to be applied mechanically, i.e. contrasting the Chinese youth-dependency ratio (the ratio of the population under 15 to the population 15-64) of about 28% in 2008 with the Turkish ratio of 36%, suggests a difference of 4 percentage points in savings/GDP. While not a trivial magnitude, clearly, this does not explain much of the difference between the private saving rates of the two countries (11% in Turkey vs. about 50% of GDP in China).

Naturally, other factors must be at play then. On the household side, the literature mentions the high **productivity growth** in China. Applied in a life-cycle context, this would mean new working-age generations will be richer than their retired counter-parts, which raises the aggregate saving rate for the population. The **precautionary** saving motive is suggested as another major explanation given high uncertainty and low health benefits. Another reason is strong retirement savings in view of low state pensions (see e.g., IMF, 2005). Chamon and Prasad (2008) show that the increase in saving by the elderly population can be accounted for by health expenditure-related risks and also that saving in anticipation of private spending on education may be a factor raising saving by households with young children at least during transition (until the higher spending on education actually materializes). On the corporate side, Liu and Woo (1994) and Woo (2004) have argued that in the Chinese context of the unwillingness of the banking system to finance the private sector, entrepreneurs save to finance investment ("investment-motivated saving"). Consistent with this idea, corporate savings are also very high in China (over 20 percent of GDP).

Figure 5. National Saving Rates (as % of GDP)

Legend:
- European Union
- Central and eastern Europe
- Developing Asia
- Newly industrialized Asia
- Middle East
- Turkey
- Western hemisphere
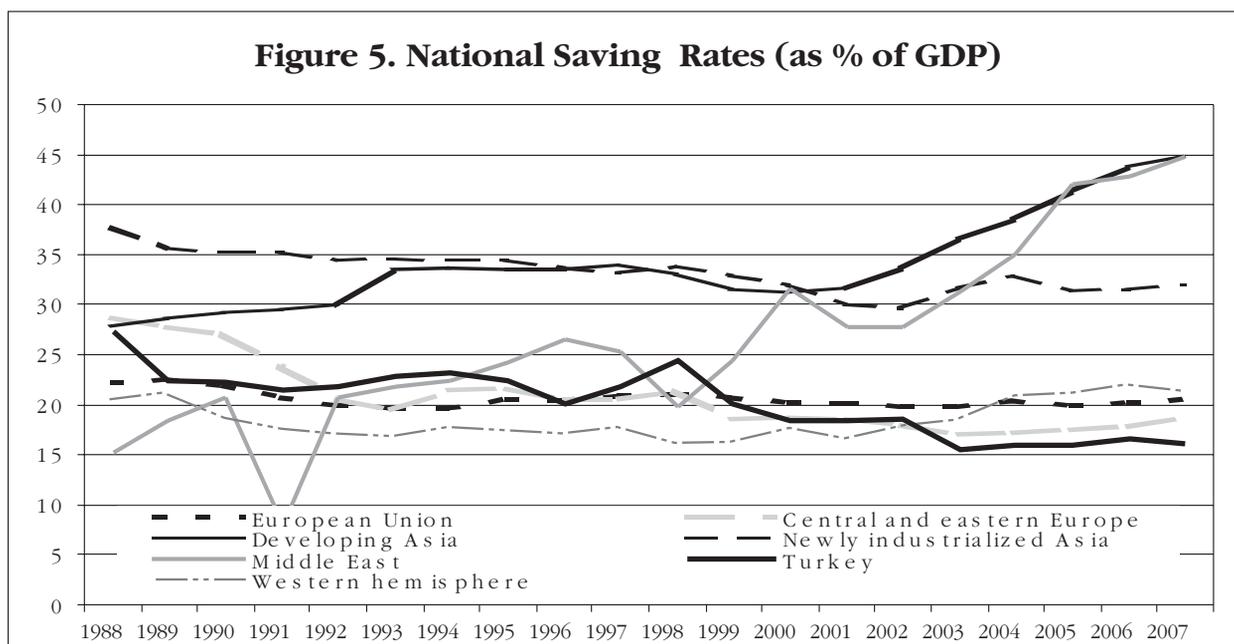
An international comparison of *private* saving rates is more difficult, because the necessary data to compute private saving is not readily available for a global sample. Here we rely on results published in IMF (2005), with the drawback that the data ends in 2004. The IMF data for comparator countries are based on saving rates unadjusted for inflation, and therefore overestimate true savings to the extent the comparison involves countries with high inflation.[21] The data shows that private savings have been roughly stable at around 20 percent of GDP for emerging markets excluding China, East Asia and oil producers (Figure 6). Turkey does not fare too badly in comparison to this set of countries, until the year 2002; saving unadjusted for inflation lay somewhat above comparator countries, while saving adjusted for inflation lay somewhat below.[22] The data also shows that Turkey's private saving rate experienced large cyclical swings several times in the past. The most dramatic episode occurred after 2002, when the Turkish private saving rate declined to levels much below emerging market comparators. In conclusion, this data shows that Turkey's private saving rate, as was the case for total saving, has been low over the last few decades in comparison with China and East Asia, but not low in comparison with other emerging markets on average. The recent decline in the private saving rate, however, brought Turkey's saving rate below that in other emerging markets.

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[21] Private saving rates of higher inflation countries are overstated for reasons discussed earlier in the report.

[22] Comparing unadjusted data provides a rosy picture as Turkish inflation was likely higher than that in comparator countries. Using adjusted data for Turkey on the other hand, biases the comparison in the other direction, since data are unadjusted for other countries.

Turkish public saving rises in parallel with the decline in private saving, explaining the limited decline in overall domestic saving in recent years. In terms of levels, a comparison with other countries based on the same IMF study shows that the Turkish public saving rate compares favorably with other emerging markets (over 3% of GDP in Turkey based on unadjusted 2007 data versus a modestly negative number (-0.5%) for emerging markets).

Figure 6. Private Saving Rates (as % of GDP)
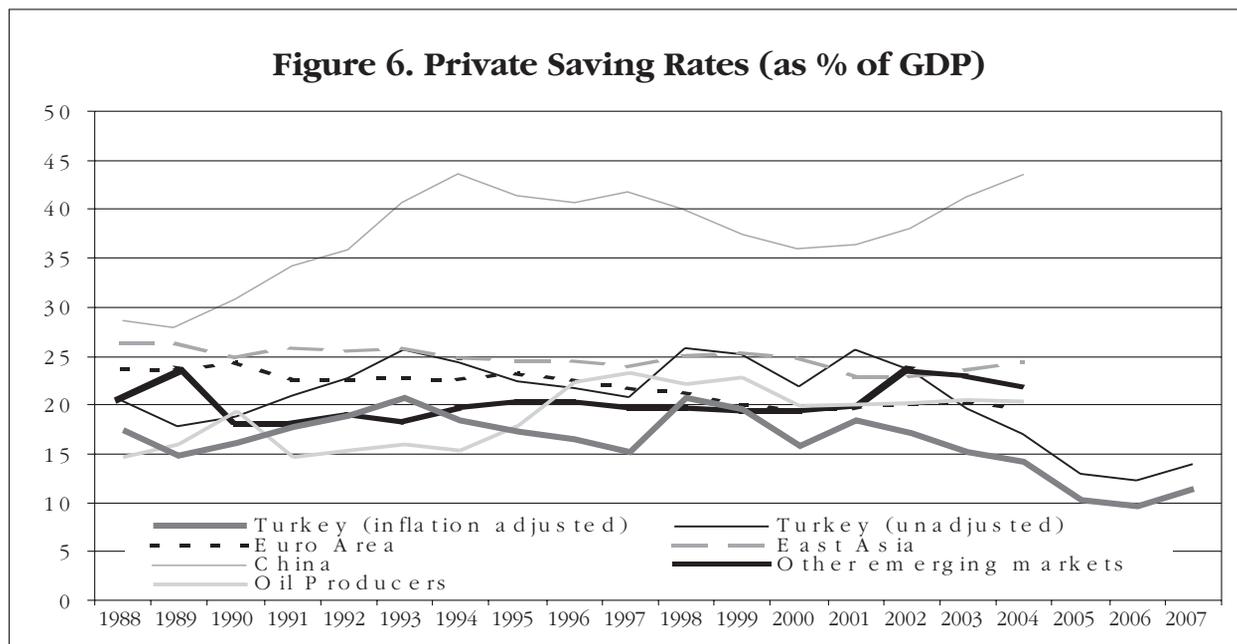
If Turkish saving, and in particular private saving, has been low relative to the world average, what about broad trends in investment and the current account balance? WEO data indicates that Turkish investment rates, too, have been low compared to other emerging markets, and to even mature markets, for extended periods of time (Figure 7).[23] This has kept the average Turkish current account balance close to zero (its 10-year average has been a deficit equivalent of 1% of GDP), while showing wild fluctuations in the interim, a reflection of Turkey's near-term macro history, characterized by booms followed by busts (Figure 8). Still, the current account balance was worse, on average, vis-à-vis both the emerging markets and mature markets. An exception is Central and Eastern European countries, again EU convergence countries, most of which have completed EU-accession in recent years (i.e. a first batch in 2004; another in 2007). These countries have had substantially higher CADs than Turkey for a protracted period (averaging 4.5% over the last 10 years).[24]

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[23] *The figure uses old NIA data until 1997 and revised NIA data thereafter.*

[24] *The literature on the experience of current account dynamics of EU accession countries is large. For a recent take, see Rahman (2008).*

Figure 7. Total Investment (as % of GDP)

Legend:
— World
– – Advanced countries
····· Other emerging market and developing countries
— Turkey

Figure 8. Current Account Balance (as % of GDP)

Legend:
– – Advanced economies
····· Other emerging market and developing countries
— Turkey
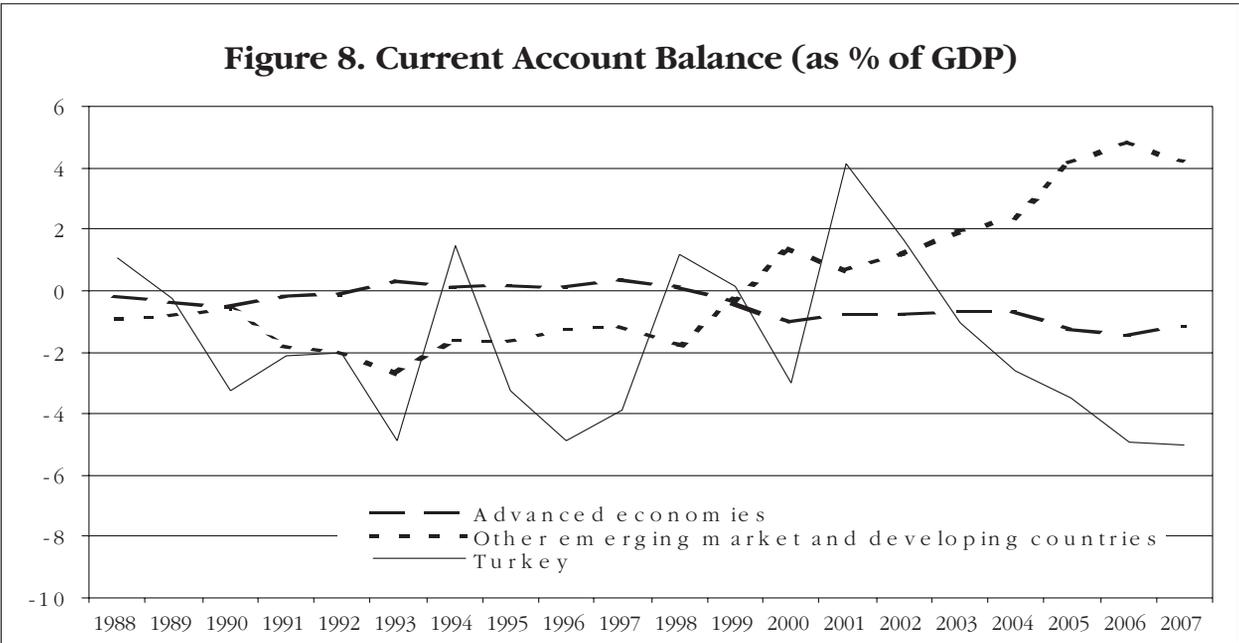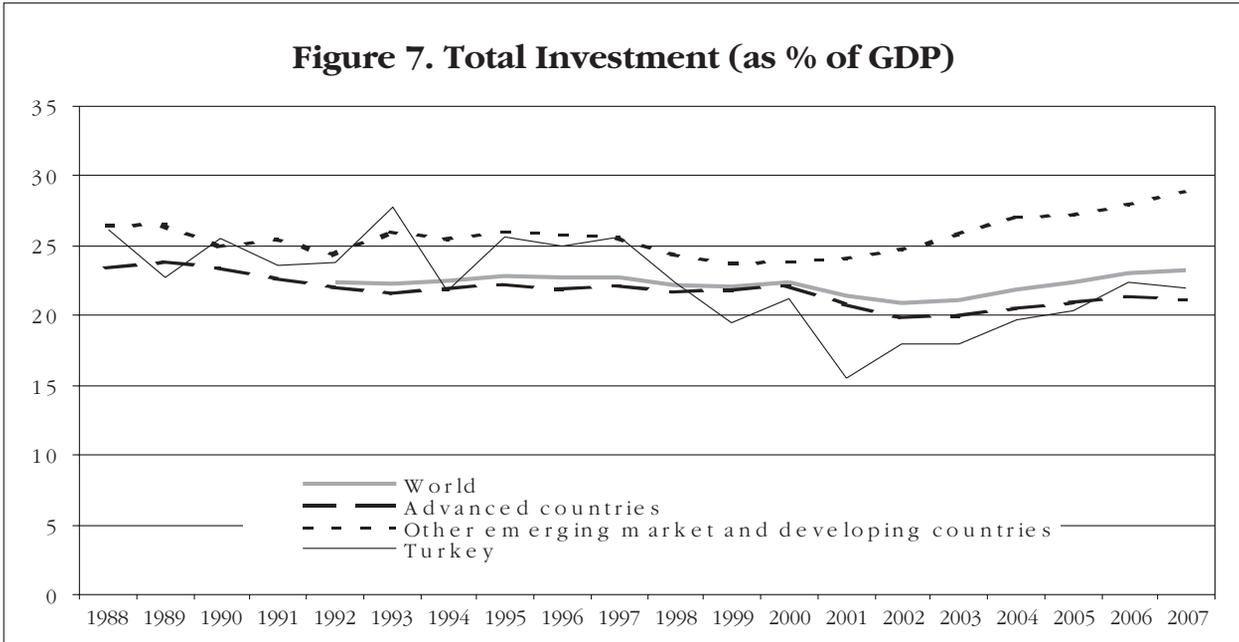
In conclusion, comparisons across countries and over time point to two main features of the Turkish saving rate. First, it is low, but mainly in comparison to the Asian and oil-exporting countries; from that perspective Turkey does not look to be an outlier. Second, there has been a large decline in the Turkish private saving rate in the past few years in the post-crisis recovery period. Having already discussed the reasons for the former above, we now turn to an analysis of the possible reasons for the recent large drop in the private saving rate.

