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Deposit Formation in Georgia

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Abstract

This paper analyzes behavior of the real deposits in Georgia in1996–2009 by modeling demand for the real broad money balances and the cash-deposit ratio. The results suggest that the main factors that affected deposits over those years were income, development of the financial sector, and changes in the tax burden, while changes in the interest rate and inflation played only a minor role. The results also demonstrate importance of the geopolitical events as they affect confidence in the banking sector.

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I. INTRODUCTION

A well-functioning banking sector that quickly and efficiently transforms savings into loans is a key element in development of an economy. A healthy banking sector is in its turn highly dependent upon stable and sizable sources of funding. In developing countries where non-banking components of the financial sector are marginal, problems in commercial banks instantly affect the rest of the economy, since commercial banks facilitate all types of cashless transactions both within the country and abroad.

The main sources of the banking liquidity is, of course, deposits, which commercial banks collect from households and companies and then pass on in a form of loans to other households and companies. A negative shock to the depositary base will impede the flow of credit, slowing down development of domestic industries, thus, reducing the pace of economic growth.

Hence, factors affecting households' saving decisions become important determinants of the financial system stability: decisions made by the households and firms on allocation of financial resources are significantly affected by the country's economic conditions; subsequently, depositors' behavior, determined by these decisions, impacts liquidity available to commercial banks and thus, affects stability of the financial sector.

There has been no research done that would have discussed this issue in the context of Georgia and this paper aims at filling this gap by identifying the determinants of the depositary base and analyzing their impact on deposit formation in the Georgian commercial banks. The empirical estimations do not produce a very stable relationship, but they do suggest that most of the growth in the depositary base came from the GDP growth and development of the financial sector, while the interest and inflation rates played very minor role and increase in the tax burden counteracted it. The results also underline that confidence in the banking sector has been very sensitive to the geopolitical developments.

II. METHODOLOGY

Deposits constitute the difference between money balances and currency in circulation:

$$D/P = M/P - C/P$$

where D/P are real deposits, M/P – real money balances, and C/P – real currency in circulation. Consequently, the deposit formation is analyzed using a three-step procedure: we estimate the money demand, the currency-deposit ratio, and then, the real deposits are modelled using the two functional forms.

Modeling the Broad Money Demand

There exists a vast amount of literature analysing money demand. Generally, narrow money—the monetary base or M1—is used to estimate the money demand as it tends to be more responsive to changes in economic variables (e.g., Lucas, 1988; Hetzel, 1984; Stock and Watson, 1993; Ball, 2001). However, given the goal of this paper, a broad measure of money, M3, is used, as it includes deposits denominated both in national and foreign currency.

In its simplest form, the demand for real money balances is modelled as a decreasing function of the opportunity cost of holding it, usually measured by the nominal interest rates, and an increasing function of a scale variable that approximates the number of transactions in the economy, usually income or wealth (e.g. Lucas, 1988; Hoffman and Rasche, 1991; Stock and Watson, 1993). Thus, the standard functional form for money demand is as follows:

$$M/P = F(Y, i), \; F_Y > 0, \; F_i < 0$$

where M is the money stock, P – the price level, Y – the real income, and i – the nominal interest rate.

While such an idea is rather common, particular specifications vary. For instance, Felmingham and Zhang (2001) use the spread between interest on broad money and on non-money assets, while in a specification used by Vega (1998), the two interest rates enter separately. Komarek and Melecky (2004) extend the traditional money demand function consisting solely of domestic variables by including variables such as direct investment, effective exchange rate, the rate of return on foreign assets, and other indicators that are likely to have influence on demand for money in small open transition economies. Exchange rates, either bilateral nominal (Sriram, 1999a; Komarek and Melecky, 2004; Van Aarle and Budina, 1996) or real effective exchange ones (Mutluer and Barlas 2002), are also used in order to account for currency substitution.

The specification used in this paper includes among the determinants of the M3 demand the following variables: the real GDP, the interest rate on deposits, and CPI inflation.

