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A Technical study on the determinants and outlook of private sector deposits in the Greek banking system

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The present empirical study draws on the existing literature on private savings behavior to identify and analyze the main drivers of commercial bank deposits in Greece since the country joined the euro area in January 2001.

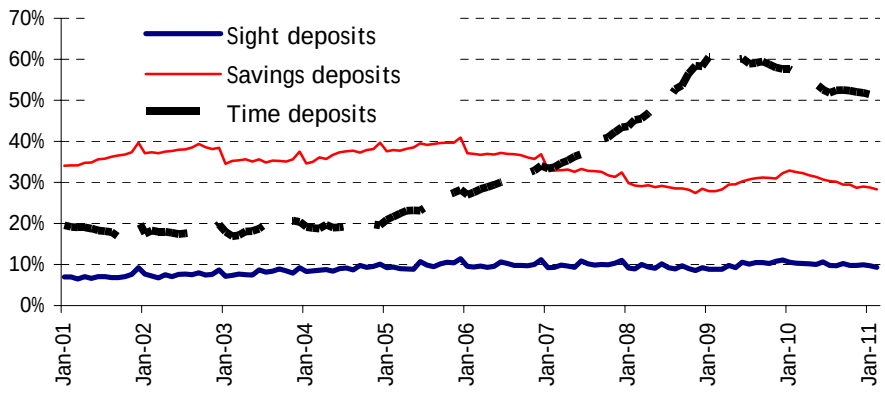
Our empirical methodology employs cointegration techniques and a vector error correction model (VECM) for studying the determinants of private-sector deposits to domestic commercial banks.

Private-sector deposits to the Greek banking system have been on a prolonged rising trend since the country's entry into the euro area. The total value of private deposits peaked in H2 2009, before embarking on a declining path following the eruption of the sovereign debt crisis in late 2009.

Among other important empirical findings, our study documents a strong positive link between bank deposits and bank credit to the domestic private sector in the periods before and after the eruption of the sovereign debt crisis. A strong positive link also exists between bank deposits and the level of gross national product (GDP).

From a policy standpoint, these empirical results appear to argue strongly against a hasty phasing out of ECB's present liquidity support measures that would endanger a more severe slowdown of bank credit with negative consequences for the domestic economy.

Evolution of resident private sector deposits in Greece
(% of GDP)



Source: BoG, Eurobank Research

I. Introduction*

The present empirical study draws on the existing literature on private savings behavior to identify and analyze the main drivers of commercial bank deposits in Greece since the country joined the euro area in January 2001. Our empirical methodology employs cointegration techniques and a vector error correction model (VECM) for studying the determinants of private-sector deposits to domestic commercial banks.

Significant efforts have been made by researchers in recent years to determine private savings behavior both at an individual- and a cross-country level. Among other reasons, the long-debated relationship between savings and the level (as well as the growth rate) of income has provided a strong motivation for considering more thoroughly the evolution of savings.

Although a large volume of theoretical and empirical research now exists with respect to the behavior of private savings, little has so far been done in analyzing the determinants of commercial bank deposits. The latter, along with any cash balances held outside the banking system normally constitute a significant part of overall private financial savings. Other forms of the latter may include investments in mutual funds and government and corporate debt instruments as well as other financial assets outside the M3 monetary aggregate definition, such as stocks and gold.

Private-sector deposits to the Greek banking system have been on a prolonged rising trend since the country's entry into the euro area. The total value of private deposits peaked in H2 2009, before embarking on a declining path following the eruption of the sovereign debt crisis in late 2009.

The liquidity position of the domestic banking system has come under increased pressure since the outbreak of the crisis as a stream of downgrades of Greece's sovereign credit by international rating agencies inevitably affected the ratings of domestic banks, halting their access to interbank funding markets. These developments hit the Greek banking system in a particularly challenging period, characterized by a shrinking deposits base, a recessionary domestic environment and rising non performing loans (NPLs).

In view of these developments and in a move to prevent a sharp contraction of domestic credit, authorities decided to extend and broaden the special support program for bank liquidity that was introduced in late 2008 (N.3723/2008). These steps along with a further loosening in ECB's collateral acceptance criteria for sovereign bonds appear to have so far prevented a much sharper contraction in bank credit that could exacerbate the economic recession. The latter is especially relevant, given the overwhelming dependence of domestic households and businesses on banks for financing relative to alternative sources of funding.

Among other important empirical findings, our study documents a strong positive link between bank deposits and bank credit to the domestic private sector in the periods before and after the eruption of the sovereign debt crisis. A strong positive link also exists between bank deposits and the level of gross national product (GDP). These findings point to the risk of a further contraction in the domestic deposits base this year, with key preconditions for a sustained recovery of the latter including, among others, a return to positive economic growth and a resumption of bank credit. From a policy standpoint, these empirical results appear to argue strongly against a hasty phasing out of ECB's present liquidity support measures that would endanger a more severe slowdown of bank credit with negative consequences for the domestic economy.

The rest of the document is structured as follows: Section II provides a literature review on the behavior and determinants of private savings and commercial bank deposits; section III contains an overview of the evolution of private deposits in Greece before and after the outbreak of the sovereign debt crisis in late 2009; section IV presents our data and explanatory variables; section V presents and analyses our empirical findings; section VI concludes

(*) The authors would like to thank Mr. Fokion Karavias for his valuable insights to this paper. Mr. Karavias is General Manager Global Markets, Institutional Asset Management and Services and Member of the Executive Committee of Eurobank EFG

II. Behavior of private savings and commercial bank deposits: Literature Review

Significant efforts have been made by researchers in recent years to determine private savings behavior both at an individual- and a cross-country level. Among other reasons, the long-debated relationship between savings and the level (as well as the growth rate) of income has provided a strong motivation for studying the evolution and determinants of savings. The existing literature presents the following three major theoretical frameworks for studying and analyzing private savings: the *Life Cycle Hypothesis* (Modigliani and Brumberg, 1954), the *Permanent Income Hypothesis* (Friedman 1957) and the more recent *Buffer-Stock Hypothesis* of savings behavior (Deaton, 1991 and Carroll, 1992).

The life cycle hypothesis of savings behavior stipulates that consumption in a particular period depends on expectations about lifetime income. The model is built around the saving/consumption decisions of a representative agent who maximizes lifetime utility subject to a budget constraint. The latter equals current wealth plus the present discounted value of the expected labor income over the working life of the agent. In its simplest form, the life cycle model assumes perfect foresight of the agent about the "true" income generating process as well as the future evolution of a range of variables affecting his consumption/saving behavior *e.g.* family composition, birth rate, dependency ratio and date of death. The basic framework also assumes frictionless capital markets, where the agent can easily borrow against his future income. These assumptions imply that individuals spread lifetime consumption over their lives by building up savings during "good" times (when income is high) in order to maintain desired consumption levels during "bad" years (when income is low). As a result, an agent's consumption in any given point in time is constrained only by his lifetime resources and savings are expected to be higher at his working age and low at young and old ages (Ozcan, Gunay and Ertac 2003).