S E C T I O N 4

POSSIBLE EXPLANATIONS FOR THE
SHARP DECLINE IN THE PRIVATE
SAVING RATE

POSSIBLE EXPLANATIONS FOR THE SHARP DECLINE IN THE PRIVATE SAVING RATE

What accounts for the sharp reduction in the private saving rate in recent years? We try to answer this question by reviewing the "usual suspects" suggested by the literature review above. Specifically, these include improved prospects, since Turkey recovered from a deep financial crisis in 2001, deteriorating terms of trade reflecting the increase in oil prices, a catch-up on account of durable consumption, and looser credit. We have not included growth itself (as opposed to improved prospects) and demographics among our suspects, given that their effect worked in the opposite direction: high growth over the period would have stimulated saving, and a decline in dependency ratio over the period would also have exerted upward pressure on saving.

Improved prospects

Several surveys of consumer expectations are available to help us gauge how confidence and agents' perception of the outlook has fared since the 2001 crisis. Unsurprisingly, confidence rose from the troughs of the crisis. By 2004-05, however, according to CNBC-e indicator of "consumer expectation", more persons expected the economic situation and their finances to deteriorate rather than to improve over the next year (see Figure 9). In theory, this should have called for an increase in saving, not a decrease, following the argument of Campbell (1987), whereas, paradoxically, the decline in private saving was sharp in 2004. Indicators of "consumer sentiment" and "consumer confidence" remained stronger for longer, but these indicators also reflect the current appetite to buy durable goods as well as the current financial situation of respondents, rather than purely expectations of the future.

Figure 9. CNBC-e Consumer Confidence Index (Jan-02=100)
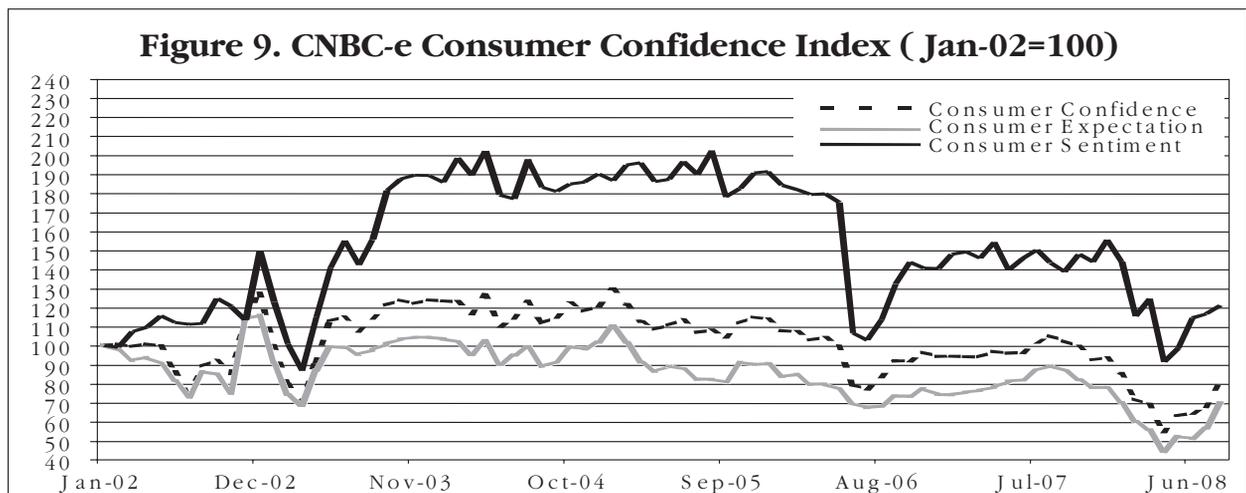
Data note: Consumer expectation: based on expectations of own future (one year ahead) financial situation and economic situation ("better or worse than currently?"); Consumer sentiment: based on current appetite to buy durable goods ("good time, bad time?"); Consumer confidence: based on own financial situation (compared to previous year), current economic situation (compared to previous month), future financial situation, future economic situation and appetite to buy durable goods. Index above 100 indicates more people had positive than negative responses.

Similarly, expectations for employment (naturally, the major source of income growth) from TurkStat show that expectations were rather gloomy, with more people expecting the job situation to deteriorate than to improve starting in early 2004 (Figure 10). The same is true for purchasing power as of mid-2004 and the general economic situation starting in the second quarter of 2005.

Figure 10. CBRT-TurkStat Consumer Confidence Index
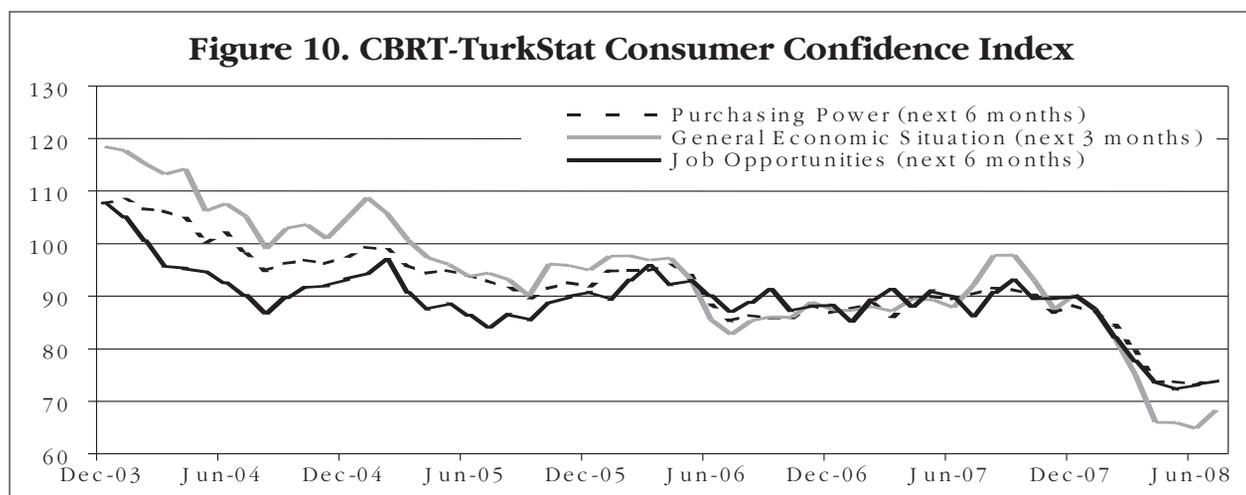
Data note: Indices indicate the balance of positive and negative responses to questions asking respondents to compare the trend in purchasing power, general economic situation, and job opportunities (Q: "better or worse than currently?"). Index above 100 indicates more people had positive than negative responses.

In sum, while appealing on the face of it —the idea that agents would have drawn down their savings on the back of an economic boom and attendant improvement in expectations— or the "improved prospects" thesis in short, does not find much support in the data in terms of explaining the sharp drop in savings starting from 2004.

Post-crisis consumption catch-up

One explanation for the decline in the saving rate could be a simple "catch-up" from compressed spending levels for *durable* consumption goods during the crisis. After all, durable spending is for the types of goods (e.g., washing machines, electronics) whose purchase people postpone at times of crises. In fact, durable goods consumption is known to be very cyclical.

In the case of Turkey, too, durable goods spending fell by 30 percent in 2001 and remained at low levels in 2002, as households delayed their purchases. Spending then rebounded sharply in 2003, nearly doubling in the next three years, from crisis lows (see index of real spending on durables in Figure 11). (Specifically, consumption of durable goods was 80 percent higher during 2003-06 than in 2001-02). To assess whether the rebound in durable good spending simply reflected a catch-up from compressed levels we calculated a baseline for spending, i.e. spending that would be necessary to keep the per capita stock of durables unchanged at 2000 levels. Such spending would need to be positive because of depreciation and population growth. This baseline is our counterfactual, that is, the spending on durable goods we might have expected in the absence of a crisis. If spending was only a catch-up from compressed levels, cumulated spending on durable goods since 2001 should be about equal to cumulated levels under the baseline. We found that the shortfall in spending compared to baseline in 2001-02 was about 30 percent less than the excess in 2003-04, which means that already in 2004 the stock of durables per capita had recovered to 2000 levels.[25] Therefore, the catch-up thesis does not square well with the data either, making us naturally suspect that other factors might have been at play in igniting the boom in durable consumption goods. Growth in credit and declines in real interest rates are likely reasons to which we turn later.[26]

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[25] *In order to derive our baseline we needed an estimate for the initial stock of durable goods. In a steady state this stock is equal to durable goods spending divided by population growth plus the depreciation rate. We assumed that 1999 was a steady-state, i.e. a year in which the stock of durables per capita might have remained constant, with new purchases just equal to depreciation plus population growth (2000 was a boom year in which the stock of durables per capita probably grew, so not a steady state). We used 15% for the depreciation rate of the stock of durables and 1% for population growth, corresponding to actual recent population growth. Based on durable spending and these assumptions, we calculated the stock of durable goods in 1999. We then derived the 2000 stock of durables by removing 15% depreciation and adding actual spending on durables in 2000. This 2000 stock of durables in per capita terms then became our benchmark. We calculated spending necessary to maintain this stock and compared this with actual spending. Using a 10 or 20 percent depreciation rate makes little difference to the results, though results are somewhat sensitive to the choice of benchmark (i.e. to estimates of the initial stock of durables). With a 15 percent higher benchmark, the stock of durables per capita recovers to 2000 levels in 2005; and with a 25 percent higher benchmark (a very unlikely situation), the stock of durables per capita recovers to 2000 levels in 2006.*

[26] *Mankiw (1985) is a classic study of the role of real interest rates in the decision to purchase durable goods.*

Figure 11. Actual and Counterfactual Spending on Durables (Index)

Counterfactual spending is the amount of spending necessary to keep the stock of durables per capita at 2000 levels
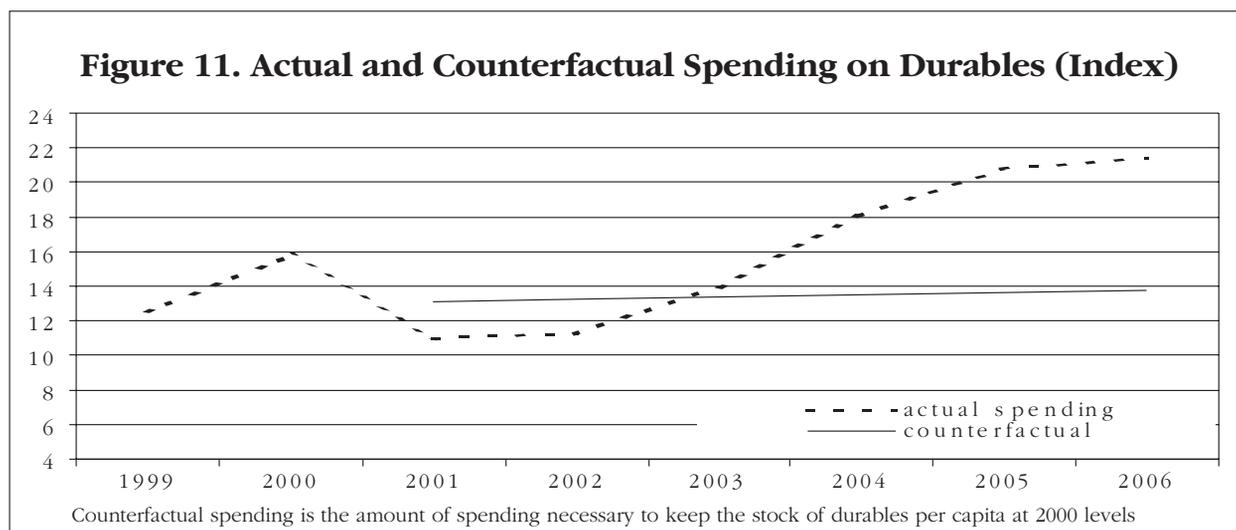
Deterioration in terms of trade

In explaining the recent cyclical decline in the Turkish private saving rate, another place to look is energy prices. After all, Turkey is a heavy importer of energy, situated on the opposite side of countries whose saving rate has greatly benefited from the commodity boom of recent years. To give an example, Turkey's net import bill amounted to some $30 billion in 2007, or over 4% of GDP, as oil prices sky-rocketed, going up four-fold from less than $30 p/b (Brent) in early 2004, to over $120 p/b in early 2008.[27] One could therefore imagine that the terms of trade effect, which is also a significant driver of the saving rate in the panel-data regressions reviewed above, would have had a major contribution to the decline in saving during this period.

Somewhat surprisingly, however, the oil price effect on the current account as a percent of GDP was quite limited, as shown in the chart below, to about 1 percent of GDP during the 2004-2007 period (Figure 12). This has been the case because GDP in dollar terms has also risen rapidly during this period, largely compensating for the sharp increase in energy prices. More generally, the Turkish terms of trade have held up well. Strong Turkish export prices, partly reflecting dollar weakness vis-à-vis the Euro and partly diversification toward higher value-added goods (such as electronics, automobiles, and white goods), prevented a sharp deterioration in Turkey's terms of trade.[28]

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[27] Oil prices had risen to almost $150 p/b by mid-summer, but these recent moves (i.e. beyond the $100 p/b mark of late 2007) were largely speculative, and appeared to be pricing a relatively healthy global economy, which did not materialize. Prices at the time of writing (end-December 2008), were around $45 p/b.