- The real GDP is used as a proxy for the volume of transactions in the economy. Since the volume of transactions is greater when the output is higher, the demand for real balances is expected to be increasing with the level of output.

- While usually money demand is assumed to be negatively depending on the interest rates, here the relationship is believed to be positive. That happens because broad money includes deposits and thus, the interest rate on deposits becomes the rate of return on holding money.[2]

- CPI inflation is included as the opportunity cost of holding money with respect to real assets and is expected to have negative coefficient (see e.g., Sriram, 1999b). This cost is expected to be significant since in Georgia, as in many developing countries, real assets, in particular housing, represent a substantial part of public's portfolio as the range of financial instruments is limited given underdeveloped financial markets (see Nachega, 2001).

Note that the interest rate and the rate of inflation are included separately in order to distinguish between two different effects: the interest rate on deposits is the rate of return on broad money with an expected positive sign, while inflation represents the opportunity cost of holding money relative to real assets with an expected negative sign.

Thus, the following functional form is assumed for the money demand:

$$\ln M_t / P_t = \beta_1 \ln Y_t + \beta_2 i_t + \beta_3 \pi_t + u_t$$

where M/P is real broad money, Y is real GDP, i is the nominal rate of return on deposits, π is the rate of the CPI inflation, and u is the error term.

Initially we also included the real exchange rate, however, it turned out to be statistically insignificant. In any case, the causal relationships would not have been very straightforward to interpret. Firstly, an increase in demand for domestic currency (for example, when tax payments are due) may itself lead to appreciation. Secondly, the fact that monetary aggregate measure that we use includes deposits both in domestic and foreign currency, complicates the issue further, as, for example, the nominal depreciation of the domestic currency would affect

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[2] The rate of return on financial instruments, such as bond and securities, can be viewed as an opportunity cost of holding the broad money (Mutluer and Barlas, 2002). However, the markets for these types of financial assets are underdeveloped in Georgia and hence, satisfactory time series do not exist.

both the right hand side variable (REER) and the left hand side variable (the real money), which measures dollar deposits in terms of domestic currency.

Modeling the Currency-Deposit Ratio

In the literature, the determinants of this ratio usually include income growth, opportunity cost of holding currency, but often other, country-specific factors as well.

- One of the main determinants of the currency-deposit ratio is the level of income (Boughton and Wicker, 1979; Hasan, 2001). As income rises, the share of deposits increases and thus, the ratio declines. Also, during recessions, as confidence in the banking sector decreases, deposits may be withdrawn, increasing the ratio. These considerations suggest that the income growth affects the ratio negatively.

- The relative cost of holding currency rather than depositing it, measured by the nominal interest rate, is another factor that has effect on the currency-deposit ratio (Khatkhate et al., 1980; Dadkhah and Mookerjee, 1988). Its increase diminishes the attractiveness of holding currency compared to deposits and thus, reduces the currency-deposits ratio.

- Theoretically, inflationary expectations are also bound to affect cash-deposit allocation decisions as expectations of high inflation would reduce attractiveness of deposits and induce depositors to purchase durable consumption goods and physical assets. However, no data on inflation expectations in Georgia exist, while inflation leads do not turn out to be statistically significant.

- Cagan (1965) suggested that the currency-deposit ratio is likely to be influenced by increased financial sophistication: as a wider range of liquid financial assets becomes available, the demand for currency increasingly falls.[3] Georgia experienced a rapid development of financial sector since the late 1990s and data indeed suggest a decreasing trend in the currency-deposit ratio. However, variables that could be used as a proxy for financial sophistication are either not easily available (a number of credit and debit cards[4] in circulation or the number of ATMs) or not sufficiently

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[3] However, for the U.K., Beenstock (1989) rejected the hypothesis, as at that time of rapid financial innovation, the currency ratio rose rather than declined.