Overall, the basic form of the life cycle model predicts a *negative* relationship between savings and current income and a *positive* relationship between savings and expected lifetime resources. Yet, some of the key assumptions of the model appear to be way too restrictive and, more importantly, not unanimously supported by recent empirical evidence. For instance, in real life households and businesses face certain constraints in their ability to borrow large amounts of money against their future expected income. Such constraints may take the form of *e.g.* credit limits, required liquid collateral assets and higher interest rate charges. The existence of these borrowing constraints may induce a close link between consumption/savings behavior and disposable income flows, regardless of the representative agent's age and employment situation (see e.g. Campbell and Mankiw 1991). Furthermore, recent studies do not generally support the basic model's assumption that savings are entirely exhausted at death. In fact, empirical evidence tends to suggest that saving rates of the elderly are not systematically lower that those of working-age individuals as the former prefer to transfer significant amounts of wealth to their children. These considerations induce a significant amount of uncertainty as to the theoretically correct sign of the relationship between savings and income. One should also be aware of a serious endogeneity problem arising in response to the issues discussed above. Specifically, while income growth is understood to affects savings through the above-mentioned channels, savings can also affect growth via its impact on investment and capital accumulation.

In its basic form, the permanent income hypothesis differentiates between *permanent* and *transitory* income as determinants of private savings. Specifically, income changes perceived by economic agents to be permanent tend to reduce current savings since they can justify higher consumption now and in the future. On the other hand, income changes perceived to be transitory motivate consumption smoothing, with part of today's income windfall being saved to support higher spending tomorrow.

On the other hand, the buffer-stock hypothesis of savings behavior stipulates that consumers accumulate assets so that they can protect their consumption from unpredictable income fluctuations. An important implication of the buffer-stock savings model is that under relatively general assumptions the model implies the existence of a *target* wealth stock. Whenever wealth is above the target, consumer's impatience dominates leading to higher consumption and lower savings. On the other hand, when current wealth is lower than the corresponding target, fear or prudence dominates leading to higher current savings.

Determinants of private savings

Empirical studies on private savings behavior have concentrated on the effects of a number of potential determinants, which can be generally categorized as follows (see e.g. Ozcan, Gunay and Ertac 2003).

a) Demographic determinants such as the age distribution of the population, birth rates and the dependency ratio. These potential explanatory variables are suitable for empirically testing the main predictions of the life-cycle model and, in particular, the existence of a precautionary motive for saving in working age in order to facilitate consumption at retirement.

b) Financial determinants such as the real interest rate on private deposits in commercial banks and various proxies for the level of development and efficiency of the financial system (*e.g.* degree of monetization of the economy and borrowing constraints). Empirical studies regarding the effect of the real interest rate on private savings behavior have generally been ambiguous, with most of them documenting a weak interest elasticity of private savings. One potential explanation for this finding is that the negative income effect of higher interest rates trend to broadly offset their positive intertemporal substitution effect.

c) Income and growth determinants, with a number of empirical studies documenting a positive and significant relationship between the *level* of income and the savings rate. However, the theoretical view on the link between aggregate savings and the *growth* of income has been more ambiguous. According to the permanent income hypothesis, higher growth today would imply higher anticipated future income, encouraging people to increase consumption (and reduce savings). On the other hand, the life-cycle model postulates that higher income growth would tend to increase aggregate savings, through a rise in the saving of active workers relative to the dissavings of people at retirement age.

d) External-sector determinants, such as the current account deficit and the terms of trade. For an open economy model, the standard views is that positive terms of trade shocks tend to increase savings vis-à-vis their positive effects on wealth and income. On the other hand, an increase in the current account deficit instigates a partial decline in private savings, as external saving may act as a subsidy to domestic private savings.

e) Uncertainty determinants, including proxies for macroeconomic and political stability. Macroeconomic uncertainty, proxies *e.g.* by the inflation rate, is usually expected to have a positive impact on savings, as agents in such an environment would try to hedge risk by increasing precautionary savings. In a similar manner, periods of heightened political or economic uncertainty may lead to an increase in precautionary savings.

f) Fiscal determinants, including various measures of the government's fiscal policy stance *e.g.* the general government balance. Besides the state budget balance, the latter also incorporates the balances of a range of sub-national public entities such as local governments, social security funds and state-controlled public corporations. The effect of fiscal policy on savings has been a topic of heated debate in the literature. According to the traditional Keynesian view, a temporary reduction in government savings would lead to higher national savings. On the other hand, the neo-classical view of the life-cycle model would assert that a decline in government savings tends to raise consumption and discourage saving by shifting the tax burden from present to future generations. As a result, a decline in government saving (*e.g.* via higher budget deficits) would instigate a decline in national savings. Yet another view is the well-known *Ricardian Equivalence* principle of Barro (1974). According to the latter proposition, the government's issuance of debt instruments *(e.g. bonds)* to finance dissaving results in an equal increase of private sector savings, as the private sector saves in anticipation of higher future taxes to service increased government debt. As a result, the latter theory postulates that public and private savings are perfect substitutes. In its purest form, the Ricardian Equivalence proposition assumes frictionless capital markets and perfect foresight on the part of savers. Interestingly, a number of past empirical studies have documented that Ricardian Equivalence hypothesis does not hold rigidly, though some form of offsetting exists between public and private savings.

Commercial bank deposits

Although the apparent (and long-debated) relationship between savings and income has motivated a substantial amount of theoretical and empirical work on private savings behavior in recent years, little has so far been done in analyzing the determinants of commercial bank deposits. The latter, along with cash balances held outside the banking system normally constitute a significant part of overall financial savings, other forms of which may include real estate processions, investments in mutual funds, government debt instruments and corporate bonds as well as other financial assets such as stocks and gold.

Among the relevant empirical studies on the topic that appear in recent literature, Finger and Hesse (2009) estimate a number of vector error correction models (VECMs) to account for a number of domestic and international factors that help to explain deposit demand in Lebanon. Employing a broadly similar framework, Haron and Wan Azmi (2006) examine deposit determinants of commercial banks in Malaysia. In their paper, Haron and Wan Azmi underline the classical Keynesian view of the main motives why people hold money; namely, transactions, precautionary and investment motives. The authors then examine the determinants and behavior of the three main deposit facilities offered by Malaysian commercial banks to cater for these motives that are demand, savings and time deposits.

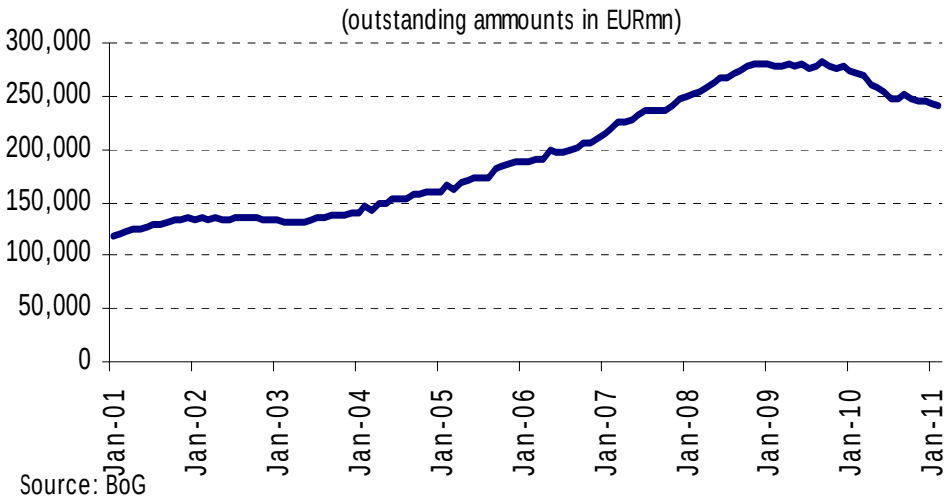
Depositor's money has traditionally been a significant source of funding for commercial banks, greatly influencing their ability to extend loans to the real economy. This has been particularly pronounced in the immediate aftermath of the Lehman Brother's debacle (Sept

2008). During that period, the virtual collapse of the securitizations business, ensuing disfanctionalities in the interbank funding markets and a sudden stop in foreign capital inflows to a number of emerging market economies rendered the depositor base as the main source of funding for domestic banks. For many economies in the CESEE region -- that in the pre-crisis boom years exhibited double-digit growth of private credit and industry-wide loans-to-deposits ratios well above 100 percent -- this situation resulted in a sharp deceleration of domestic credit, which exacerbated the economic recession. More recently, economic growth resumed in the majority of economies in the region, credit dynamics stabilized and deposit balances in commercial banks have again started to record positive dynamics.