[28] In fact, Turkey's terms of trade deteriorated only modestly, by less than 10% in the period from 2003 through 2007.

Figure 12. Energy and Non-Energy Current Account Balance (as % of GDP)
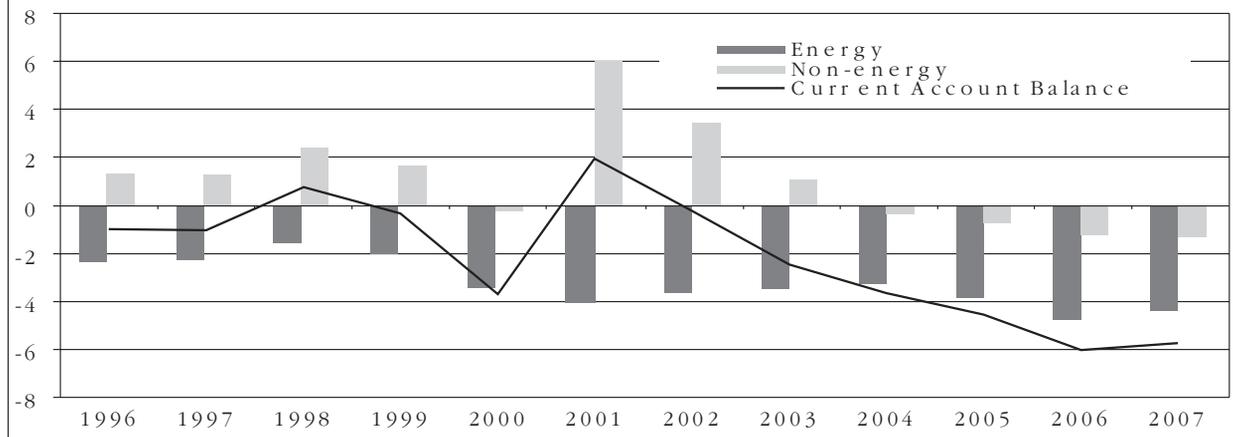
Increase in public saving

The most recent empirical evidence on the importance of this effect is provided in a recent regression analysis for Turkey by the IMF (IMF, 2007). The study finds for the period 1980-2005 that the key determinants of the Turkish private saving rate are *public saving* (with the expected negative coefficient), *inflation* (with the expected positive coefficient), and *real GDP growth per capita* (with a positive coefficient). Based on these results, the 8% decline in inflation-adjusted private saving from the peak in 2001 to the through in 2005 is largely explained by the increase in the public saving rate (a contribution of -7% of GDP), the decline in inflation (a contribution of –3%) and an increase in growth (a contribution of +6%). Neither the change in credit to GDP ratio (or a relaxation of the credit constraint for Turkish households), nor the real interest rate, have a statistically significant impact in this particular study.

A linear interpretation of these findings is that strong "Ricardian effects" might have been present in the Turkish case (as noted in the literature review, the long-run coefficient on public saving in the IMF study, at -0.7, is quite large and close to almost full offset)[29]. In this view, the increase in public savings (thanks to a strong fiscal adjustment) led to a decline in private saving, because improved public savings today implied a lower future tax burden for forward looking, rational agents. But this interpretation is not entirely realistic because there is room

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[29] *Measurement error in measuring public saving rates —likely to be present in the Turkish raw data as well as in the inflation adjustment— would bias the coefficient on public saving downward to –1, as noted in IMF (2007), though a robustness check using instrumental variables in the same study did not find that measurement error substantially affected the estimates.*

to suspect that, as in many emerging market economies, the strong theoretical assumptions required for the Ricardian equivalence result to hold— notably the absence of liquidity constraints, risk-neutral agents, internal equilibria with bequests for everyone, and especially, the certainty that government spending will not increase in the future— are largely absent in the Turkish case as well.

While hard to prove formally, a more natural and broader interpretation of these findings in our judgment is that, it is the Turkish stabilization experience, and notably its impact on interest rates and credit, that underlies the decline in saving.[30]   Clearly, the increase in public savings (or overall fiscal position) through generation of unprecedented primary surpluses during this period, contributed to restoration of confidence after the 2001 financial crisis. This, in turn, led to lower inflation, lower real interest rates, a greater ability to borrow from abroad, and strong FDI inflows (from 2005 onward). All these factors combined to release resources for lending to the private sector, or creating a so-called "crowding in" effect for the private sector (Figure 13).

Figure 13. Balance Sheet of the Banking Sector (Share in total assets)
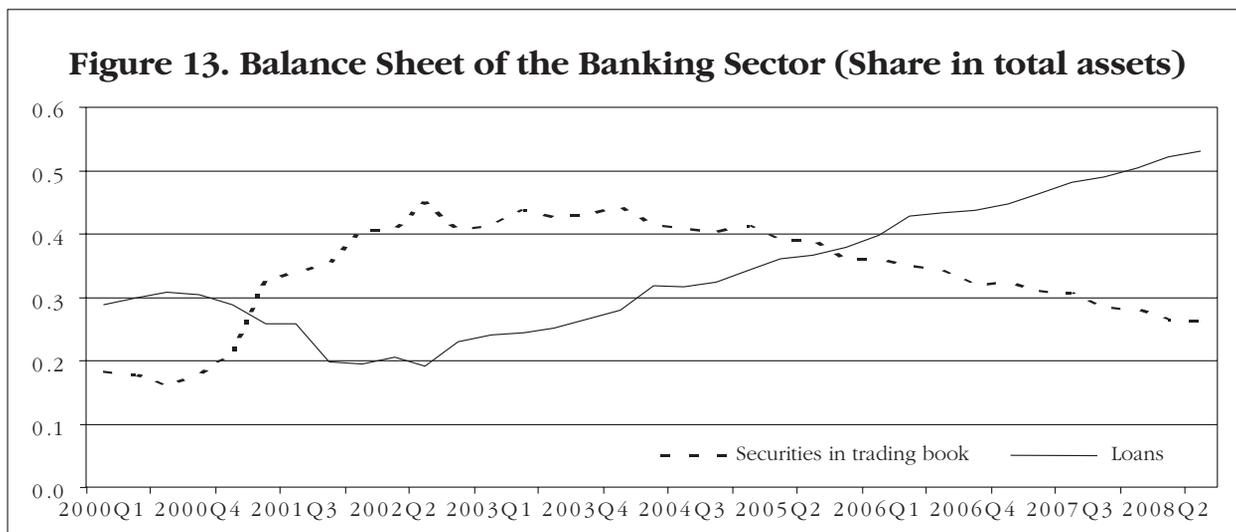
Technically, the correlation among public savings, real interest rates, and credit growth (see Figure 14) seems very strong in the Turkish data, which makes it difficult to formally test (i.e. disentangle) the hypothesis of Ricardian effects versus more indirect (e.g., confidence-related) influences of broader fiscal stabilization. One suggestive piece of evidence against the linear (Ricardian) interpretation is

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[30]   *A consumption boom is a general feature of Latin American stabilization episodes, and has been subject of much research (e.g. Calvo and Vegh, 1999; Gavin, Haussmann, and Talvi, 1997). These episodes have often turned out badly, as boom turned into bust, and doubts remain that Turkey may, once again, suffer from the same fate.*

offered by household level data, discussed in Section 6 below. Namely, the aforementioned large increase in spending and decline in savings took place among households headed by the elderly as well, which is hard to explain by Ricardian effects, since these agents should be relatively unaffected by future reductions in taxes.

No matter what the reason behind the negative correlation between private and public saving, the high correlation is bad news in terms of the ability of government saving to raise total saving in Turkey. One policy implication of our interpretation, however is that, an increase in public saving in the future will need to be accompanied by tight monetary policy and/or prudential mechanisms targeted at curbing extensive credit growth. This will be necessary to prevent spillovers from higher public saving into lower interest rates and higher credit, if a large offset by private saving is to be avoided.

Figure 14. Collinearity between Public Savings and Real Interest Payments (as % of GDP)
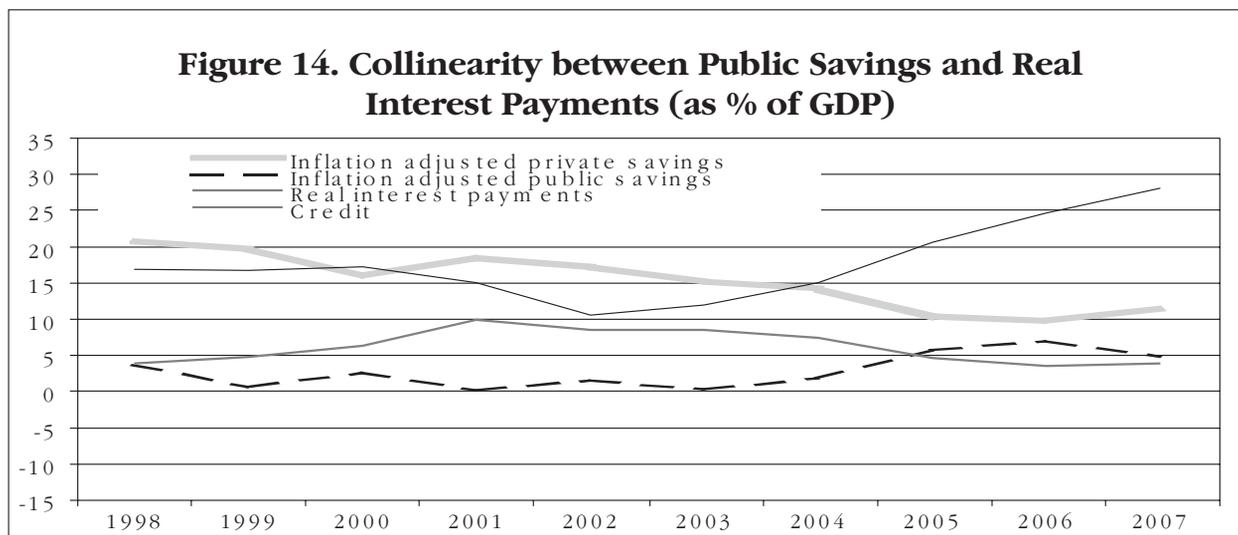
Looser liquidity constraints

As a natural extension to the previous discussion, we look closer at the evolution of credit in the post-crisis period. Unsurprisingly, credit expanded rapidly during this period, with particularly remarkable expansion in consumer credit, albeit from a low base. After a sharp rebound from post-crisis lows, annual consumer credit growth settled at a 60% (y/y) plateau in real terms from early 2005 through mid-2006. It has slowed after the May-June 2006 sell-off in global financial markets by which Turkey was also affected, but credit growth still remained well

above a 20% p.a. rate, again in real terms. During this period, consumer credit rose from around 4% of total private consumption in 2003, to some 15% at the end of 2007 (Figures 15 and 16).

This increase was essentially the consequence of the above-mentioned successful stabilization experience, characterized by sharp declines in the budget deficit and inflation, and a big jump in FDI flows. Gross capital inflows (i.e. before reserve build-up by the banking sector including the Central Bank) surged to over $150 billion (cumulative) in the period from 2004 through 2007. Injection of this external liquidity into the Turkish financial sector was a key driver in fueling credit growth.[31]

Figure 15. Retail Loans to Private Final Consumption Expenditures (%, share)
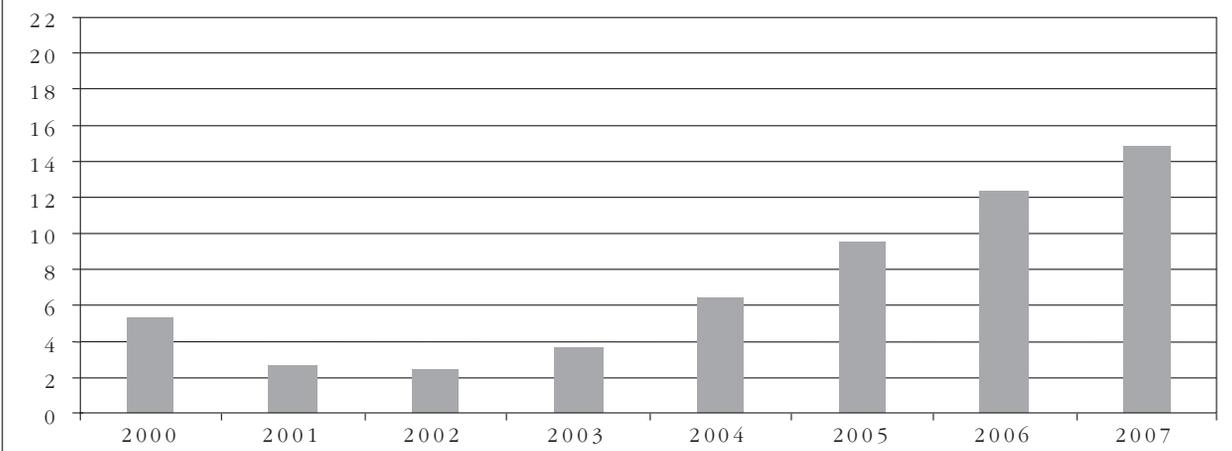
Figure 16. Consumer Loans and Individual Credit Cards (real y/y growth,%)

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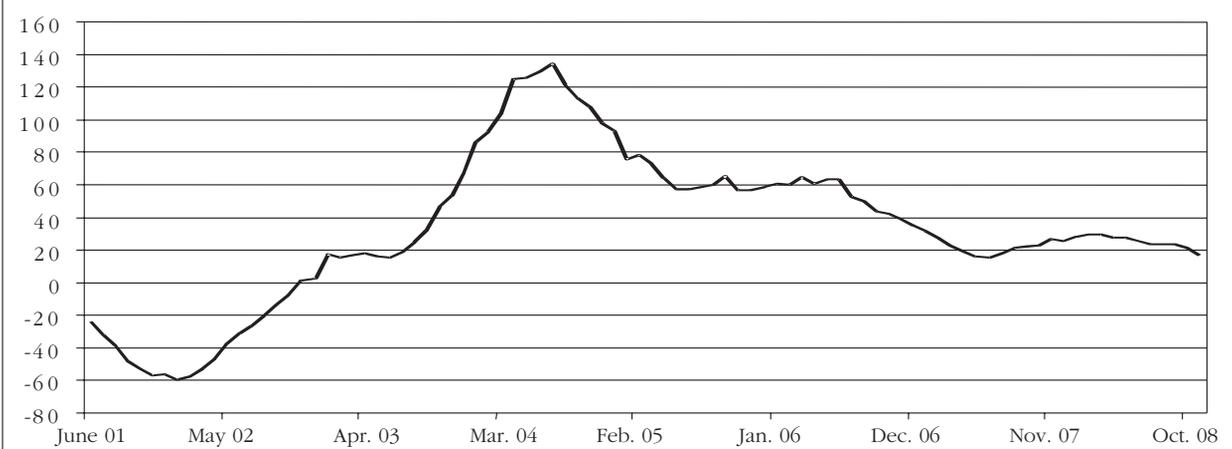
[31] *It may be worthwhile adding that loans to the corporate sector grew at a lower pace during this period, with the ratio of consumer credit (including credit cards) to total loans rising from a pre-crisis 25% to over 40% in late 2008. During this period, corporate sector external indebtedness rose by 4-fold, however, from around $30-$35 billion, to about $125 billion.*

How would an increase in consumer credit cause a reduction in savings? As noted in the literature review above, this may happen through various mechanisms such as the direct effect of relaxed liquidity constraints on consumption, the indirect effect on precautionary saving as agents have access to a greater buffer of liquidity, i.e. feel safer as a result and draw down their savings, and "hyperbolic discounting", i.e. a situation in which people are impatient in the near-future, hence use revolving credit when it is available. All these mechanisms seem to have played a role in reducing savings in the case of Turkey.