[4] Institutional changes significantly affected the currency-deposit ratio and, in particular, the use of debit cards. Since 2006, payments of pensions have been made using banking accounts. This increased the number of those holding a bank account, and thus reduced the amount of currency in circulation. Overall, there is a tendency for transactions to become less cash intensive in Georgia as banks are increasingly used for the payments of wages and as well as other transactions.

dynamic (a number of branches of commercial banks). Given lack of other choices, the M2/M0 ratio is used instead.[5]

- Matthews (1982) argues that the relative demand for currency increases with the spread of the "black economy." Transactions in the black economy tend be in the form of cash since bank records could lead to detection by tax authorities. Thus, the demand for cash will vary directly with the average rate of tax, which stimulates the black economy. In Georgia a number of reforms, which reduced a number of taxes as well as their rates, has been implemented over the last few years. However, as the revenue administration was reformed, tax payments have been enforced more rigorously. These considerations suggest the rate of effective tax burden to be an important factor.

Thus, the functional form for the cash-deposit ratio is assumed to be of the following form:

$$\ln C_t / D_t = \alpha_0 + \alpha_1 \ln Y_t + \alpha_2 i_t + \alpha_3 T_t + \alpha_4 \ln FI_t + \varepsilon_t$$

where C/D is the currency-deposit ratio, Y is real GDP, i is the nominal interest rate, T is the effective tax burden measure, FI is an M2/M0 ratio approximating financial innovations, and ε is the error term.

Modeling Real Deposits

Real deposits are constructed as the difference between real broad money balances and real currency. In particular,

$$\left. \begin{array}{l} \ln\left(\dfrac{M}{P}\right) = F(X) \Rightarrow \dfrac{M}{P} = e^{F(X)} \\[2mm] \ln\left(\dfrac{C}{D}\right) = \Phi(Z) \Rightarrow \dfrac{C}{P} = \dfrac{D}{P}e^{\Phi(Z)} \end{array} \right\} \Rightarrow \dfrac{D}{P} = \dfrac{M}{P} - \dfrac{C}{P} = \dfrac{M}{P} - \dfrac{C}{D}\dfrac{D}{P} = e^{F(X)} - \dfrac{D}{P}e^{\Phi(Z)} \Rightarrow \dfrac{D}{P} = \dfrac{e^{F(X)}}{1 + e^{\Phi(Z)}}$$

where X is a vector of right hand side variables in the money demand equation and Z is a vector of right hand side variables in the currency-deposit ratio equation.

The equation can be log-linearized as follows:

$$\ln\left(D/P\right) = F(X) - \ln\left(1 + e^{\Phi(Z)}\right) \approx F(X) - e^{\Phi(Z)} \approx F(X) - \Phi(Z) - 1$$

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[5] Note that the M3 multiplier is a transformation of the cash-deposit ratio, and thus cannot be used. Using the M2 multiplier, though not ideal, does not present similar empirical difficulties, given a large share of the FX deposits that are reflected in the cash-deposit ratio but not in the M2 multiplier.

III. EMPIRICAL ANALYSIS

The economic reforms undertaken since the Rose Revolution of 2003 and the progress made subsequently in the economic development have brought about considerable improvement in the financial sector. Fast growth and improved fiscal position decreased country risks and stipulated the financial system to become one of the most dynamic sectors of the Georgian economy with an average annual growth rate of 20 percent in 2004–09, compared to the average GDP growth of about 6 percent (Figure 1). The August 2008 war with Russia and the international financial crisis have caused a significant decline in the growth rates in all sectors of the economy and the financial sector growth slowed down to 4.3 percent in 2008 and 1.5 in 2009.

Commercial banks represent the main segment of the financial sector in Georgia (no less than 97 percent of assets). Liberal regulations implemented in the banking sector since 2003 have facilitated growth of the industry and increased the interest of large foreign banks in the Georgian banking market. This contributed to the continuous expansion of the banking sector reflected in the growth of banking sector assets on average by 62 percent a year in 2005–07. Profitability ratios (rates of return on assets and equity) have been high by international standards (Figure 2) until 2008 when they deteriorated sharply. Growing trust towards the banking sector, driven by their improved profitability as well as positive economic outlook have consequently led to a rapid increase in deposits (Figure 3).