III. Evolution of private deposits in Greece before and after the outbreak of the sovereign debt crisis

Domestic private-sector deposits to the domestic banking system have been on a prolonged rising trend since the country's entry into the euro area in January 2001. The total value of private deposits peaked in H2 2009, before embarking on a declining path following the eruption of the sovereign debt crisis in late 2009 (Graph 1.1). The liquidity position of the domestic banking system has come under increased pressure since the outbreak of the crisis as a stream of downgrades of Greece's sovereign credit by international rating agencies inevitably affected the ratings of domestic banks, halting their access to interbank funding markets. These developments hit the Greek banking system in a particularly challenging period, characterized by a shrinking deposits base, a recessionary domestic environment and rising non performing loans (NPLs).

Graph 1.1. General government & private-sector total deposits and repos in the Greek banking system - domestic and non resident entities.

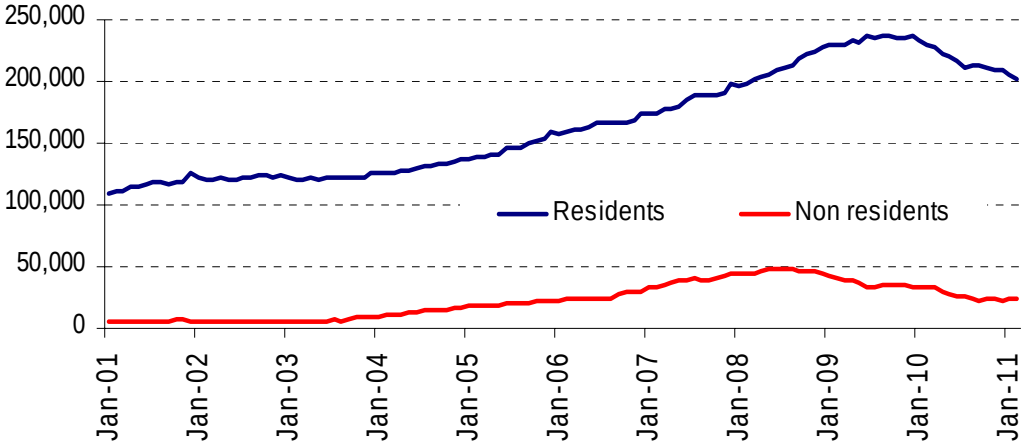


According to the latest Bank of Greece (BoG) data, the total volume of domestic private sector *(households and non-MFI businesses)* deposits and repos contracted to ca €202.2bn in February 2011, from €232.5bn in January 2010 and a multi-decade high of around €237.8 recorded in September 2009. This implies a contraction of ca €35.65bn over the respective period (or around €35.52bn if repos are excluded from the respective calculation). Over the same period, private sector deposits to the domestic monetary financial institutions (MFIs) from other euro area and *non* Eurozone private sector entities decline by ca € 8.87bn.

Non resident deposits to the domestic banking system have been on a steady upward trend since the country's euro area entry (especially in the period after 2004), peaking at ca €49bn (~20.7%-of-GDP) in May 2008 from levels of just €5.32bn (~3.6%-of-GDP) in January 2001 (Graph 1.2). From their mid-2008 peak, non resident private sector deposits to the domestic private sector declined by €25.4bn cumulatively, despite their resilience in the immediate period following the Lehman Brothers collapse (Sept 2008) thanks to the strong capital adequacy position of the Greek banking system and its limited exposure to toxic assets.

Faced with declining domestic deposits, restricted access to international funding markets, increased NPLs and eroded collateral values for ECB financing, Greek banks had to navigate though a particularly difficult environment, having in addition to pay back some €8bn in 2010 in the form of maturing liabilities to other parties[2]. In view of these developments and in a move to prevent a sharp contraction of domestic credit, authorities decided to extend and broaden the special government support program for bank liquidity that was introduced in late 2008 (N.3723/2008).

Graph 1.2. Private sector deposits to Greek MFIs (EUR mn)



Source: BoG

These steps along with a further loosening in ECB's collateral acceptance criteria for sovereign bonds appear to have so far prevented a much sharper contraction in bank credit that could exacerbate the economic recession. The latter is especially relevant, given the overwhelming dependence of domestic households and businesses on banks for financing relative to alternative sources of funding. Note that the total outstanding balance of domestic MFI lending to the domestic private sector at the end of 2010 was broadly unchanged relative to its level at the beginning of that year.

The total *nominal* value of government guarantees utilized by domestic banks as a credit enhancement for the issuance of corporate bonds, consequently placed as collateral with the ECB for funding, amounted to €50bn in the period January 2010-February 2011 (and to an overall amount of €62bn since the inception of the bank liquidity program). Taking in to account mark-to-market valuation adjustments and haircuts applied on collateral values, the banking system is estimated to have absorbed total liquidity of ca €35bn from the Euro system between January 2010 and February 2011.

As an additional step to support liquidity in the domestic banking, a relevant bill was submitted to Greek Parliament in late March 2011, providing for the extension of the present government guarantees program for banks by a further €30bn. This new program of guarantees comes with stronger conditionality than the previous ones. It requests banks wanting to utilize the new scheme to submit detail plans for their medium-term financing need than have to be approved by the BoG and the ECB, in coordination with the European commission and the IMF.

As it is also noted in the latest BoG Annual Report, the support measures specified above are of temporary nature, aiming to provide enough time for domestic banks to adjust their cost base and assets structure to the new macroeconomic environment and market conditions. As surmised by the analysis above, liquidity has so far been the primary problem of the domestic banking system, while capitalization levels, especially for the four largest commercial banks, remain exceptionally strong.

According to the latest available data, the capital adequacy ratio of Greek banks stood in December 2010 at 13.8% (and at 12.2% at group-wide level), remaining well above the 8% regulatory minimum. In view of these considerations, it is fair to say that the origins and

[2] *Industry-wide NPLs in the Greek banking system rose to 10.4% of total loans in December 2010, from 7.7% a year earlier, with a further increase expected this year.*

causes of the Greek debt crisis have so far been quite different from those in other euro area peripheral economies currently facing severe funding problems (e.g. Ireland and Portugal). In that sense, it is fair to say that the Greek crisis has been purely a sovereign-related phenomenon.