Reduction in real interest rates

The reduction in real interest rates was very large during the stabilization episode coming down from almost 30% in the immediate aftermath of the crisis, to high single digits more recently. But it is difficult to pinpoint their effects. As explained in the literature review, real interest rates have an ambiguous effect on savings mainly because of income and substitution effects working in opposite directions in the case of savers. "Living off interest income" is a typical feature of many households in Turkey, the result of years of chronic fiscal deficits, macroeconomic instability and high real interest rates, hence the emergence of a "rentier class". This means that there is a large class of people for whom the income effect of lower interest rates was adverse, reducing consumption and increasing saving. This would have stemmed the negative impact of lower interest rates on saving through the substitution effect. We find some evidence that this was indeed the case based on household budget survey data. As described in Section 6, households with interest income did not reduce their saving rates, whereas households without interest income, did.

Wealth effect

Another notable feature of the post-crisis experience, which is related to the decline in interest rates, is the sharp rise in asset prices, both in the stock market and the housing market. We may thus ask whether there was a "wealth effect" at play in Turkey, whereby consumption was spurred by higher wealth, or the perception of it. We can check for a wealth effect (as it relates to housing) thanks to household budget survey data, which distinguish households according to

whether they lived in their own homes rather than were tenants. Data is unfortunately not available on financial assets, so that we cannot enquire into their effects.[32] Judging from the household survey, home-ownership is widespread, with some 70% of households living in their own home. The data in the Turkish case clearly show that home-owners and non-home-owners behaved differently. Home-owners reduced their saving rates, whereas tenants maintained them (Section 6).

While tempting to simply ascribe this to a wealth effect from home-ownership, interpretation is made difficult by the fact that, as noted in the literature survey, it is difficult to justify the existence of a wealth effect on theoretical grounds: after all, home-owners will normally continue to live in their homes, so are not directly better off simply because these homes are worth more.[33] In fact, home-owners face two offsetting effects: an increase in value of an asset, and an increase in imputed housing costs. Possibly the results reflect the fact that access to liquidity was greater for home-owners as owners of a worthy collateral. Furthermore, tenants may have been more reluctant to borrow or reduce saving, since they were in fact worse off as the result of the housing boom and attendant increase in rents.

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[32] *Stock market effect is arguably not that huge in Turkey. Stock ownership is not particularly widespread among the population, nor makes up a major chunk of household wealth. Market value of all ISE stocks was 30% of GDP in 2007, one-third of it was in "float", and most of the float (about 70%) was owned by foreigners.*

[33] *One could argue that they may have even been worse off in fact, because of higher property taxes.*

DEMOGRAPHIC PROJECTIONS: HOW MUCH OF A "SAVING BONUS" IS AWAITING TURKEY?

DEMOGRAPHIC PROJECTIONS: HOW MUCH OF A "SAVING BONUS" IS AWAITING TURKEY?

Population pyramids for Turkey show that there is currently a bulge for the five 5-year cohorts in the 10-35 year old category. As the demographic transition proceeds this population bulge will age, and by 2025 relocate to the 30-55 year old category (Figure 17). This would normally lead to an increase in the saving rate. We provide estimates of this impact in this section.

Mechanically an increase in the saving rate will result, because the share of the population with spending in excess of income (children and youth) will decline and the share of the population with income in excess of spending will increase. Of course, behavior is likely to change as the demographic transition proceeds. Parents will likely substitute quality for quantity of children and increase education expenditures (which are classified as consumption, though they are really investment in human capital). This would dampen the effect of fewer children on saving. Second, parents will likely increase their saving for retirement apace with the breakdown of the family support system whereby the young support their parents in old age. The family support system typically breaks down with the reduction in the number of children that can support parents. In addition, there is the impact of greater longevity, which leads to a need for more saving to cover longer retirement, and of youth unemployment, which will probably fall as the number of youths falls over time. These effects would lead to higher retirement saving.

Later on, as the boom generation ages further and enters retirement, there is likely to be a negative impact on saving as the result of dissaving by these 5 large cohorts. The first cohort (which is currently 30-35 years old category) does not reach the 65-year retirement age till 2040, and older cohorts reach this age even later, so any serious impact from this group should not be expected till after 2050.

What impact will the change in demographic structure have on saving? One quick way to gauge this is to use existing estimates based on panel data studies. Loayza et. al. (2000b) estimates that a 1 percentage point reduction in youth-dependency ratio is associated with a 0.5 percentage point increase in the saving rate.[34] In Turkey population projections suggest the youth-dependency

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[34] *We do not explicitly consider the impact of changing demographics on the investment rate. The literature concludes that any effects are minor compared to the effects of demographics on the saving rate and the current account (e.g., Higgins, 1998, Helliwell, 2004)*

ratio (under 15 years old/population 15-64) will fall from 37 to 27 percent between 2007 and 2025. Based on the panel-data estimates of Loayza et. al., the impact of a lower youth-dependency ratio would then be to raise private saving by about 5 percent of GDP between 2007 and 2025.

Figure 17. Turkey: Population Pyramids, 1980-2050
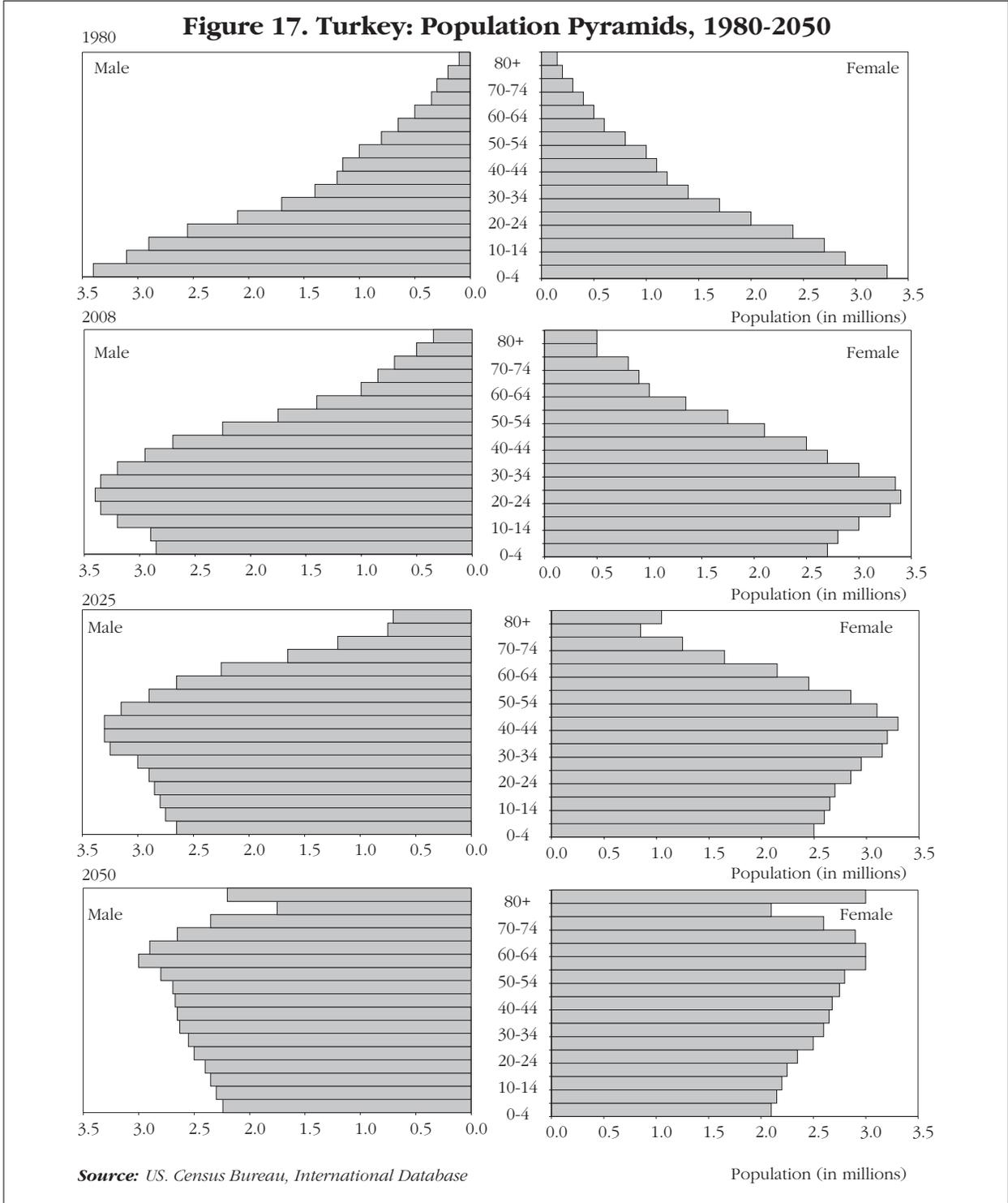
We also used two other methods to project the Turkish aggregate saving rate, based on two different sets of estimates of individual saving by age groups. Individual saving is not directly available from the data, since data on expenditures is only available at the household level. After obtaining estimates for these individual saving by age as described below, we mechanically extrapolate using the projected population structure. That is, we implicitly assume saving by age will remain unchanged over time (e.g., the saving rate for the 30-34 years old age group is assumed to remain the same for this age group in the future). This assumption seems roughly appropriate given the mechanics causing the second demographic dividend and is consistent with the household demand model where monetized savings are a substitute for children (Section 2). Specifically, as fertility is declining, so that future 30-34 years old age groups will have fewer children, it is reasonable to expect people will use at least some of the money they no longer need to spend on children to save for retirement, now that they cannot count on children as old-age insurance. There could still be an impact on individual saving by age groups, with increases in spending on children (with quality replacing quantity) while children remain in the household and higher saving for retirement after children have left the home. Results are therefore only suggestive of what could happen.

Specifically for both sets of estimates of individual saving obtained by our 2 methods, we multiply the saving of each age group by the projected share of the population in this age group, then sum to obtain aggregate saving. We do the same for income (for which individual data is available), then obtain the aggregate saving ratio.[35] Implicitly we not only assume unchanged individual saving rates, but also unchanged relative income by age group over time. These exercises indicate that the household saving rate may increase from 10 percent of disposable income in 2005 to 12-15 percent in 2025, depending on the method used to obtain individual saving rates. As a percent of GDP the effect should be of similar magnitude, or some 2-5 percent of GDP.[36]

5.1. Method 1: Regression Analysis

In this first method we follow the literature, where individual saving is obtained from household saving based on regression analysis (Deaton and Paxson, 2000).

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[35] Saving decompositions of this type have been used to explain historical changes in aggregate saving rates and have been based on household saving, by age of household head, on which information is readily available (Japelli and Pagano, 1997).

[36] While disposable income is only some 85-90 percent of GDP, private saving is underestimated in the household data because of under-reporting.

The regression we estimate is

$$S_h = \Sigma \beta_a n_{ah} + \varepsilon_h$$

where $S_h =$ is household saving, n_{ah} is the number of persons of age-group *a* in the household, and β_a measures the average contribution to household saving by age-group *a*.

We then use predicted saving by age β_a to simulate future saving rates, using projected population shares n_{ah}, and 2005 individual incomes (available from the household survey). Using this method, we estimate the saving ratio at 11.3% in 2005, compared to the observed saving ratio of 10%. For this reason we scale the age-profile for saving down by 1% in order to ensure the saving rate in 2005 in the simulations corresponds to the actual data.

Below we show the raw data for the profile of income and spending by age of household head (Figure 18), the profile of income and spending we derived at the individual level (Figure 19), and the corresponding saving at the individual level (Figure 20). Figure 19 shows that spending of adults on themselves increases over time, in step with rising incomes, possibly reflecting liquidity constraints or buffer-stock saving (Section 2).[37] Also of note is that incomes decline early and rather sharply after 50-54 years old, reflecting the prevalence of early retirement in Turkey.

The saving profile at the household level (Figure 18) is rather flat, as is commonly found in the literature, reflecting endogenous household formation.[38] At the individual level, however, a stronger life-cycle saving pattern emerges (Figure 20). Of note is that the oldest age groups do save substantially, something that reflects the fact that income data includes transfers from the state and family members.