For the empirical analysis we use a monthly dataset covering the period from January of 1997 to March of 2010, although the sample used for estimation stops in July 2008 in order to exclude the effect of the August war between Russia and Georgia. The data is from national sources, such as the National Bank (NBG) and the Ministry of Finance. The variables, with an exception of interest, inflation, and tax rates are specified in the logarithmic form. All time series are seasonally-adjusted using the Census-X12 method in EViews.

- The price level is measured using the consumer price index (CPI) and its year-on-year growth rate is used to measure inflation.

- Real GDP at constant 1996 prices is used as a scale variable.[6]

- We use the broad definition of money (M3), defined as a sum of money outside banks (i.e. currency) and deposits, denominated both in national and foreign currency.

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[6] The quarterly values are divided by three to arrive at monthly data. Using other ways of constructing monthly data leads to similar results.

- The nominal rate of return on broad money is calculated as a weighted average of nominal interest rates on demand deposits in national and foreign currency with weights representing the shares of national and foreign currency deposits in total deposits respectively at any given point in time.

- The real interest rate is calculated as a difference between the nominal interest rate and CPI inflation.

- The financial sophistication of the economy is measured by the M2 multiplier.

- The "black economy" effect is captured by the ratio of tax revenues to the nominal GDP.

The variables are plotted on Figure 5. We also include on the chart the real effective exchange rate, calculated by the NBG.[7] In general, the picture is that of confidence in the economy gradually restored in the late 1990s until the Russian default of 1998, which is followed by real depreciation and an increase in inflation, which offsets an increase in nominal interest rates. The early 2000s are characterized by stagnation that are followed by improvements brought about by the Rose Revolution of 2003—a faster growth in real GDP, real appreciation, increases in deposits, M2 multiplier, and tax collection. Finally, the period of internal instability in 2007–8 and the 2008 August war with Russia are followed by a fall in GDP, real depreciation, decreases in deposits and the money multiplier, and increases in interest rates. In order to account for the deviations caused by the geopolitical factors, we introduce two dummy variables, one in order to account for effects of the Russian default of 1998, and the other to account for effects of the Rose Revolution of 2003.

A variable that helps analyze the level of trust in the economy and its banking sector in particular, is the level of dollarization of deposits (Figure 4). While at the beginning of the sample dollarization is just above 40 percent (as banking sector is mostly used for a limited number of transactions,[8] such as, for example, tax payments that have to be done in the domestic currency), as the economy grows, the level of deposits increases but the dollarization of deposits also rises quickly, reaching 80 percent at the end of the decade. It peaks at 87 percent right before the Rose Revolution and then steadily declines, reaching 60 percent in July of 2008. Following the war, the number quickly jumps to 76 percent and remains above 70 at the end of the sample.

As Augmented Dickey-Fuller test indicates, most of the variables, with an exception of interest and inflation rates, may have unit roots (Table 1). Thus, we use cointegration

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[7] An increase in REER means real appreciation of the domestic currency.

[8] In January 1997 there were GEL 81 mln of deposits, while in December of 2008 there were more than GEL 3 billion.

analysis in order to estimate the long-run relationships between the variables. The Johansen test confirms existence of cointegrating equations, which are estimated using the vector error-correction technique. A constant term is included in order to account for trends in some of the variables.

We start estimation using eleven lags and then exclude some of them using lag exclusion tests. Exclusion of the lags does not have a big impact on the money-demand equation, but the equation for the cash-deposit ratio appears to be very unstable, and exclusion of lags dramatically changes the estimated coefficients.

The resulting relationships are as follows (standard errors in the brackets):

$$\ln M_t / P_t = -10.97 + \underset{(0.17)}{2.98} \ln Y_t + \underset{(0.03)}{0.27} i_t - \underset{(0.01)}{0.05} \pi_t$$

$$\ln C_t / D_t = 29.61 - \underset{(1.84)}{5.83} \ln Y_t + \underset{(0.06)}{0.09} i_t + \underset{(0.09)}{0.61} \ln T_t - \underset{(2.25)}{8.98} \ln FI_t$$

All the variables in the above equation have expected signs and are statistically significant with the exception of the nominal interest rate in the second equation. A few points are worth mentioning.