As to the potential causes of the drawdown in private sector bank deposits -- a phenomenon that became particularly pronounced in H1 2010 -- the latest Bank of Greece annual report highlight, among others, the following[3]:

a) The economic downturn and the sharp decline in real wages and profits, which impacted disposable incomes and forces domestic households and businesses to tap their existing pool of savings to finance consumption and operating expenditure.

b) Increased uncertainty of depositors about the outlook of the domestic economy. This is understood to have prompted an outflow of private deposits to the foreign subsidiaries of Greek banks (domiciled in Cyprus, U.K., Luxemburg and elsewhere) as well as other banks abroad. Anecdotally, these developments occurred as a result of increased uncertainty about the future domestic tax regime and fears that authorities might eventually utilize deposit-related information in their fight against tax evasion. According to Bank of Greece estimates, more than 1/3rd of total deposit outflows following the eruption of the sovereign debt crisis were destined to financial institutions abroad. In addition, exacerbated fears of a sovereign default and a forced exit from the euro area, especially in the period leading to the signing of the €110bn EU/IMF bailout package, appear to have also played a role in stimulating deposit outflows, with a part of them being invested in financial assets outside the M3 money-aggregate (e.g., foreign stocks, bonds and gold) or simply held in the form of under-the-mattress money[4].

The first potential driver of deposit outflows cited above constitutes a testable hypothesis in our study and will be discussed more thoroughly in the empirical part of our paper. However, factor *b)* deserves some further elaboration at this point, not least because it is more difficult to capture and quantify in an empirical model. Specifically, it is important to note that as early as in the beginning of 2010, a number of reports circulated in the domestic press suggested that the government was planning to utilize any existing information for the cross checking of individual wealth (including in the form of deposits with domestic commercial banks) and income declared for tax purposes. Anecdotally, this frightened a significant number of high net worth individuals, leading them to send money abroad.

Furthermore, the period leading to the signing in of the €110bn EU/IMF bailout programme for Greece (May 2010) saw a significant rise in market rumors suggesting the possibility of an imminent sovereign default and forced exit from the euro area. This situation again frightened a number of domestic depositors, leading them to increase their liquid holdings outside the domestic banking system (*e.g.* in the form of cash holdings in special safety boxes at domestic banks as well as deposits in foreign banks and foreign subsidiaries of Greek banks).

As to the interest rates on deposits, according to BoG data interest rates on new time deposits of up to one year maturities increased significantly in 2010, while those of overnight deposits remained broadly unchanged. As a result, the average weighted interest rate on all deposits categories increased over the past 14 months, standing at 2.18% in February 2011, from 1.32% in December 2009. This increase reflects not only higher interbank rates (3m euribor up ca 38bps between December 2009 and February 2011) but, primarily, higher interest rates offered by domestic banks to attract deposits.

Categories of commercial bank deposits in Greece and their behavior

Looking now at the different types of private sector deposits in Greece, these could be broadly separated in the following three general categories that are also in line with the available aggregate BoG statistics:

- sight deposits
- savings deposits
- time deposits

In line with the classical theory of money demand, these categories can be broadly associated with different motives of economic agents for holding part of their financial savings in the form of commercial bank deposits. These motives include:

- transactions demand motive
- precautionary motive

[3] *See Bank of Greece Annual Report 2010.*
[4] *According to BoG data, private deposits amounted to as much as 98.7% of Greece's monetary aggregate in December 2010.*

- investment motive

The first general category of deposits, *i.e.,* sight deposit, or more commonly, current account facility, is broadly associated with the transactions demand motive. It is designed to fit the need of households and businesses to finance daily commitments in the form of household spending and operating expenditures.

The savings deposit facility aims to fill the needs of those who wish to save money for precautionary purposes and, in the same time, earn some income.

The third deposit category *i.e.,* time deposits, cater for the investment (and speculative) motives of those who may have idle funds and are looking for a satisfactory return on their money balances.

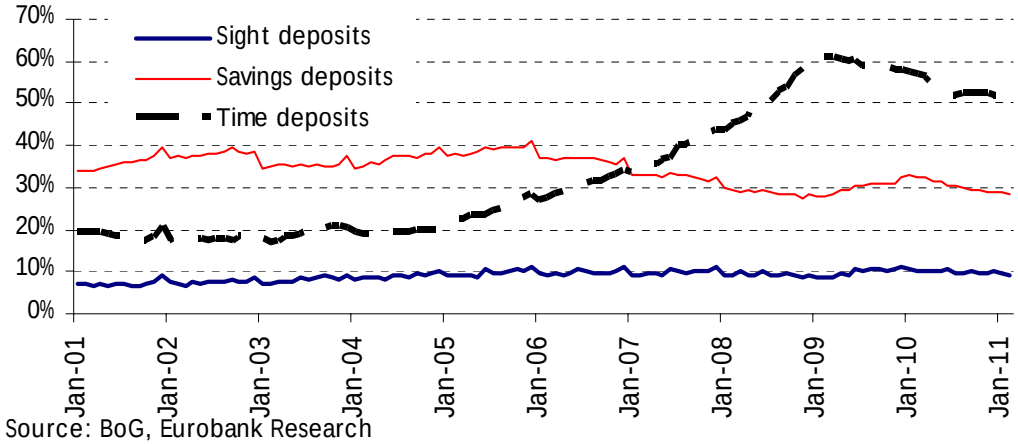
A closer look at the evolution of these distinct categories of private deposits in Greece, before and after the eruption of the sovereign debt crisis reveals some interesting trends.

Specifically, sight deposits of residents peaked at ca €26bn in December 2009 (from levels around €10bn in early 2001), before decelerating to ca €21bn in February 2011. In percentage points-of-GDP, sight deposits remained broadly steady between 7%-11% throughout the entire period January 2001-February 2011.

Saving deposits have been also broadly stable during the period 2001-2005 (ranging between 35%-of-GDP and 40%-of-GDP), before embarking on a declining trend thereafter. They reached ca 28%-of-GDP in February 2011, from levels around 31%-of-GDP in Q4 2009.

On the other hand, time deposits have been broadly stable (~20%-of-GDP) in the first four years following Greece's euro area entry, before assuming a steep uptrend thereafter, reaching highs beyond 60%-of-GDP in H1 2009. Time deposits have declined significantly since late 2009, reaching ca 51%-of-GDP in February 2011.

Graph 1.3. Evolution of resident private sector deposits in Greece (% of GDP)



Source: BoG, Eurobank Research

Considering the relative volumes and the evolution of the different categories of demand deposits over the last decade, it is surmised that time deposits explain the greater part of the pre-crisis increase (and post-crisis decline) of total private sector deposits in Greece.

At an empirical level, studying the evolution of the different categories of private deposits noted above could provide the base for testing a number of hypotheses underlying the existing literature of private savings behavior. In our study we choose to follow a more general approach, not looking at different deposit categories but instead testing a number of hypotheses, most of which relate to the general categories of potential savings determinants highlighted in the following section.