Figure 21 shows projected saving rates based on our exercise. The projection uses the estimated β_a and economy-wide averages for n_{ah} and calculates saving as

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[37] *Using the income profiles by age, we also constructed household saving for a composite household consisting of two adults from age 15 onwards, who have a first child at age 25-29 and a second child at age 30-34, and assuming each child stays with the household for 20 years. The pattern of spending is as one would expect, reaching a peak when the head of household is 45-49 years old, after which spending declines reflecting the departure of the first child.*

[38] *Among young adults, only those with relatively high earnings (and therefore saving) can set up independent households. Similarly, among the elderly, the relatively well-off are more likely to persist as heads of household. Seventeen percent of households in Turkey are extended households, i.e, multi-generational households, accentuating these effects.*

$\Sigma\beta_a n_{ah}$. It suggests that changing demographics will cause the saving rate to increase by 2 percentage points by 2025, or some 1 percentage points per decade, a small effect. (As a percent of GDP, the increase would be similar). Moreover the impact is measured imprecisely, and we cannot reject, based on 95% confidence intervals, the hypothesis that saving will stay constant over time.[39] At the same time, the upper bound suggests that saving could at most increase by 4 percentage points by 2025.

Note that in this method β_{ah} is estimated without bias only if the correlation between n_{ah} and ε_{ah} is zero. This will not be the case if the number of persons in a certain age category (e.g. a large number of children, older persons) is systematically correlated with a variable affecting saving omitted from the regression (e.g., income or education, urban/rural location, extended family). For example, if families with a large number of children tend to be poorer and have lower spending, spending by children will be underestimated. The same could be the case for families with a large number of older people, if extended family organization is more prevalent among poor families. Hence, as a check on the results, and also because the coefficients were imprecisely estimated, we use an alternative method, which does not rely on regression analysis (method 2, below).

5.2. Method 2: OECD Equivalency Scale

Our second method for obtaining individual saving involves deriving individual spending from household spending, using the "modified OECD" equivalency scale. This scale takes into account economies of scale in household consumption and lower spending by children compared to spending by adults.[40] The equivalency scale assigns the first adult a weight of 1, additional persons over 13 years of age a weight of 0.5, and children under 14 a weight of 0.3. Thus children under 14, for example, are assumed to consume 0.3 times as much as the household head. The lower weights for additional household members reflect economies of scale and hence lower costs for additional members. Individual saving is then calculated as individual income minus individual spending based on the above method, using 2005 data. Next saving and income are aggregated by age-group.

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[39] *We calculated confidence intervals around our central estimates for aggregate saving, based on the 1.96x the standard deviation of projected household saving.*

[40] *Assuming equal per capita spending for all household members irrespective of age would give us stronger, but less realistic, results.*

This procedure has some drawbacks of its own. Notably, it involves some measurement error. Because household heads are assumed to spend more than other adults (parents or grown children) in extended families, a change in status to household head raises one's consumption, as calculated here. Because older persons are more likely to be household heads, this imparts some upward bias to spending in age-profiles most likely to contain a household head.

The results using the OECD equivalency scale show a stronger life-cycle pattern than in method 1, as the oldest age groups no longer save substantially (Figure 20). Extrapolating saving and income to the future based on projected population figures, as in method 1, we predict an increase from 10 to 15 percent of disposable income by 2025 (about 5% of GDP), or 1% every 4 years. After 2025, the saving rate stops increasing, weighted down by the growing share of the elderly population (Figure 21).

Figure 18. Income and Spending by Household, 2005

Source: Household Budget Survey, 2005
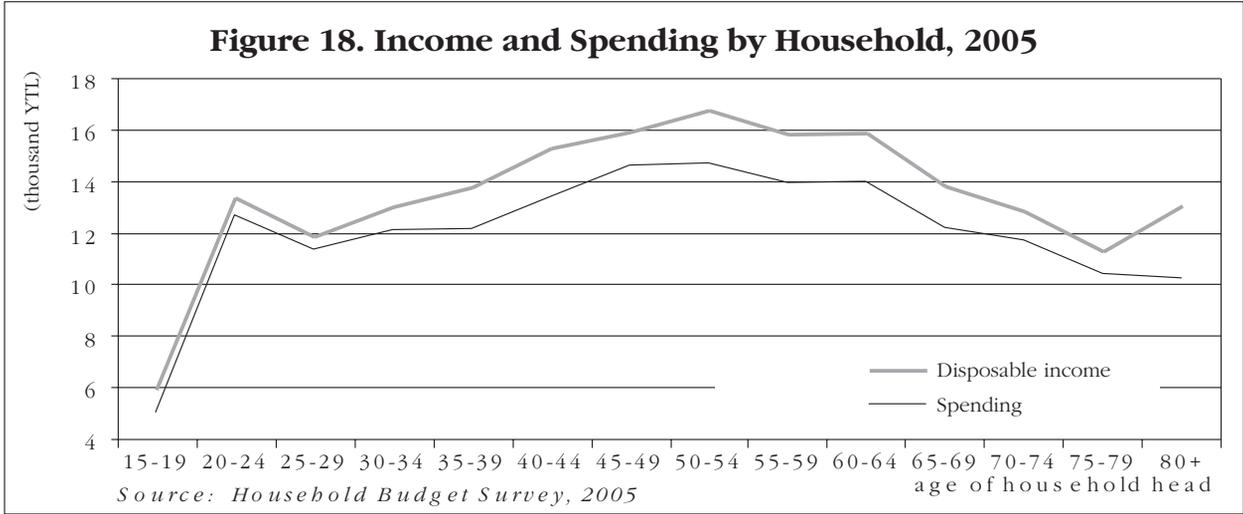
Figure 19. Individual Income and Spending Over the Life-Cycle, 2005

- Disposable income
- Spending (method 1)
- Spending (method 2)

Method 1 : Regression analysis to uncover age-effects;
Method 2 : Based on OECD adult equivalent weights
Source   : Own calculations

age of household member
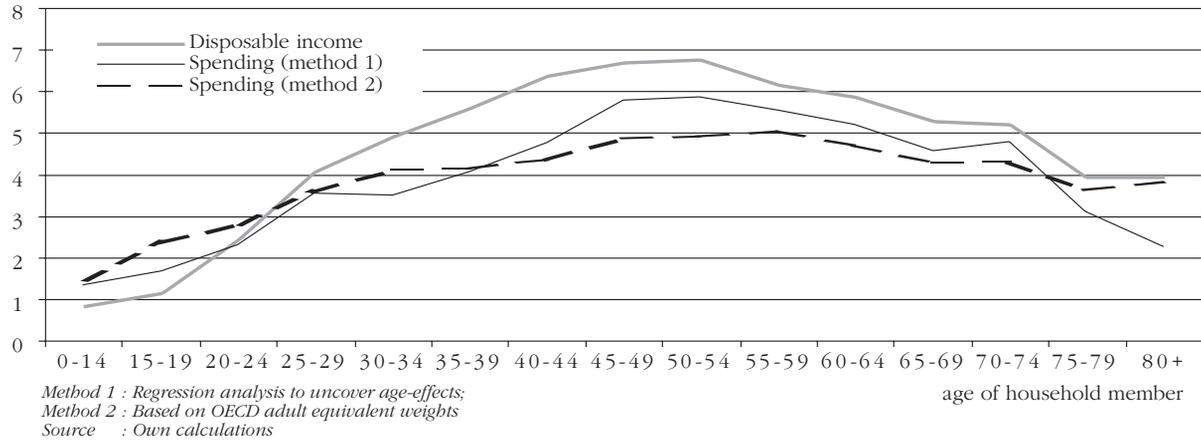
Figure 20. Age Profile of Individual Savings, 2005

YTL

- Estimate Method 1
- Upper bound (95% confidence interval)
- Lower bound (95% confidence interval)
- Estimate Method 2

Source : Own calculations

age of household member
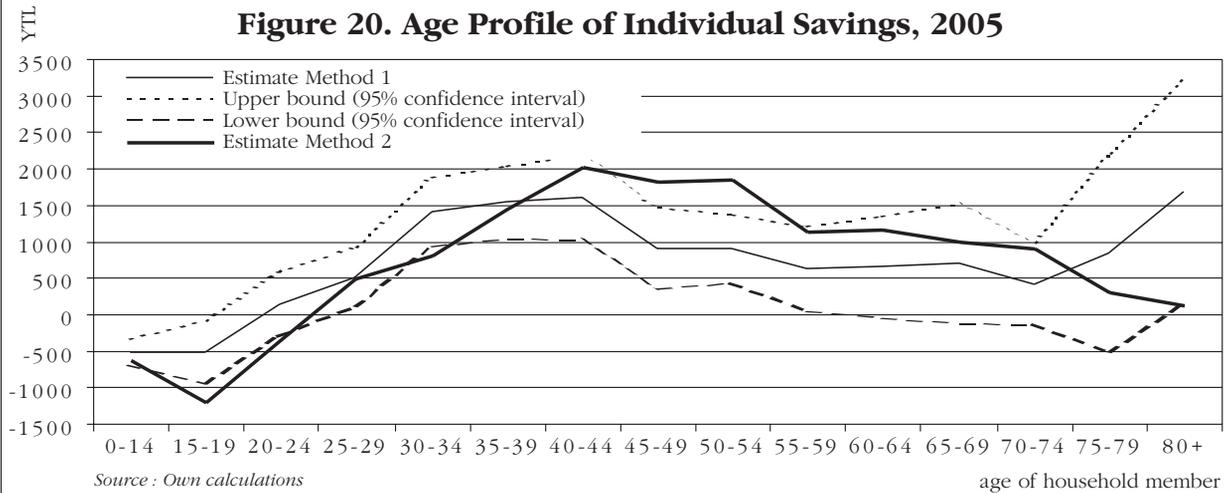
Figure 21. Simulated Private Savings Ratio (% disposable income)

- Savings ratio (method 1)
- Savings ratio (method 2)
- Lower bound (method 1)
- Upper bound (method 1)

Source : Own calculations
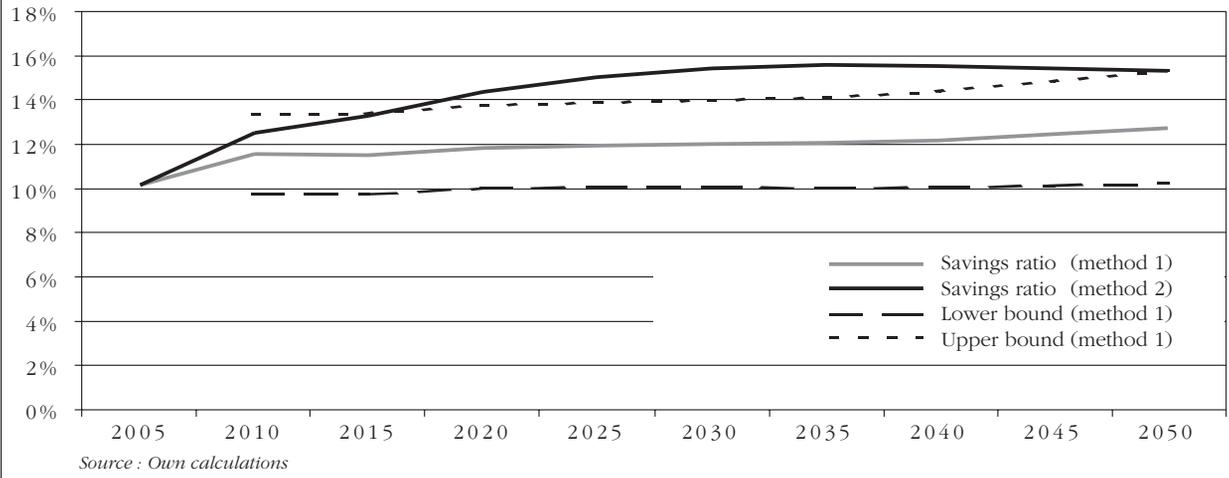
TESTING HYPOTHESES WITH HOUSEHOLD BUDGET SURVEY DATA

TESTING HYPOTHESES WITH HOUSEHOLD BUDGET SURVEY DATA

In this section, we use household budget survey data to explore whether the large decline in the aggregate saving rate was shared among various groups. This also allows us to examine various hypotheses on the drivers of the decline in the saving rate. We also estimate an equation for aggregate household saving, to check, inter alia, for the effect of private health expenditures and home-ownership on saving. The data are from the Household Budget Surveys of 2004 and 2005 (see Appendix II for details and some caveats on the data).

Saving across groups

Table 1 shows the household saving rate by characteristic of the household head for 2004 and 2005. These years are chosen, because the decline in the private saving rate was most pronounced between 2004 and 2005. We consider demographic and economic/socio-economic characteristics. We have ample observations for each cell in the table, as we only consider sub-groups accounting for at least 15% of households, to ensure robustness of the results.

The table shows that the large decline in the household saving rate was broad-based across demographic and socio-economic groups. Saving rates declined roughly by the same amount irrespective of urban-rural location, number of children living in the household, and age of the head of household. The fact that saving declined as much in households headed by elderly persons as in other households is at first sight a mystery and we return to this below. Savings rates declined slightly more for those with more education, and about the same for the poorest quintile of the population, as measured in terms of rooms per adult equivalent.[41] Saving rates declined somewhat more for the self-employed as well as those working in small enterprises (fewer than 10 employees). Strikingly, saving rates almost did not decline for workers in the public sector. The table also shows that saving declined more for those living in their homes and less for those earning interest income, as discussed further below.

Findings for households with green cards and by income quintile are discussed in Appendix II, as their robustness is doubtful because of low quality of the data (under-reporting of incomes).