The income elasticity of money demand is estimated to be about 3, which is higher than what is found for other countries, where income elasticity tends to be close to unity. The most plausible explanation is that other segments of financial markets (such as stock and bond markets) are underdeveloped in Georgia and, thus, deposits (and real estate) are the only viable ways of saving. The coefficients on interest rates and inflation are small, suggesting that the level of income is the main determinant in the consumption-saving allocation decisions.

The model confirms the positive relationship between the relative demand for currency and the spread of the "black economy" in Georgia. As the effective tax burden increases, demand for cash increases, indicating expansion of the unreported activities. The empirical analysis also allows detecting the effect of financial sophistication, approximated by the money multiplier, on the currency-deposit ratio. The negative coefficient indicates that increase in financial innovation (an increase in the M2/M0 ratio) decreases the currency-deposit ratio, as the financial system allows holding less cash and more deposits.

Both of the fitted time series, based on the estimated long-term relationships, are more volatile than the actual time series. This is even more so in the second case, where volatility of the fitted time series is more than two times higher (Table 2). The higher volatility of the fitted time series is reflective of higher volatility of the explanatory variables, in particular, financial innovation and the effective tax burden.

In order to arrive at the final specification for the real deposits, we combine two equations as described in Section II and smooth the obtained time series by switching to moving averages (Figure 8).

The resulting equation looks as follows in its log-linearized form:

$$\ln D_t / P_t = -41.59 + 8.80 \ln Y_t + 0.18 i_t - 0.05 \pi_t - 0.61 \ln T_t + 8.98 \ln FI_t$$

This equation shows that the income elasticity is high and positive. It indicates that people increase their deposits as high economic growth increases confidence in the banking system and encourages people to increase their deposits. Again, the high income elasticity reflects lack of financial assets other than deposits to invest money into.

The interest rate on deposits has a positive sign, as it represents the rate of return and therefore, an increase in it induces people to increase their deposits in commercial banks. Meanwhile, the real deposits are negatively affected by inflation, which represents the opportunity cost of holding deposits. Inflation can also be seen as a measure of uncertainty in banks, and with its increase attractiveness of deposits decreases and funds shift away from deposits toward consumer durables and physical assets. The effect of financial sophistication on deposits is positive as expected. The increase in the financial innovations makes it possible for transactions to become less cash intensive and increases attractiveness of deposits relative to cash. Meanwhile, the spread of the "black economy" has a negative effect on deposits, as transactions in the black economy are likely to be more cash-intensive.

When comparing the actual and fitted time series, we identify periods that can be associated with various geopolitical developments. In the late 1990s, the actual depositary base is much smaller than the fundamentals suggest (Figures 8 and 9), which is reflective of low confidence in the economy and the banking sector around the time of the 1998 Russian default. Afterwards, as the economy recovers, the interest rates decline and so does the predicted depositary base, remaining broadly in line with the fundamentals. Following the Rose Revolution the actual depositary base increases beyond what our model suggests, reflecting optimistic views that the residents of the economy must have formed. The two lines cross in mid 2007 when internal stability has dissipated and political confrontations, leading later to demonstrations and presidential elections, took place. Afterwards, the actual deposits remain in line with the fundamentals until the early 2009 when the predicted depositary base increases and the gap opens up again.

IV. CONCLUSIONS

This paper analyzes the formation of deposits in Georgian commercial banks in 1996–2009. Deposits are modelled as the difference between the real money balances and currency in circulation, with each of the two estimated using co-integration analysis, allowing this way to identify the underlying long-run relationships.

In line with the economic theory, the empirical analysis shows that the real GDP, nominal interest rate on deposits, and the financial sophistication have a positive effect on the depositary base, while inflation and spread of the shadow economy affect it negatively. It emerges that the main driving forces are the income effect, development of the financial sector, and the effective tax burden, while interest and inflation rates play a minor role. Comparison of predicted and actual values underlines importance of the omitted factors (such as those reflecting the geopolitical events) that affect confidence in the economy as a whole and its banking sector.