IV. Data and Explanatory Variables

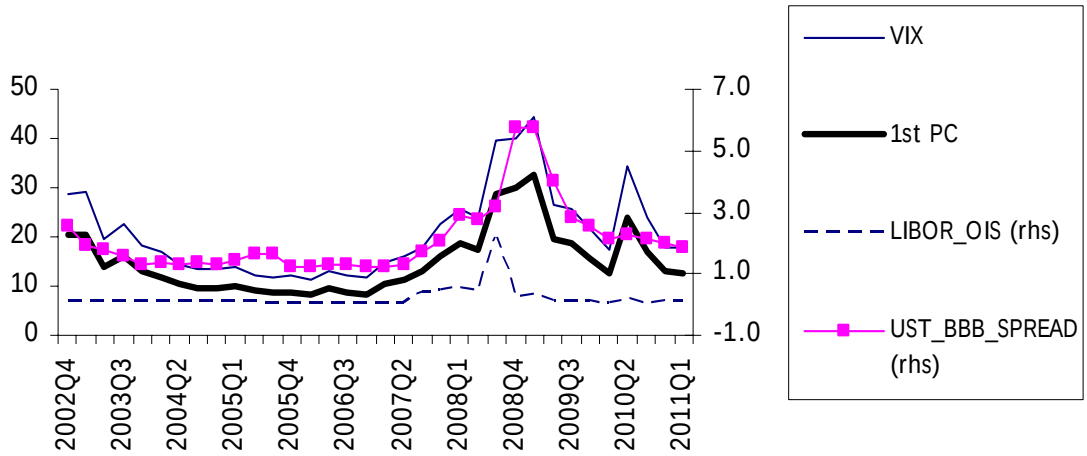
In this empirical study we draw on the existing literature on private savings behavior to identify and analyze the main drivers of commercial bank deposits in Greece over the last decade. Our data set consists of *end-of-quarter* observations on domestic private sector bank deposits and a number of potential explanatory variables. Our left-hand-side variable (denoted as **ln_priv_deposits)** constitutes the natural logarithm of domestic private sector (i.e., households and non-MFI businesses) deposits and repos in the domestic monetary financial institutions (MFIs). The available series depicts outstanding balances of EURs and other currencies and is denominated in EUR millions. The source of our deposits series is Bank of Greece (BoG). The potential explanatory variables utilized in our study fall under one or more of the following general categories:

Uncertainty Variables

ln_hcpi denotes the natural logarithm of the harmonized consumer price index (HCPI) for Greece. The source of the data is Eurostat.

ln_risk denoted our external risk indicator, which is derived as the 1st principal component of the following financial risk variables: VIX (implied volatility of the S&P500 stock index), 1-month LIBOR-Overnight Index Swap (OIS) spread and the yield spread between the 10-year US Treasury note and similar maturity BBB-rated corporate paper. The source of the data is Bloomberg. The principal components analysis results (not presented in this paper) are available upon request. Due to certain data limitations for the construction of our *ln_risk* indicator, we also utilize as an alternative risk indicator the VIX implied volatility index (denoted as **ln_vix** in the following empirical results section).

Graph 1.4. Risk variables & 1st principal component (PC)



Source: Eurobank Research, Bloomberg

Income Variables

ln_gdp_sa, which denoted the natural logarithm of gross domestic product in constant (i.e., 2000) prices in EUR millions. The source of the data is the Hellenic Statistical Authority (EL.STAT.).

The data are provided in non-seasonally adjusted terms and the authors utilized the U.S. Department of Commerce's Census X-12 methodology to derive the corresponding seasonally adjusted series[5]. The GDP data utilized span the period Q1 2001 to Q4 2010, which also constitute the *maximum* data span utilized in our study so as to reflect the current availability of existing data.

Financial Variables

real_ir_deposits in our study denotes the *real* interest rate on resident private sector *existing* deposits in the domestic MFIs. The source of the data is BoG and the series is deflated by the harmonized CPI rate for Greece. The series is deduced as the weighted average of

[5] *See U.S. Department, U.S. Census Bureau "X-12 quarterly seasonal adjustment Method. Release Version 0.2.9".*

interest rates on all categories of domestic private sector bank deposits *(weighs calculated as relative values of the various outstanding categories of deposits relative to all existing private sector deposits).*

ln_private_credit denotes the natural logarithm of outstanding private sector credit in EUR millions and the source of the data is BoG.

External Sector Variables

ln_trade_sa denotes the natural logarithm of the current account deficit (EUR millions) in seasonally adjusted terms. The source of the data is BoG.

Dummy variable

D_crisis denotes a dummy intending to capture the effect of the Greek sovereign debt crisis on domestic bank deposits. Our dummy takes the value of 1 for the period after Q4 2009 and 0 in all other quarters.

V. Empirical Methodology and Results

We employ **cointegration techniques** and a **vector error correction model** (VECM) for studying the determinants of private-sector deposits in Greece. As first step, we search for the presence of *unit roots* in the variables utilized in our study, by employing the Augmented Dickey-Fuller (ADF) test.

Unit Root Tests (see also ANNEX A.1.)

We find all variables in our study to be unit root (i.e., I(1)) processes. For expositional purposes we report below the test results for our **ln_priv_deposits** variable.

Table 2.1 Unit root test for ln_priv_deposits

Null Hypothesis: LN_PRIV_DEPOSITS has a unit root

Exogenous: None

Lag Length: 3 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.585004	0.8382
Test critical values:	1% level	-2.628961	
	5% level	-1.950117	
	10% level	-1.611339	

*MacKinnon (1996) one-sided p-values.

The ADF statistic value in the table above is 0.585004 and the corresponding one-sided p-value is 0.8382. Moreover, the associated 1%, 5% and 10% critical values are all lower than ADF t-statistic, suggesting that the test can not reject the null of a unit at conventional test sizes. In the unit root test presented above, we utilize the Schwarz Information Criterion (SIC) for selecting the maximum number of lag terms in the ADF test equation (here 3 lags).

The table below also shows the results of performing the ADF test in the first differenced series of the variable *ln_priv_deposists*. For this series, the ADF test rejects the hull hypothesis of a unit root at the 10% and 5% levels (against the alternative hypothesis of stationarity), though a unit root cannot be rejected at the 1% confidence level. (The second part of the table depicts the intermediate equation calculated for performing the ADF test on the first differenced series)

Table 2.1.1. Unit root test for Δ(ln_priv_deposits)

Null Hypothesis: D(LN_PRIV_DEPOSITS) has a unit root

Exogenous: None

Lag Length: 2 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.967694	0.0481
Test critical values:	1% level	-2.628961	
	5% level	-1.950117	
	10% level	-1.611339	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LN_PRIV_DEPOSITS,2)

Method: Least Squares

Date: 10/23/04 Time: 22:02

Sample (adjusted): 2002Q1 2011Q1

Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LN_PRIV_DEPOSITS(-1))	-0.301592	0.153272	-1.967694	0.0573
D(LN_PRIV_DEPOSITS(-1),2)	-0.528310	0.189388	-2.789570	0.0086
D(LN_PRIV_DEPOSITS(-2),2)	-0.010019	0.159693	-0.062742	0.9503

R-squared	0.549372	Mean dependent var	-0.002483
Adjusted R-squared	0.522864	S.D. dependent var	0.035169
S.E. of regression	0.024293	Akaike info criterion	-4.519652

Sum squared resid	0.020065	Schwarz criterion	-4.389037
Log likelihood	86.61356	Hannan-Quinn criter.	-4.473604
Durbin-Watson stat	1.558661		

As an alternative, we performed the Phillips and Perron 1988 unit root tests for the level and first differenced series of *ln_priv_deposists*. Here again the null of a unit root for the series in levels was not rejected at conventional test sizes. On the other hand, the Phillips and Perron (PP) test firmly rejected the unit root hypothesis against the stationarity alternative for the first differenced series. Note that the PP method estimates the AR(1) version of the DF test equation and modifies the t-ratio of the estimated coefficient so that the serial correlation does not affect the asymptotic distribution of the test statistic. (All results of our unit root tests are available upon request).

Cointegration (see also ANNEX A.2.)