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[41] *We cannot condition on income because of measurement error, as explained in Appendix II, Using the OECD scale as discussed in Section 5. Saving rates for those without access to hot water, another measure of poverty, on the other hand, did decline by more than for households with access to hot water.*

Table 1. Group Household Savings Rates, Characteristics of Household Head

	2004	2005
Overall	0.17	0.10
Rural	0.17	0.10
Urban	0.16	0.10
<40 years old	0.17	0.08
40-60 years old	0.16	0.11
>60 years old	0.19	0.11
3 or more kids	0.14	0.08
1 or 2 kids	0.17	0.11
Zero kids	0.18	0.09
Have interest income	0.13	0.13
No interest income	0.17	0.09
Owns residence	0.19	0.11
Doesn't own residence	0.10	0.07
Public	0.13	0.12
Private	0.21	0.12
Self-employed	0.26	0.18
Not self-employed	0.12	0.07
Green card	-0.15	-0.20
No green card	0.17	0.11
Enterprise <10 employees	0.22	0.14
Enterprise >=10 employees	0.16	0.11
Lowest 20% income	-0.25	-0.36
Highest 80% income	0.19	0.13
Primary education or less	0.14	0.09
Middle and high school education	0.16	0.10
Higher education	0.22	0.15
Lowest 20% rooms/adult equivalent	0.15	0.09
Highest 80% rooms/adult equivalent	0.17	0.10
No hot water	0.12	0.01
Hot water	0.18	0.12
Doubtful	0.04	-0.01
Not doubtful	0.21	0.14

Doubtful cases are those where household income was in lowest quartile, yet hot water; those where household head did not know social security status; those with negative income or spending and cases of extra-large dissavings, where dissavings is larger than 2.6 times annual income

Age of household

The elderly should be relatively unaffected by improved economic prospects (retirement income should not be affected), an improved fiscal outlook (lower future taxes will affect future generations not the elderly themselves),[42] or relaxed liquidity constraints (income is not rising over time, so such households should not

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[42] In theory, it is possible that the elderly internalize the impact lower prospective taxes on their children and plan to leave fewer bequests (hence reduce their saving), as pointed out by Barro (1974).

wish to borrow). The fact that saving declined as much, or even slightly more, in households headed by elderly persons as in other households therefore requires explanation. The saving rate for households headed by those over 60 decreased from 19% to 11% between 2004 and 2005, compared to a decline from 17% to 10% for all households.[43] Spending by households headed by elderly persons was up 29% compared to 22% for the remainder (incomes were up 18% for this group compared to 14% for the remainder).

Increased costs of private health care is not a plausible explanation for the rise in spending, as the share in health expenditures for households headed by the elderly was, though increasing, very small: 2.5% of consumption expenditures in 2004 and 2.9% in 2005.[44] Furthermore, increases in the cost of health care would normally lead to higher saving, not lower saving, as households anticipate higher health expenditures and save somewhat more than expected expenditures for precautionary reasons.

There is, however, one development where one would expect a disproportionate effect on the elderly: the wealth effect from rising real estate prices and other assets. 90% of elderly households owned their own home. If the elderly do not simply wish to pass on their higher assets as inheritance, they will draw down some of their assets after an increase in their value, or at least reduce their saving rate. We turn to the effect of home ownership next.

Home ownership

A wealth effect from higher housing prices will be present if people consume more use of real estate services now than they will in the future. As noted in the literature survey this may be the fact for the elderly; it holds additionally for owners of lots of land on which larger buildings can be built through e.g., partnership with construction companies, as is often the case in Turkey. In those cases, owners will receive a share of the new construction in proportion to the value of the land, hence may receive more than their planned use of real estate services when prices are high. There will also be a wealth effect if higher housing prices increase access to credit (home equity loans or higher limits for personal loans) and affect saving through that channel.

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[43] *We found similar declines in saving when we excluded extended families from households headed by those over 60.*

[44] *Excluding extended households, since these could bias the results, the share of expenditures on health was also low (3.1 and 3.5 percent respectively).*

To check for a wealth effect we compared household who owned their residency with other households. Given the large increase in real estate prices and hence wealth, we would expect the former to have reduced their saving more in the presence of a wealth effect. This turns out to be the case. Homeowners reduced their saving rate from 19 to 11 percent whereas others reduced their saving rate much less, from 10 to 7 percent. This resulted from spending growth (24%) outstripping income growth (13%) for owners; for tenants the figures were 20 and 17% respectively. As suggested above, higher rates of homeownership may account for the reduction in saving by households with older heads of household.[45]

Interest income

To check for an effect of lower interest rates, we distinguished households with interest income from those without (15% of households report interest income in 2005). Having interest income, such households had negative income effects from lower interest rates, and might respond by lowering consumption. This would tend to offset the substitution effect, whereby in the first period saving would fall because of a lower rate of return. For households without interest income, in contrast, income and substitution effects would go in the same direction, stimulating consumption. We found that spending and saving behavior fit this description. Saving by households with interest income did not decline, but instead rose slightly, and spending rose much more moderately than for households without interest income, consistent with an important income effect.[46] These results may have a policy implication: given the large income effect for households with assets, measures such as reducing taxation of interest may not lead to higher private saving. Since such measures would also raise the budget deficit, they would lead to a reduction of national saving.

Public sector work

A finding in Table 1 is that the saving rate did not fall much for workers in the public sector.[47] At first sight, one might think this would reflect the fact that public sector workers did not face the same improved prospects as workers in the private sector. In that case, their spending and saving should have remained

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[45] *50% of households with household head under 40 owned their residence, versus 76% and 88% respectively for those with household head of 40-60 and over 60 years old.*

[46] *Interest income was defined as the sum of bank interest income (local and foreign currency deposits) and interest income on government and bank bills. 15 percent of households had such income in 2005. Households with interest income experienced income increases of 12% and spending increases of 12%; in contrast, households without interest income experienced income increases of 13% and spending increases of 24%.*

[47] *Public sector is defined as civil service plus public enterprises. However, in the sample, there seem to be very few public enterprise workers, based on answers to the questionnaire.*

relatively flat. However, spending of households with a head working in the public sector increased only slightly less than spending in households with a head in the private sector (22% versus 24%), instead of being flat. The large difference in saving behavior is instead attributable to *higher* income growth among state workers (21% in the state sector versus 12% in the private sector).[48] Possibly the large income increase may have been seen as transitory, thereby limiting consumption out of this higher income and causing higher saving among public sector workers.

Saving equation

We estimate a comprehensive equation for the household saving ratio (saving/disposable income) to better understand determinants of saving, and changes therein, in Turkey. The equation closely follows Chamon and Prasad's (2008) work on China and controls for demographics of the household, household income, education, insurance and employment characteristics, expected health expenditures, home ownership, and interest income.

Demographic variables include age of the household head, the number of children of various ages, and the number of elderly in the household. The equation includes the log of household income, and is estimated with instrumental variables given the measurement error in this variable.[49] As instruments we use all independent variables (other than income) plus, in order to capture income, a dummy variable for whether the household has hot water and the number of rooms per capita (specifically, the number of rooms divided by the number of adult equivalents, using the modified OECD scale described in Section 4). The equation also controls for the education level of the household head and spouse.

It is estimated for a core group of households, which excludes households whose head was under 25, over 70, a student, involuntarily unemployed, disabled or sick, waiting for work or in seasonal employment.[50] The sample was also restricted by excluding doubtful observations (results for the unrestricted sample are available in Appendix II).[51]

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[48] This is somewhat of a mystery because there was no unusual adjustment to civil servant wages in 2005. The increases in private sector incomes are in line with increases in both private manufacturing and minimum wages of 13% on average in 2005.

[49] In Chamon and Prasad (2008) no such instrumentation is done, but this is critical here given under-reporting of incomes (see Appendix II).

[50] This follows the literature (see e.g., Japelli and Pagano, 1997, Chamon and Prasad, 2008). Households with young or older heads are typically wealthier than average, and including them may cause bias.

[51] Given the very large number of cases of large negative saving rates, we had cause to believe there was large under-reporting (Appendix II). We thought this problem would be larger for cases where the head of household did not report social security status, where incomes were in the lowest quintile yet the household had access to hot water, where income or spending were negative (theoretically impossible), and where dis-saving were larger than 260% of income, and we restricted the sample by excluding these observations.

Variables of interest are whether the household head has social security (and its type), the number of persons working for the state, the share of women in the household who were housewives, a proxy for large expected health expenditures, a dummy variable indicating whether the head of household was a home-owner and a dummy variable indicating whether the household had any interest income. The proxy for large expected health expenditures is estimated in a separate probit for the years 2004-05 (Table 2).[52] The probit results explaining large health expenditures are as expected. "Absence of any health insurance" has a positive coefficient, the number of household members under 15 has a negative coefficient, and the number of household members over 60 has a positive coefficient.

Table 2. Survey Probit Regression:
Probability of Health Expenditures > 10% of Spending, 2004-05

	Coef.	Std. Err.	t	P> [t]
Log non-health expenditures	-0.18 ***	0.03	-5.8	0.00
Urban location	0.01	0.04	0.2	0.81
No health insurance	0.13 ***	0.05	2.7	0.01
Number of household members				
Under 15	-0.06 ***	0.02	-3.0	0.00
Under 15 interacted with 2004	0.05 **	0.02	2.1	0.04
15-39	0.11	0.08	1.4	0.17
40-59	-0.02	0.08	-0.2	0.81
60+	0.19 ***	0.05	4.1	0.00
60+ interacted with 2004	-0.10 **	0.04	-2.3	0.02
Constant	-0.04	0.29	-0.1	0.89
Number of observations	17100			
F (9, 17089)	12.5			

*** Statistically significant at the 1% level; ** 5% level; *   10% level.

Table 3 shows the results for the household saving equation for 2004 and 2005.

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[52] *In estimating the equation in Table 2, we follow Chamon and Prasad (2008). Specifically, the dependent variable in the probit equals one when health expenditures are large, specifically if health expenditures exceed 10 percent of consumption expenditures (we chose a 10 percent threshold for health expenditures, rather than a 20 percent threshold as in Chamon and Prasad, because very few households spent more than 20 percent of disposable income on health). Independent variables are the log of non-health expenditures, a dummy variable for urban/rural location, a dummy variable indicating the presence of health insurance, and 4 variables indicating the number of persons under 15, 15 to 39, 40 to 59, and over 60. The regression is estimated for pooled 2004-05 data, with year dummies interacted with demographic variables. An indicator variable is then constructed based on this probit, which equals one when the probability of large health expenditures exceeds 10 percent. This indicator variable is then entered in the household saving regression.*

Table 3. Survey Instrumental Variables Regression: Savings/Disposable Income

	2004		2005	
	Coef.	t	Coef.	t
Log income	0.14 ***	4.66	0.23 ***	7.39
Urban location	-0.02	-1.40	-0.03	-1.30
Emekli Sandigi (civil servants)	0.03	1.02	0.06 **	1.99
Bag-kur (self-employed)	0.15 ***	6.83	0.06 **	2.46
Other	0.10	1.59	0.15	0.94
No social security	0.00	0.18	-0.01	-0.70
1 public sector worker	0.03	1.17	-0.02	-0.66
2 or more public sector workers	0.04	0.83	0.01	0.15
Have interest income	-0.03	-1.41	0.00	0.21
Health risk	0.26 ***	6.41	0.28 ***	5.13
Homeowner	0.03 **	2.04	0.00	0.11
Head aged 30-34	-0.01	-0.56	0.01	0.22
Head aged 35-39	-0.01	-0.48	0.05	1.45
Head aged 40-44	-0.01	-0.22	0.04	1.07
Head aged 45-49	0.02	0.81	0.02	0.65
Head aged 50-54	-0.04	-1.21	0.02	0.61
Head aged 55-59	-0.04	-1.17	0.05	1.17
Head aged 60-64	0.01	0.14	-0.04	-0.67
Head aged 65-69	-0.04	-0.77	0.02	0.33
Log household size	-0.04 *	-1.65	-0.07 **	-2.06
Share members aged 0-4	-0.10	-1.56	0.13	1.60
Share members aged 5-9	-0.10	-1.57	0.02	0.29
Share members aged 10-14	-0.18 ***	-2.78	0.05	0.65
Share members aged 15-19	-0.15 ***	-2.64	-0.07	-0.93
Share members aged 60+	0.03	0.45	-0.04	-0.34
Share members that are housewife	0.07 *	1.87	-0.02	-0.49
Secondary education, head	0.01	0.39	-0.05 ***	-2.71
Tertiary education, head	-0.03	-0.95	-0.12 ***	-3.52
Secondary education, spouse	0.00	0.09	-0.03	-1.45
Tertiary education, spouse	0.00	-0.05	-0.11 **	-2.45
Extended family	-0.01	-0.37	0.02	0.95
Constant	-1.17 ***	-4.41	-2.05 ***	-7.65
Number of observations:	5254		5226	
R-squared	0.19		0.16	

Estimated with instrumental variables. Instruments for log income include all variables in the regression plus access to hot water and number of rooms per adult equivalent. Sample consists of a core group of households, which excludes households whose head was under 25, over 70, a student, involuntarily unemployed, disabled or sick, waiting for work or in seasonal employment. Sample excludes doubtful cases. Doubtful cases are those where household income was in lowest quartile, yet had hot water; those where social security status of household head was not reported; those with negative income or spending and cases of extra-large dissavings, where dissavings is larger than 2.6 times annual income. Health risk is a dummy variable equal to 1 for households where a probit regression indicates a 10% or greater chance of health expenditures in excess of 10% of consumption expenditures. Omitted categories: Head of household 25-29, social security=SSK scheme (general scheme).

*** Statistically significant at the 1% level; ** 5% level; * 10% level.

Income is statistically significant with positive coefficients for both years, indicating that the average propensity to save is higher for the rich than the poor, consistent with empirical evidence and both the original Keynesian formulation and more recent theories (see Dynan, Skinner and Zeldes, 2000). The coefficients are however implausibly large. For example, a one percent increase in income is

associated with an increase in the saving/income ratio of .23 or 23 percentage points in 2005.

There is some evidence for a positive impact of **uncertainty** on saving in line with theory. Participation in the social security scheme for the self-employed, who are presumably subject to greater uncertainty than employees, has a positive statistically significant coefficient. Health risk also has a positive, large and statistically significant impact on saving.

We also find some evidence that **home-ownership** was associated with higher saving in 2004 and not in 2005, consistent with a wealth effect which would have driven down saving for homeowners (as home prices increased substantially in this period). The results are consistent with our earlier finding that the saving rate for homeowners as a group declined much more than that of others between 2004-05 (Table 1).

The dummy for participation in the social security scheme for civil servants is positive in 2005 (consistent with our earlier finding that public sector workers maintained their saving rate whereas others reduced them). Additional dummy variables for working for the state are statistically insignificant.

The dummy for households with **interest income** is insignificant, somewhat surprising given our earlier findings that such households did not reduce their saving rate whereas others did.

Age of household head has no effect, which is not surprising, given that the regressions control for other factors (income, household size, number of children of various ages) that underlie the relationship between age of household head and saving ratio.