While the results for the real money demand are reasonable, the results for the currency-deposit ratio are not very robust. The equations incorporate highly volatile variables (such as, the effective tax burden), and thus, identifying more stable indicators could allow for better estimations. Other possible improvements include separation of deposits in domestic and foreign currencies, and introducing short-term dynamics. We leave these for future research.

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Table 1. Augmented Dickey-Fuller Test Results

	Level			1st Difference		
	Constant	Constant and Trend	None	Constant	Constant and Trend	None
ln (M/P)	0.27	-1.69	5.83	-10.39*	-10.36*	-3.22*
ln (RGDP)	-0.86	-4.04*	0.10	-11.99*	-12.43*	-12.03*
i	-5.57*	-4.30*	-2.70*	-18.38*	-18.54*	-18.37*
π	-4.07*	-4.08*	-0.49	-7.09*	-7.06*	-7.12*
ln (C/D)	-1.55	-2.57	-0.61	-15.14*	-15.20*	-14.06*
Tax Burden	-1.15	-2.85	1.31	-14.90*	-14.85*	-14.71*
Fin Inv.	1.53	-0.51	2.72	-14.66*	-15.23*	-14.29*
	Critical Values					
	-2.88	-3.44	-1.94	-2.88	-3.44	-1.94

NB: * denotes rejection of the unit root hypothesis at the 0.05 level.

Table 2. Variance Decomposition

|	Constant	GDP	i	π	Effective Tax Burden	Financial Innovation	Fitted Series	Actual Series
Mean		6.60	4.86	7.15	18.29	0.33		
Std. Deviation		0.24	2.19	4.84	4.98	0.18		
Real Money Equation								
Mean	-10.97	19.63	1.31	-0.33			9.64	9.46
Std. Deviation		0.70	0.59	0.22			0.81	0.63
Equation for Currency-Deposits Ratio								
Mean	29.61	-38.45	0.43		11.13	-2.96	-0.22	-0.34
Std. Deviation		1.37	0.19		3.03	1.61	1.09	0.48
Equation for Real Deposits 1/								
Mean	-41.59	58.08	0.88	-0.33	-11.13	2.96	8.94	8.89
Std. Deviation		2.07	0.40	0.22	3.03	1.61	1.01	0.83