It is a well-knows results in econometric analysis that when two or more *trending* or *non stationary* time series are regressed on each other the *spurious regression* problem arises. In case of trending time series, the spurious found relationship may be due to a common trend governing both series rather than to pure economic reasons. In case of nonstationarity (say of I(1) type) the series - even without drifts - may exhibit local trends that tend to move along for relatively long periods. The problem of spurious regressions stimulated the development of the theory on non-stationary time series analysis. Engle and Granger (1987) pointed out that a linear combination of two or more non-stationary time series may be stationary. If such a stationary linear combination exists, then the series are said to be *cointegrated.* Moreover, the linear combination – called the *cointregrating equation* – may be interpreted as a long-run equilibrium relationship among the variables.

Since all variables utilized in our study have been found to be integrated of order one (i.e., I(1) processes) we proceeded next to test for cointegration among the variables using the relevant methodology developed by Johansen (1991, 1995). The presence of cointegration in our variables forms the basis a number of alternative VECM specifications examined in our study. In this paper, we test for cointegration between our left-hand side variable, **in_priv_deposits**, and alternative sets of (potential) explanatory variables utilized in our study. The resulting cointegrating relations found then constitute the basis for the Vector Error Correction Models (VECMs) we will analyze in the following section. For illustration purposes, **Table 2.1 (ANNEX A.3.)** presents the cointegration test results for the following variables:

- ln_priv_deposits *i.e.,* natural logarithm of the level of domestic private sector deposits to domestic MFIs)
- ln_GDP_sa *i.e.,* natural logarithm of the level of seasonally adjusted GDP in constant prices
- ln_private_credit *i.e.,* natural logarithm of the level of domestic private sector credit
- ln_cpi *i.e.,* natural logarithm of the Greek consumer price index

As implied by Table 2.1, both the Trace and Maximum Eigenvalue tests point to the existence of one cointegration relationship among the above variables.

Empirical results

Based on the results of our cointegration tests we next proceed to estimate a number of alternative VEMC models, starting with **Model 0 (results presented in Table 3.1 of ANNEX A.4.).** For expositional purposes we call the latter "baseline" model.

Our baseline VECM (Model 0) includes the following variables:

- **ln_priv_deposits** *i.e.,* natural logarithm of the level of domestic private sector deposits to domestic MFIs
- **ln_GDP_sa** *i.e.,* natural logarithm of the level of seasonally adjusted GDP in constant prices
- **ln_hcpi** *i.e.,* natural logarithm of the harmonized consumer price index for Greece
- **ln_gvnt_deficit** *i.e.,* natural logarithm of general government budget deficit

The results from estimating Model 0 (depicted in Table 3.1) are interpreted as follows:

The first (upper) part of the table shows the estimated coefficients (and associated standard errors & t-statistic values) of the VECM's error correction term, which can be interpreted as the long-term equilibrium relationship linking ln_priv_deposits with the three other variables utilized in our baseline Model. For demonstration purposes we present this equilibrium relation below:

$$ln\_priv\_deposits = 27.80 + 5.28*(ln\_gdp\_sa) - 3.91*(ln\_hcpi) + 0.21*(ln\_gvtn\_deficit) + \varepsilon_t \quad (2)$$

All coefficients in the equation above are significant and appear to have the (theoretically) correct sign. Specifically, the **coefficient of GDP is positive and significant**. Putting aside the long-standing debate regarding the direction of causality between savings and income, one would be tempted to interpret the positive and significant coefficient of ln_gdp_sa in the equation (2) in line with the *life-cycle hypothesis* of Modigliani and Brumberg.

In its purest form, the latter effectively predicts that higher income today would result to higher savings (and vise versa) on the basis that the positive substitution effect out-weighs the negative income effect on savings. In reality, however, the opposite phenomenon appears to have happened in Greece over the past decade or so as private savings (e.g. in %-of-GDP) having been on a declining trend since the country's euro adoption. According to Eurostat data, the private savings rate in Greece declined to near zero percent in 2009 from levels around ten percent a decade earlier. As a result, the permanent income hypothesis appears to provide a better explanation of the evolution of private savings in Greece over the past decade. Specifically, higher income (and income expectations) in the pre-crisis period encouraged (aggregate) dissavings, while lower income (and pessimistic income expectations) in the period following the outbreak of the sovereign debt crisis seem to provide the base for a gradual restoration of the private savings rate.

In our empirical study though we do not try to explain the behavior of total private savings, but that of a subset of financial savings, which is private sector deposits to domestic banks. As a result, we give the following interpretation to the positive estimated coefficient on ln_gdp_sa in equation (2): In the pre crisis period, higher disposable income of households and higher business profitability led to higher bank deposits (in levels and in percentage of GDP terms), especially in view of attractive interest rates on deposits offered during that period relative to other forms of investments e.g. in T-bills. In the period following the outbreak of the sovereign debt crisis (Q4 2010), lower disposable incomes have led households and businesses to tap their existing poll of deposits to finance current consumption and operating expenditure.

The coefficient of ln_hcpi in equation (2) is estimated to be negative and (marginally) significant. This result can be interpreted on the basis that, ceteris paribus, higher inflation leads to a lower *real* interest rate on deposits. In our case, it appears that the negative effect of inflation on demand for deposits has outweighed any positive effect due to increased uncertainty associated with higher inflation (that could stimulate precautionary savings).

The coefficient of ln_gvnt_deficit in long-term equilibrium equation (2) is estimated to be positive and significant. Its value (=0.21) is significantly lower than 1, suggesting than some form of offsetting exists between public savings and private deposits, though this results cannot be strictly interpreted in the logic of the Ricardian Equivalence proposition, as the latter requires a comparison between aggregate private savings (instead of just private deposits) and government savings.

The second part of Table 3.1 displays the estimated coefficients (along with their associated standard errors & t-statistic values) of the VECM's first differenced lagged terms (four lags utilized in our study). It is worth nothing here that our **D_CRISIS** dummy variable that intends to capture the confidence effect of sovereign debt crisis on deposits is statistically significant and has the theoretically-correct *negative* sign.

The fit of our VECM, implied by our adjusted R^2 is quite high (~70%), suggesting that our base model does a very good job in explaining volatility in our left hand variable ln_priv_deposits. Furthermore, the adjustment parameter of our Vector Error Correction Model 1 is negative and significant (a = -0.076). This implies that the *speed* of adjustment towards long-term equilibrium is ca 7.6% per quarter, suggesting that any deviation from equilibrium takes, ceteris paribus, around 13 quarters to correct.

As a final note, our Lagrange multiplier (LM) test for residual serial correlation of up to 12 lags do not reject the null hypothesis of no serial correlation. A White (1980) test on our VECM's residuals in levels and squares cannot reject the null of no heteroskedasticity against heteroskedasticity of unknown, general form. Furthermore, a normality test on residuals (utilizing Cholesky orthogonalization) cannot reject the null of multivariate normality of residuals.

Based on the results of our cointegration tests we proceed next to estimate a number of alternative VEMC specifications (**Model 1** *through* **Model 6**), the estimated coefficients (and related inference statistics) of which are presented in Table 3.2. All estimated coefficients presented in Table 3.2 are statistically significant, as indicate by the reported t-statistic values (in parentheses below coefficient point estimates). Moreover our diagnostic tests, point to "well-behaved" residuals as they firmly reject the null hypothesis of *no-autocorrelation*, *no-heteroscedasticity* and *no-normality* of residuals for our estimated models. Moreover, our estimated cointegration equations appear to be stable throughout the span of our sample, while our joint causality tests on explanatory variables on private deposits indicate that these variables Granger-cause private deposits in the short-run. Note that in all of models (Model 0 to Model 6) we have utilized a dummy variable (D_Crisis) to capture the effects of the sovereign debt crisis. All estimated coefficients of our dummy variable are significant and have the correct (i.e., negative) sign and are available upon request. Furthermore, the fit (Adjusted R^2 s) is exceptionally high in all models under examination, ranging between 54% and 87%.