Household size, which captures the effect of the **number of children,** has a significant negative impact on saving, as does the share of household members 10-14 and 15-19 (2004 only), consistent with findings in the literature that a high dependency ratio depresses saving.

Secondary and tertiary **education** for the head of household and secondary education for the spouse has a significant negative effect on the saving ratio (2005 only). Possibly this reflects greater access to credit for those layers of the population. The share of household members who are housewives has a marginally positive effect on saving in 2004 (10 percent significance level), while a dummy for extended families has no statistically significant effect.

SECTION
7

POLICY OPTIONS

POLICY OPTIONS

When thinking about policy options, one possibility is to take the agnostic line: that the role of savings in resolving Turkey's main macro challenges is somewhat overstated. If Turkey were to figure out the true bottlenecks to growth, say, through a well-thought out process of "growth diagnostics", a solid saving ratio could simply *follow*. In other words, this line of thinking would probably advise putting the emphasis on obstacles to growth rather than on raising the saving rate per se (see Chapter 2 in Rodrik, 2007). In this context, one needs to look for measures that can raise growth, without a need to raise investment (i.e. reforms which increase total factor productivity), so as to ensure a reduction in the current account deficit.

Until this is done, the question of what to do when domestic saving are inadequate to finance investment —and hence are a source of vulnerability— could be addressed through the generic expenditure-switching and expenditure-reducing policies, i.e. through lower absorption/growth (consumption plus investment) and a weaker currency. These could be engineered through a tighter fiscal and looser monetary policy mix. However, this would not come without complications, given Turkey's —in our view, entirely sensible— commitment to an Inflation Targeting framework (a combination of a floating exchange rate regime with emphasis on price stability as the overriding objective). Another complication is the large offset of private saving to increases in public saving. This would call for tighter monetary policy, to control credit growth, rather than looser monetary policy. Exports would fall victim to this strategy.

A less benign global environment may do the job of reducing vulnerabilities, too, by reducing capital inflows and hence investment, but the casualty would again be low growth. Finally, one would want to limit vulnerability to capital flow reversals by lengthening government debt maturities, which with 3-year average maturity, are still low. This was the policy response suggested by Gavin, Haussmann, and Talvi (1997) to tackle the vulnerability stemming from low domestic saving in Latin America.[53]

Another line of thinking is to insist on policy activism explicitly targeted at increasing the saving rate. The bad news is that, the ability of policy to affect the

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[53] *This of course leaves unresolved vulnerabilities stemming from high and relatively short-term corporate indebtedness, which has risen substantially in recent years to some $125 billion by mid-2008.*

private saving rate seems somewhat limited in Turkey, as elsewhere. The good news is that, an increase of a few percentage points of GDP is all that would be necessary, provided investment remains unchanged. In fact, some increase in the saving rate is probably already underway because of improving demographics (a lower youth-dependency ratio) and social security reforms enacted in May 2008 (see below).

Furthermore, low Turkish saving seems to be a reflection of various factors, such as a relaxation of liquidity constraints, catch-up from low levels of consumption of durables during the 2001 crisis, and a strong wealth effect, all of which have no or little impact on saving in the long-run. Finally, the Turkish saving rate did not respond positively to the strong growth experienced over the last 5 years, whereas panel-data evidence suggests a positive link between the two. If growth were to persist, we may see the positive effect on saving over the longer-term.

What else could be done to encourage saving? One option is stronger fiscal policy. But not only that an increase in public saving does not translate into an equivalent increase in national saving —because of partial offsets in private saving— the room for further fiscal adjustment is limited in Turkey's circumstances, largely for political reasons. In fact, we started seeing political pressures heighten vividly in early 2008, with the government stepping up infrastructure projects or spending in general, instead of putting the priority to increasing the budget surplus. While there may be some justification for this from a debt sustainability angle, relaxing fiscal policy is entirely inappropriate from a CAD/saving angle. Instead, targeting budget surpluses would appear to be the most effective approach in raising national saving, around which a consensus should be built.[54]

Another standard option is to encourage a shift from income taxes to consumption (indirect) taxes, which would stimulate saving since it would no longer be taxed. However, in Turkey, consumption taxes already make up two-thirds of tax revenue, in contrast to international practice, notably in OECD countries.

Liberalization of the financial sector and the development of institutions that facilitate long-term saving are another tool for increasing saving. Laws and practices in this area do not seem to be an impediment for long-term saving in Turkey, however. Liberalization of deposit rates occurred in the early 1980s in Turkey. The institutional framework for long-term saving —insurance, mutual

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[54] *Rather than taking this route however, the government targets capping the budget deficit (including privatization revenue) at some 1.5% of GDP in the next several years, under, in our view, fairly benign assumptions on the macro environment.*

funds, and private pension funds— is also fully in place.[55] Portfolio allocation rules are not restrictive, unlike in some countries where the majority of funds under management by insurance companies and pension funds are required to be invested in government bonds. As a result, returns on these instruments are competitive, and are thus not an impediment to long-term saving.[56] Nevertheless the number of participants in insurance, mutual funds and pension funds is quite limited. The number of life-insurance policies is small, amounts under management by mutual funds are some 3 percent of GDP, and there are only about 1.5 million contributors to private pension plans, with contributions of only $3.3 billion as of December 2007, or some 0.5% of GDP.[57] Still, participation is not out of line with other emerging markets with voluntary pension schemes, especially given the fact that pension funds only started operating in October 2003.

Interest taxation could be reduced; this could through a substitution effect lead to higher private saving. Or US-style Individual Retirement Accounts (IRAs), which allow IRA contributions to be deducted from taxable income (with retirement income taxed in exchange, but at a lower tax-rate), could be introduced. However, these measures would be risky as they would also reduce government revenues. The overall impact on national saving would depend on how elastic private savings are to the measures. The World Bank Saving Project concludes that, "tax incentives have only small effects on national saving, particularly when the negative effects on public saving are taken into account." Our own finding that there is likely a substantial income effect on interest earners, which would go in the direction of higher consumption and lower saving, also suggests tax incentives may have a limited impact, though more research is necessary to verify this result.[58]

One could tax interest expenditures on credit card purchases to discourage borrowing for consumption purposes. (This goes rather in the opposite direction of measures that were at some point under discussion to limit interest rates that can be charged on credit cards). Other measures would be special consumption taxes, as in the past. However, these measures would complicate the already complex tax system.

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[55] *The basic laws are the new 2007 Turkish Insurance Law, prepared in accordance with EU norms (replacing the 1959 Insurance Supervision Act and its various amendments), the 2007 Revision of the Mutual Funds Law (various laws dated 1993 through 2006), and the 2001 Law on Private Pensions Savings and Investments. The legal and institutional framework for private pensions was completed in 2002.*

[56] *See, for instance, Mulheisen (1997) for a discussion of the case of India.*

[57] *Group policies are very limited, constituting only 10% of total policies (the remainder being individual policies). Rules for vesting (portability of pension rights when shifting employers) were initially unclear, reducing demand for group pensions, but these issues were largely resolved in 2006.*

[58] *Another factor limiting the impact on saving is the fact that the supply of capital tends to be highly elastic in the absence of impediments to capital flows. In that case, interest rates net of taxes will not change, muting the impact on saving.*

The May 2008 reform of the Turkish social security system includes a reduction in replacement rates.[59] Lower replacement rates should lead to higher private saving rates over time, as individuals now need to provide for their own retirement to a greater extent than before. The May 2008 reform is in line with the general policy prescription of limiting future replacement rates.

"To the extent that countries meet the challenge of aging by expanding unfunded familial or public transfer programs, asset growth will be reduced, and the second demographic dividend will be diminished. By contrast, if workers are encouraged to save and accumulate pension funds, population aging can boost capital per worker, productivity growth, and per capita income. Thus, policymakers, especially in developing countries, will need to focus on establishing financial systems that are sound, trusted, and accessible to the millions who wish to secure their financial futures. The time to do so is now so that, as a population ages, its growth-inducing potential will be realized." Lee and Mason (2006).

These types of measures, however, only have an impact over the medium-term. This is because of grandfather clauses protecting existing rights, i.e. that accrued pension benefits cannot be reduced, so that the replacement rate will take time to fall. To further influence private saving, pedagogical means could be used. Public relations campaigns that highlight the size of prospective deficits in social security, and thereby emphasize funding difficulties in the future, would lead to higher private saving, as current contributors would realize that their benefits may be cut in future. An example of such campaigns is the case of Norway, which was relatively successful in deflecting pressures for spending oil revenues, by highlighting that these funds were necessary to fund future social security deficits.

Another prescription is to use public funded pension programs (where investors receive the returns on their saving), rather than PAYG programs. The latter tend to depress private saving to the extent people expect pension benefits to exceed their pension contributions. A switch to a fully-funded system is however certainly no panacea for Turkey, notably because in the transition to such a system, the government continues to be liable for existing pension liabilities, without having corresponding revenues. [60]

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[59] *The social security reform comprised the following: (a) the retirement age remains unchanged through 2035 (currently 60 for male and 58 for female), and then is raised by one year, every other year, to reach 65 for both sexes in 2048; b) the number of premium days is raised to 9,000 days from 7,000 at SSK (it is already 9,000 days at Bag-Kur and ES) by increasing it 100 days every year from 2007 onward, thereby reaching 9,000 in 20 years; (c) the replacement ratio (the ratio of the retirement salary to the earning base), which is already very high in Turkey (around 2.6%-3% depending on the fund), is slightly reduced to 2.5% through 2016, then falls to 2% from 2016 onward; and d) in determining the pensionable base, wages are valorized according to a (50-50) weighted average of inflation and wage growth, and all future pensions are indexed to inflation. Increases in the retirement age and number of premium days required for benefits, while beneficial for the social security deficit (a longer period of contributions and a shorter one of benefits), do nothing to stimulate private saving.*

[60] *Roldos (2007) documents the fiscal cost of the transition in Latin America.*

SECTION 8

CONCLUSIONS

CONCLUSIONS

In this report, we found that Turkish overall and private saving rates have not been chronically low in the sense that, excluding Asia and oil-exporting countries, both have been about equal to emerging market averages over long periods. However, there is a chronic problem in another sense: the private saving rate tends to fall sharply during each boom period, as we've observed in this report. Having experienced its most recent boom from the aftermath of the 2001 financial crisis until recently, this explains why the Turkish saving rate is currently low by international and its own historical standards.

Motivated by this observation, we proceeded to ask why saving has fallen dramatically during the last boom episode, by examining the "usual suspects" suggested by the theoretical and empirical literature. These usual suspects include improved prospects, higher access to credit, lower interest rates, the wealth effect, and Ricardian effects from higher public saving. We used macroeconomic data, confidence data and household survey data to shed light on the issue.

Our findings tend to favor explanations based on availability of ample liquidity, over that of improved prospects. Consumer confidence in Turkey, though it rebounded sharply in the immediate aftermath of the crisis, has not been particularly strong over the past several years. These findings point to the role played by rapid credit expansion and low interest rates, themselves the by-products of a successful stabilization program and an exceptionally benign international environment.

We also found evidence of an effect of home-ownership: home-owners reduced their saving rate substantially, whereas the reduction was only minor for tenants. This result makes sense, given that tenants were relatively worse off as the result of the boom in house prices and rents, and also helps explain another finding in the report, namely the large decline in savings among households headed by the elderly. Finally, we find that households with interest income did not reduce their saving, consistent with a relatively large income effect from reduced interest rates. The policy implication of this finding is that measures to stimulate saving by increasing its rate of return (such as reduced interest taxation), may not have much of an impact.

While saving is likely to rise substantially by itself as the result of the financial crisis of 2008, as liquidity dries up and economic prospects deteriorate, we can expect saving to fall again to 2007 levels in the next upturn when credit growth resumes. At that point an increase in the total saving rate of a few percentage points will be required to contain the current account deficit within the safe zone of 2-3% of GDP.

A continued increase in public savings, together with increases in the private saving rate underway because of improved demographics (a decrease in the youth-dependency rate), which we estimate could raise saving rates by around 5% of GDP by 2025, and social security reform would put this within reach, without hurting growth too significantly. As for the increase in public savings, given the large offsets by private saving experienced in the past, care will have to be taken to conduct monetary policy with a view to preventing large growth in credit and too rapid reductions in interest rates.

Looking further ahead, deepening in credit markets over time is to be expected given Turkey's very low private credit/GDP ratio. This will place downward pressure on saving. While the buffer-stock theory and some empirical evidence suggest that the effect of increases in credit may disappear in the long-run, even a temporary reduction in saving will pose challenges in the transition period, creating well-known vulnerabilities related to the current account. Structural reforms that buttress the *productivity* of investment, or more broadly overall "total factor productivity" in the economy, hold the possibility of reducing the current account deficit without reducing growth and should therefore be the focus of policy.

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Appendix I:
Inflation-Adjustment of Private and Public Saving

Adjustment for inflation involves removing the interaction of inflation and net public debt held by residents. World Bank (1998) explains the procedure.

The inflation adjustment equals the difference between actual saving and measured saving. Adjusted saving is the nominal value of the change in real wealth over the period:

$$S_t^a = -\left(NDD_t / p_t - NDD_{t-1} / p_{t-1}\right)\bar{p}_t - \left(e_t NFD_t / p_t - e_{t-1} NFD_{t-1} / p_{t-1}\right)\bar{p}_t$$

where S is saving in nominal terms, the superscript a denotes adjusted saving, NDD is net domestic liabilities, NFD is net foreign liabilities, p is the domestic price level and, e is the nominal exchange rate, a bar over a variable indicates its period-average, and variables without bars are expressed in end-of-period values.

In contrast, measured (unadjusted) saving is simply the increase in assets, or the decline in liabilities.

$$S_t = -\left(NDD_t - NDD_{t-1}\right) - \bar{e}_t \left(NFD_t - NFD_{t-1}\right),$$

The difference between the adjusted and unadjusted saving is net capital gains and also the required inflation adjustment. In our implementation, we ignore the effects of exchange rates changes. Thus we only calculate the inflation adjustment on TL denominated net domestic debt.