Finally, it is important to note that in addition to Models 0 to 6 presented in Table 3.2 we run a number of additional ones including both real GDP and private credit (in levels) as potential explanatory variables. In all these models the estimated coefficient of our ln_gdp_sa variable was broadly insignificant and had the theoretically wrong sign *i.e.,* negative. We attribute this result to multicolinearity problems related to the GDP and private credit variables.

An important finding of empirical study is the positive (and strongly-significant) coefficients of our private credit variable. Furthermore, as indicated above, private credit appears to Granger cause deposits (and not vice versa) in the short-term. We consider this result to have an important policy-related implication, arguing against a hasty phasing off of ECB liquidity support measures for the domestic banking system that could have negative implication for the domestic economy and the growth of private deposits in the banking system.

Out-of-sample forecasts for commercial bank deposits

As an additional step in our empirical study we utilize one of our VEC Models (**Model 1**) to produce out of sample forecasts for the evolution of private deposits in Greece. These forecasts are based on three distinct scenarios for the respective explanatory variables *i.e.,* private credit and the real interest rate on deposits.

The first (base-case scenario) is broadly in line with the baseline scenario of the EU/IMF stabilization programme for Greece that projects a return to positive GDP growth from 2012 onwards. It also incorporates a projected path for rest of explanatory variables that is broadly in line with the EU/IMF programme projections.

The second (pessimistic) scenario envisions *lower* GDP (by 1ppt/annum) relative to the EU/IMF baseline and a projected path for the rest of explanatory variables that is more adverse than the baseline scenario.

Our third (optimistic) scenario envisions *higher* GDP (by 1ppt/annum) relative to the EU/IMF baseline and a projected path for the rest of explanatory variables that is more favorable than the baseline scenario. (Details about the macro scenarios under examination are available upon request).

Our out-of-sample forecasts indicate the following:

a) Domestic private sector deposits to the domestic MFIs will likely fall further this year, with the forecasted decline ranging between €21bn and €16bn in our pessimist and optimistic scenarios, respectively. Our base case scenario forecasts a further €19.5bn drop in deposits in 2011.

b) Domestic private sector deposits will begin to stabilize/recover from mid-2013 onwards provided that positive growth of GDP and domestic credit resumes by then, in line with the EU/IMF programme scenarios.

It should be emphasized that the above projections are only indicative as considerable uncertainty continues to surround the evolution of the macro economy and relevant fiscal variables in the quarters ahead.

Table 3.2. Greece: VECMs for deposit demand – Baseline & alternative specifications

	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Baseline	Credit & Interest Rate	Credit, Interest Rate & Gov. Deficit	Credit & Trade Deficit	Credit, Gov. Deficit & Trade Deficit	Trade Deficit & VIX	Credit, Gov. Deficit, Trade Deficit & VIX
ln_private_credit		1.11 (2.43)	0.54 (37.1)	0.40 (12.56)	0.37 (31.2)		0.43 (17.5)
ln_gdp_sa	5.28 (2.47)						
ln_hcpi	-3.90 (1.54)						
ln_gvnt_ deficit	0.21 (2.31)		-0.10 (11.9)		-0.03 (2.09)		0.06 (2.22)
ln_trade				0.40 (12.56)	0.37 (31.2)	1.06 (18.3)	0.43 (17.5)
ln_vix						-0.17 (3.31)	-0.06 (2.22)
real_ir_ deposits		0.03 (3.41)	0.10 (11.9)				
Long-term trend		-0.02 (1.15)					
Adjustment coefficient	-0.08 (2.89)	-0.27 (5.32)	-0.25 (3.20)	-0.22 (4.45)	-0.47 (6.75)	-0.12 (6.40)	-0.18 (3.51)
Adj. R-squared	69%	73%	54%	63%	83%	75%	87%
Test on long-run restrictions			0.31	0.76	0.77		0.58
Trace test	2	1	1	1	2	1	1
Max test	1	1	1	1	1	1	1
No residual autocorrelation	0.65	0.61	0.70	0.25	0.35	0.08	0.64
No residual heteroscedasticity	0.58	0.08	0.49	0.01	0.32	0.58	0.32
Residual normality	0.91	0.00	0.58	0.82	0.56	0.28	0.94
Stability of cointegration	2008:Q1 yes	2008:Q1 yes	2008:Q1 yes	2008:Q1 yes	2008:Q1 yes	2008:Q1 yes	2008:Q1 yes
Joint causality of explanatory variables on private deposits	0.00	0.00	0.01	0.00	0.00	0.00	0.00

Notes:

1. *t-statistics in parentheses below point estimates.*
2. *Test on long-run restrictions indicates the p-value on the null hypothesis of equal coefficients (where applicable); a value greater than 5% implies that the hypothesis cannot be rejected.*
3. *Trace test and Max test indicate the number of cointegrating relationships present, based on the trace test and maximum eigenvalue test respectively.*
4. *Residual autocorrelation, residual heteroscedasticity and residual normality indicate the p-value of the respective null hypotheses; a value greater than 5% implies that the hypothesis cannot be rejected.*
5. *Stability of cointegration indicates whether the recursively computed eigenvalues and corresponding test statistic, with a break date at 2008:Q1, are stable until the end of the sample.*

6. *Joint causality of explanatory variables on private deposits indicates the p-value of the Granger-causality test of these variables on private deposits, based on short-run dynamics; a value less than 5% implies that the explanatory variables Granger-cause private deposits on the short-run.*

V. Concluding Remarks

The present empirical study draws on the existing literature on private savings behavior to identify and analyze the main drivers of commercial bank deposits in Greece since the country joined the euro area in January 2001. Our empirical methodology employs cointegration techniques and a vector error correction model (VECM) for studying the determinants of private-sector deposits to domestic commercial banks.

Among other important empirical findings, our study documents a strong positive link between bank deposits and bank credit to the domestic private sector in the periods before and after the eruption of the sovereign debt crisis. A strong positive link also exists between bank deposits and the level of gross national product (GDP). These findings point to the risk of a further contraction in the domestic deposits base this year, with key preconditions for a sustained recovery of the latter including, among others, a return to positive economic growth and a resumption of bank credit. From a policy standpoint, these empirical results appear to argue strongly against a hasty phasing out of ECB's present liquidity support measures that would endanger a more severe slowdown of bank credit with negative consequences for the domestic economy.

Our out-of-sample forecasts indicate that domestic private sector deposits to the domestic MFIs will decline further this year, with the forecasted decline ranging between €21bn and €16bn in our pessimist and optimistic scenarios, respectively. Our base case scenario forecasts a further €19.5bn drop in deposits in 2011. Domestic private sector deposits will begin to stabilize/recover from mid-2013 onwards provided that positive growth of GDP and domestic credit resumes by then, in line with the EU/IMF programme scenarios.

ANNEX

A.1. Unit Root Tests

Assuming an autoregressive representation of order p, AR(p), of a time series y_t of the following form (ignoring the constant and any deterministic terms):

$y_t = \Phi_1 * y_{t-1} + \ldots\ldots\ldots + \Phi_p * y_{t-p} + \varepsilon_t$

There always exists an **error correction** representation of the form:

$\Delta y_t = \varphi * y_{t-1} + \sum_{i=1}^{p} \Phi^*_i * \Delta y_{t-i} + \varepsilon_t$

Where φ and the Φ^*_i s are functions of the original Φ's

The null and alternative hypothesis under the augmented Dickey-Fuller specifications may be written as:

H_o: $\varphi = 0$, series y_t is non-stationary

H1: $\varphi < 0$, series y_t is stationary i.e., I(0) process

To establish the order of integration is our study we test for unit roots both in the original level series and the corresponding first (and higher order) differenced data. In our analysis we utilize the more recent MacKinnon critical values for the corresponding stationary tests.

A.2. Cointegration

For a *k x 1* vector of I(1) variables $Y_t = (y_{1t}, \ldots . y_{kt})$ consider the following vector autoregression process (VAR (p)) of order p (ignoring the constant and deterministic trends) :

$Y_t = A_1 Y_{t-1} + \ldots\ldots + A_p Y_{t-p} + \varepsilon_t$ (1.1)

It can be shown that there is an **error correction** representation of the following form:

$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^{p-1} A^*_i \Delta Y_{t-i} + \varepsilon_t$ (1.2)

Where Π and A^*_i are functions of the original A_i s

Now, If the *k x k* matrix $\Pi = \mathbf{0}$, then there is no cointegration. Nonstationarity of I(1) type can be eliminated by taking first differences.

If Π has full rank, k, then the y_i's cannot be I(1) but are stationary.

In the more interesting case that rank(Π) = m, with $0 < m < k$, then cointegration exists and there are suitable vectors *a, β (k x m)*, such that:

$\Pi = a\beta'$

Where the columns of β contain the m *cointegrating* vectors, and the columns of matrix *a* contain the m *adjustment* vectors. Moreover, the following system of equations represents the long-run steady state relation:

$\Pi * Y = \mathbf{0}$

Where in the *steady state* $\Delta Y_t = \mathbf{0}$

Given the specification of the deterministic term we can test for the rank m of matrix Π. Specifically, there are two sequential tests: **a)** the *rank* test and **b)** the *maximum eigenvalue* test.

The rank test checks the null hypothesis H_0: Rank (Π) = m against H_A: Rank (Π) > m.

Here we start with m = 0 (no cointegration) against m =1 (one cointegration relation) and we proceed sequentially.

The maximum eigenvalue test checks H_0: Rank (Π) = m against H_A: Rank (Π) = m+1.

We start with m = 0 (no cointegration) against m =1 (one cointegration relation) and we proceed sequentially. In case that we reject m = k -1 cointegration relations, we should have to conclude that there are m = cointegration relations.

A.3. Cointegration test

For illustration purposes, Table 2.1 presents the cointegration test results for the following variables:

- ln_priv_deposits *i.e.,* natural logarithm of the level of domestic private sector deposits to domestic MFIs)
- ln_GDP_sa *i.e.,* natural logarithm of the level of seasonally adjusted GDP in constant prices
- ln_private_credit *i.e.,* natural logarithm of the level of domestic private sector credit
- ln_cpi *i.e.,* natural logarithm of the Greek consumer price index

As implied by Table 2.1, both the Trace and Maximum Eigenvalue tests point to the existence of one cointegration relationship among the above variables.

Table 2.1. Johansen cointegration test

Date: 10/23/04 Time: 23:30

Sample (adjusted): 2000Q4 2010Q4

Included observations: 41 after adjustments

Trend assumption: Linear deterministic trend

Series: LN_PRIV_DEPOSITS LN_GDP_SA LN_PRIVATE_CREDIT LN_CPI

Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.566217	60.39113	47.85613	0.0022
At most 1	0.320493	26.14751	29.79707	0.1244
At most 2	0.222166	10.30560	15.49471	0.2580
At most 3	0.000114	0.004679	3.841466	0.9445

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.566217	34.24362	27.58434	0.0060
At most 1	0.320493	15.84191	21.13162	0.2342
At most 2	0.222166	10.30093	14.26460	0.1929
At most 3	0.000114	0.004679	3.841466	0.9445

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

A.4. Baseline model estimates

Table 3.1 Baseline specification (Model 0) – VECM estimates

Sample (adjusted): 2001Q4 2010Q4
Included observations: 37 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LN_PRIV_DEPOSITS(-1)	1.000000
LN_GDP_SA(-1)	-5.282428 (2.13412) [-2.47523]
LN_HCPI(-1)	3.906167 (2.52988) [1.54401]
LN_GVNT_DEFICIT(-1)	-0.209226 (0.09034) [-2.31606]
C	27.79861

Error Correction:	D(LN_PRIV_DEPOSITS)	D(LN_GDP_SA)	D(LN_HCPI)	D(LN_GVNT_DEFICIT)
CointEq1	-0.076148 (0.02630) [-2.89526]	0.018333 (0.02099) [0.87338]	0.004049 (0.00799) [0.50660]	1.443149 (0.83915) [1.71978]
D(LN_PRIV_DEPOSITS(-1))	-0.076973 (0.19266) [-0.39953]	-0.046953 (0.15376) [-0.30536]	0.003747 (0.05855) [0.06399]	-0.378704 (6.14694) [-0.06161]
D(LN_GDP_SA(-1))	-0.477404 (0.27217) [-1.75408]	-0.312725 (0.21721) [-1.43971]	0.018728 (0.08272) [0.22640]	1.774519 (8.68370) [0.20435]
D(LN_HCPI(-1))	-0.884140 (0.70601) [-1.25230]	0.955816 (0.56347) [1.69632]	0.201708 (0.21457) [0.94004]	-12.36346 (22.5259) [-0.54885]
D(LN_GVNT_DEFICIT(-1))	-0.021871 (0.00611) [-3.57973]	9.83E-05 (0.00488) [0.02017]	-0.001130 (0.00186) [-0.60843]	-0.377213 (0.19493) [-1.93512]
C	0.006131 (0.01049) [0.58459]	0.012138 (0.00837) [1.45006]	0.009221 (0.00319) [2.89265]	0.628758 (0.33464) [1.87893]
D_CRISIS	-0.050496 (0.01778) [-2.84071]	-0.046771 (0.01419) [-3.29679]	0.007005 (0.00540) [1.29662]	-0.748199 (0.56716) [-1.31921]

R-squared	0.813442	0.538087	0.541533	0.811872
Adj. R-squared	0.694723	0.244143	0.249782	0.692154
Sum sq. resids	0.005663	0.003607	0.000523	5.765191
S.E. equation	0.016045	0.012805	0.004876	0.511912
F-statistic	6.851822	1.830576	1.856146	6.781532
Log likelihood	110.0153	118.3600	154.0816	-18.10775
Akaike AIC	-5.135965	-5.587025	-7.517925	1.789608
Schwarz SC	-4.482890	-4.933951	-6.864850	2.442683
Mean dependent	0.015617	0.004554	0.008438	0.082179
S.D. dependent	0.029039	0.014729	0.005630	0.922632

Determinant resid covariance (dof adj.)	1.68E-13
Determinant resid covariance	2.10E-14
Log likelihood	372.6643
Akaike information criterion	-16.68455
Schwarz criterion	-13.89810

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