Because the GDP deflator is available on an annual average basis, World Bank (1998) approximates the end-of-period price level at time t as a (geometric) average of the period-average price levels during periods t and $t+1$ as follows:

$$p_t = \bar{p}_t^{\,a} \bar{p}_{t-1}^{\,1-a}$$

In the implementation, we calculate adjusted saving for the government and the private sector. We assume NDD for the government is equal to net public debt

denominated in local currency, and NDD for the private sector is minus net public debt denominated in local currency. Net debt vis-á-vis non-residents is not considered for simplicity (hence one only adjusts the composition of national saving between private and public saving, not national saving itself).

Net public debt is calculated by consolidating debts/assets of the general government, public enterprises, and the central bank, and hence includes the monetary base and excludes any net government debt held by the central bank. Net public debt is not available for years before 2001. For these years we use 80 percent of Treasury debt, following IMF (2007). For 1988-94 we obtain the inflation adjustment directly from the World Bank (1998) Private Saving Database.

We scale the inflation adjustments with GDP from the revised NIA. For years before 1998, we use historical data for GDP scaled up by 34%, which is the size of the NIA revision to 1998 data.

Appendix Table 1. Inflation Adjustment, World Bank Method

	1994	1995	1996	1997	1998	1999	2000	2001
1 Gross Domestic Product (2008 revision)					70203	104596	166658	240224
2 Gross Domestic Product (historical x1.34)	5184	10402	19795	38640				
3 Net YTL Debt plus base money (IMF/TDM)	669	1105	2580	5105	9401	18791	29950	69608
4 Net YTL Debt Stock (TDM)								
5 Base money (TDM)								
6 GDP deflator, average	9	18	31	56	100	154	231	352
7 GDP deflator end of period, using alpha=-.5	13	23	42	75	124	189	285	413
8 Real debt (using GDP deflator eop)	52	47	62	68	76	100	105	169
9 Change in real debt X average GDP deflator		-88	447	361	774	3676	1247	22369
10 Change in debt		436	1475	2525	4295	9390	11159	39658
Inflation adjustment (9-10)		-524	-1028	-2164	-3521	-5714	-9912	-17289
as % of GDP		-5	-5	-6	-5	-5	-6	-7

Source: own calculations based on IMF and Turkish official data.

Appendix Table 1. Continued

	2002	2003	2004	2005	2006	2007
1 Gross Domestic Product (2008 revision)	350476	454781	559033	648932	758391	856387
2 Gross Domestic Product (historical x1.34)						
3 Net YTL Debt plus base money (IMF/TDM)	101212	155623	186563	227468	244741	260731
4 Net YTL Debt Stock (TDM)	91764	142120	167578	202301	210470	221649
5 Base money (TDM)	9448	13503	18985	25167	34271	39082
6 GDP deflator, average	484	600	673	722	788	853
7 GDP deflator end of period, using alpha=-.5	539	635	697	754	820	888
8 Real debt (using GDP deflator eop)	188	245	268	302	298	294
9 Change in real debtxaverage GDP deflator	9329	34253	15298	24520	-2471	-3991
10 Change in debt	31604	54411	30940	40905	17273	15990
Inflation adjustment (9-10)	-22275	-20158	-15642	-16385	-19744	-19981
as % of GDP	-6	-4	-3	-3	-3	-2

Source: own calculations based on IMF and Turkish official data.

Appendix II:
Household Budget Survey Data: Under-Reporting

The household surveys of 2004-05 cover about 8000 households each, and over 30,000 individuals.[61] They provide extensive data on household income, expenditures, and assets. Incomes are in theory comprehensively measured as they include the imputed rent on owner-occupied housing as well as the value of in-kind payments by employers and of own production. The 2004 and 2005 surveys do not cover the same households. Thus comparisons that follow involve similar households only.

The surveys were carried out throughout the year, and each interview covered income in the current and previous 11 months and spending in the current month. Thus, for all but December survey participants, data refer in part to the prior year. TurkStat makes an adjustment to the income data to bring households sampled in different months on a comparable basis (e.g., for those sampled in January 2005, TurkStat applies an 11 month price-index, and for those sampled in December 2005, it does not adjust the data). Because of this adjustment, and also because income refers to the last 12 months and spending only to the current month, income and spending are not strictly comparable. Because the effects tend to be offsetting (the TurkStat inflation adjustment causes an upward bias to saving and the measurement period difference between income and consumption a negative bias to saving) and to facilitate comparison with other studies that also use the raw data, we preferred to work with the raw data than to make any adjustment.[62] We use the variable "disposable income" based on 12-month income ("yilkulgel"). This variable deducts regular transfers to family members as well as fines and fees from income.

An issue with the data is under-reporting of income, given the existence of a large underground economy coupled with concerns that the survey data might be

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[61] *Surveys are also available for 1994, 2002, and 2003. Concepts are not always directly comparable in the 1994 and 2002 surveys, making it difficult to use these surveys.*

[62] *As a check, we reversed the TurkStat inflation adjustment to obtain income for the past 12 months as reported by the household. We then derived household spending for the past 12 months from the monthly data by assuming monthly household spending moved in line with the national CPI. For example, we calculate average expenditures over the previous 12 months that are 3.9% less than January expenditures. Figures are slightly different for different months of the year, and averages for the different months of the year are 3.8% in 2004 and 3.5% in 2005. Not having data on which month households were sampled in, we used these averages to adjust the monthly spending data to bring it to a prior 12 month basis. These procedures yield a measure of annual spending which is comparable to annual income (prior 12 month basis unadjusted for inflation). The overall saving ratio using this measure is 9.4% in 2005, compared to 10.1% in the TurkStat data.*

shared with the tax authorities. Indeed, Yukseler and Turkan (2007) document major discrepancies between national accounts data and household survey data on disposable income, and the recent revisions to the NIA make the discrepancy even larger. In our data, this translates into saving rates that are sometimes implausibly large and negative, in particular for (apparently) low-income households. For example, dissaving was 36 percent of disposable income in 2005 for the poorest quintile. The following graph shows individual saving rates for 2005; similar graphs can be drawn for other years.

Appendix Figure 1.
Saving as Ratio of Disposable Income, 2005
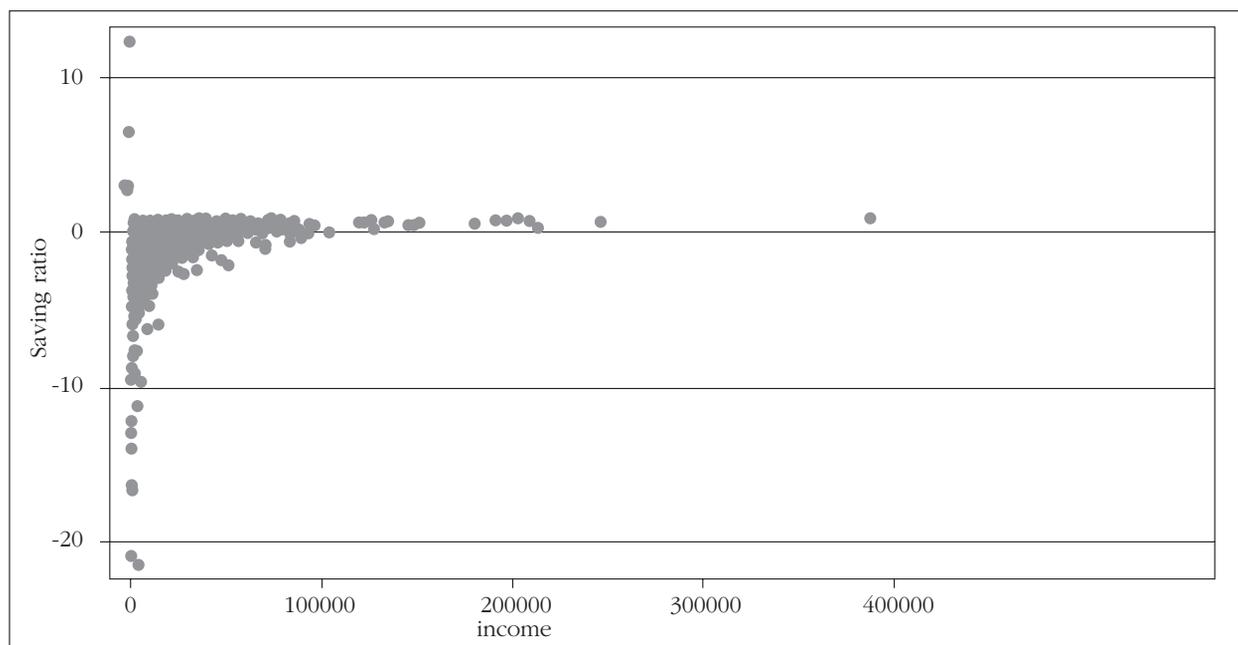
From this data one might, for example, conclude that lower-income groups have no trouble borrowing since their savings rates are very negative! However, in reality, the results more likely reflect under-reporting. Naturally, when income is under-reported, there is a tendency for both income to be low and saving (defined as income minus spending) to be negative. Thus, the finding of very negative saving rates for the lowest-income quintile could be a pure artifact, and low-income groups might not in fact save less than others. One way to gauge this is by conditioning on proxies for income rather than income itself. We use rooms

per adult equivalent (using the OECD scale discussed in Section 5) as such a proxy.[63] This way we find that the poorest quantile as defined by number of rooms in the house had a saving rate of 9% in 2005, much above the -36% when based on the income data (Table 1), and comparable to the 10% average for all households. It is possible that even this number does not accurately reflect the saving rate, if the poor under-report more say by virtue of being more likely to work in the informal sector, where under-reporting is more prevalent (see below).

Further inspection of the graph shows that the data is clearly unrealistic. There are some 8 individuals with dissaving greater than 10 times disposable income, and a large number of individuals with less extreme, but still implausible negative saving rates. We consider dissaving in excess of annual income (i.e. saving equal to -100% of disposable income or a ratio of -1 in the graph) as abnormal or unrealistic. Dissaving in excess of annual income is 6% of our cases in 2005, a large figure. The figure is up from 4% in 2004, so under-reporting seems to be getting worse.

Which are the groups that tend to under-report? One way to find out is to check the extent of abnormally negative saving rates by group. We continue to define abnormal or unrealistic saving as dissaving in excess of income. The household budget survey data for 2004-05 show that households where the head of household is self-employed are 50% more likely to have unrealistic saving than those where the head of household is an employee (results not reported). The same is true for households where the head of household works in a firm with less than 10 employees. Households whose head of household works in the private sector are more than 4 times more likely to have unrealistic saving compared to their counterpart in the state sector. One would expect these groups to under-report to TurkStat if they also under-report to the tax authorities, which is more likely the case in the private sector than the state sector. Households with a green card are almost 3 times more likely to have unrealistic saving than households without. Such households might under-report because of fear that their means-tested benefits would be taken away. Difference in means tests show that these differences are statistically significant. The fact that we find more abnormal cases amongst the groups where we would expect under-reporting is another finding (along with the sheer number of abnormal observations) supporting the idea that there is under-reporting.

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63 *By using adult equivalents, rather than number of persons, we take into account the fact that children have smaller room requirements than adults.*

Appendix Table 2: Survey Instrumental Variables Regression: Savings/Disposable Income

	All observations, 2004		All observations, 2005	
	Coef.	t	Coef.	t
Log income	0.06	1.00	0.28 ***	4.60
Urban location	0.03	0.87	0.02	0.69
Emekli Sandigi (civil servants)	0.00	0.04	0.04	1.16
Bag-Kur (self-employed)	0.16 ***	5.21	0.06	1.32
Other	0.16 **	2.17	0.19	1.15
No social security	-0.05 **	-2.03	-0.02	-0.56
Not available	-0.02	-0.72	-0.09 **	-2.19
1 public sector worker	0.07 ***	3.11	0.02	0.76
2 or more public sector workers	0.09 *	1.83	0.02	0.29
Have interest income	-0.03	-1.20	0.03	0.96
Health risk	0.21 ***	3.56	0.38 ***	5.33
Homeowner	0.07 ***	3.50	0.03 *	1.64
Head aged 30-34	-0.01	-0.32	0.05	0.77
Head aged 35-39	0.01	0.21	0.06	0.86
Head aged 40-44	0.04	1.08	0.09 *	1.59
Head aged 45-49	0.03	0.86	0.04	0.72
Head aged 50-54	-0.01	-0.24	0.09	1.50
Head aged 55-59	-0.04	-0.97	0.13 **	2.11
Head aged 60-64	-0.04	-0.52	0.12 *	1.79
Head aged 65-69	0.03	0.57	0.08	1.02
Log household size	-0.04	-0.75	-0.05	-1.29
Share members aged 0-4	-0.07	-0.47	0.01	0.10
Share members aged 5-9	-0.07	-0.57	-0.05	-0.50
Share members aged 10-14	-0.22	-1.63	-0.06	-0.64
Share members aged 15-19	-0.22 *	-1.87	-0.16 *	-1.78
Share members aged 60+	0.01	0.25	-0.11	-0.95
Share members that are housewife	0.03	0.69	-0.05	-0.80
Secondary education, head	0.03 *	1.83	-0.02	-0.85
Tertiary education, head	0.02	0.37	-0.09 **	-2.39
Secondary education, spouse	0.03	1.62	-0.04	-1.56
Tertiary education, spouse	0.07 *	1.73	-0.13 ***	-2.58
Extended family	0.02	0.55	-0.01	-0.26
Constant	-0.54	-1.08	-2.68 ***	-4.88
Number of observations:	7355		7353	
R-squared	0.07		0.14	

Estimated with instrumental variables. Instruments for log income include all variables in the regression plus access to hot water and number of rooms per adult equivalent. Sample consists of a core group of households, which excludes households whose head was under 25, over 70, a student, involuntarily unemployed, disabled or sick, waiting for work or in seasonal employment. Sample excludes doubtful cases. Doubtful cases are those where household income was in lowest quartile, yet had hot water; those where social security status of household head was not reported; those with negative income or spending and cases of extra-large dissavings, where dissavings is larger than 2.6 times annual income Health risk is a dummy variable equal to 1 for households where a probit regression indicates a 10% or greater chance of health expenditures in excess of 10% of consumption expenditures.

Omitted categories: head of household 25-29, social security=SSK scheme (general scheme).

***statistically significant at the 1% level; ** 5% level; * 10% level.

TÜSİAD