NB: the top panel shows means and standard deviations of the regressors. In the lower panels, they are scaled by the respective coefficients from the estimated equations.
1/ The mean and the standard deviation are those of the "exponential" fitted series.
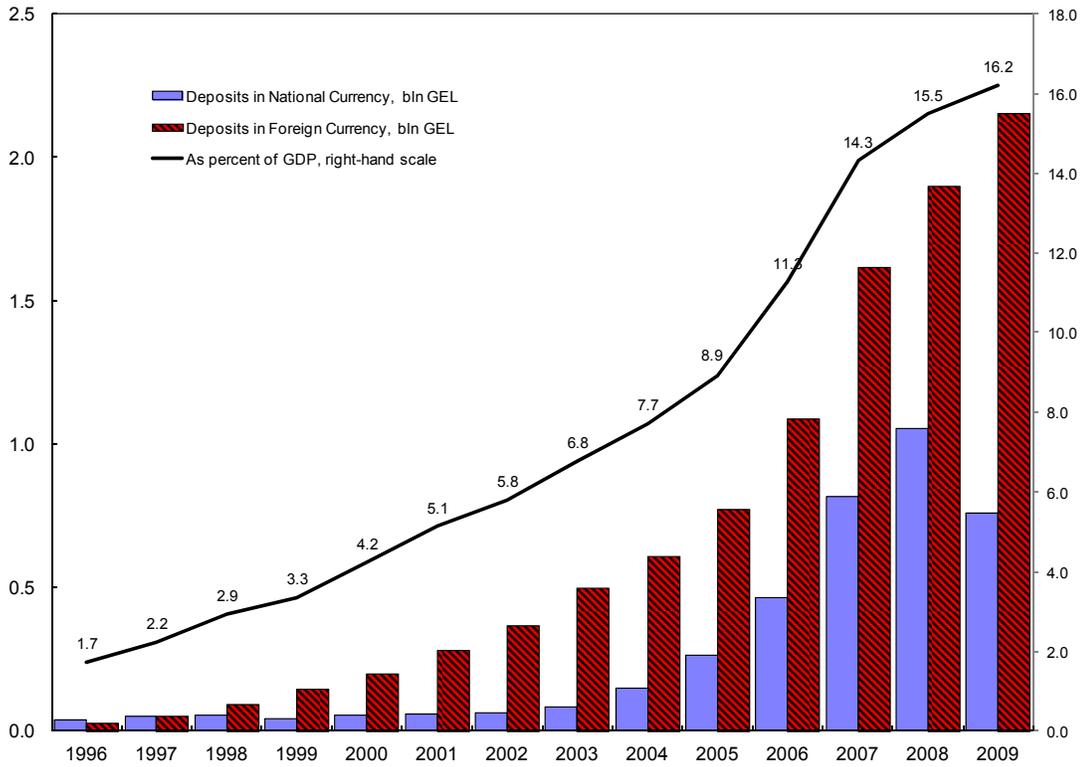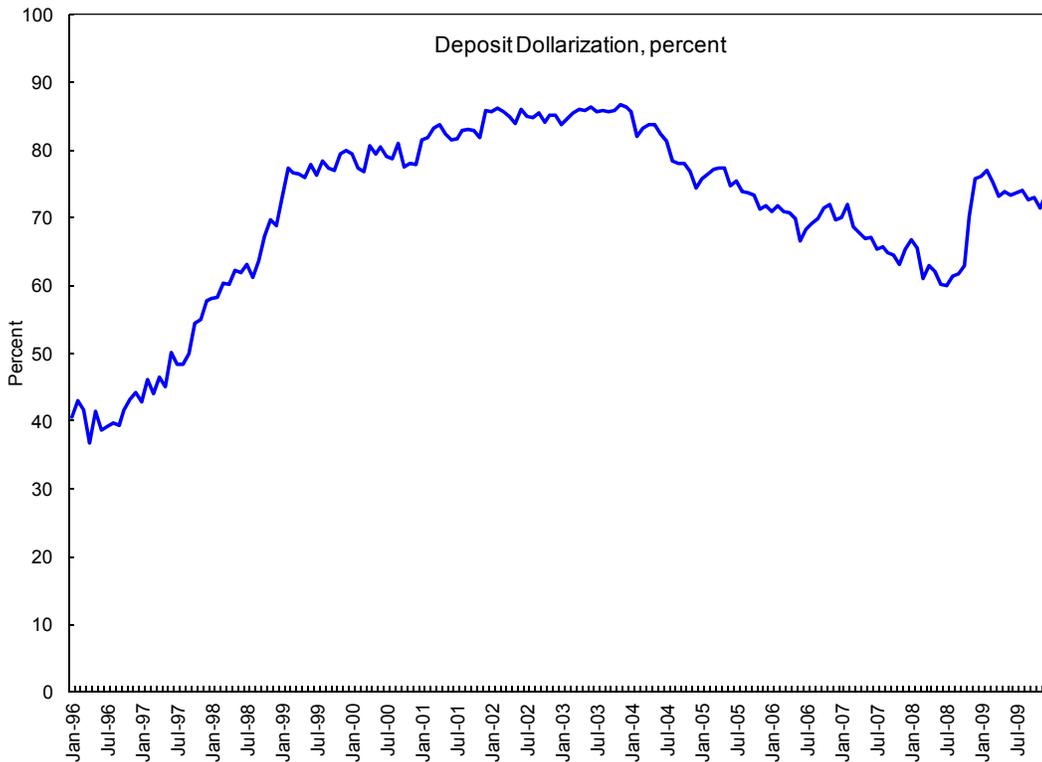
Figure 1. Real Growth in Selected Industries
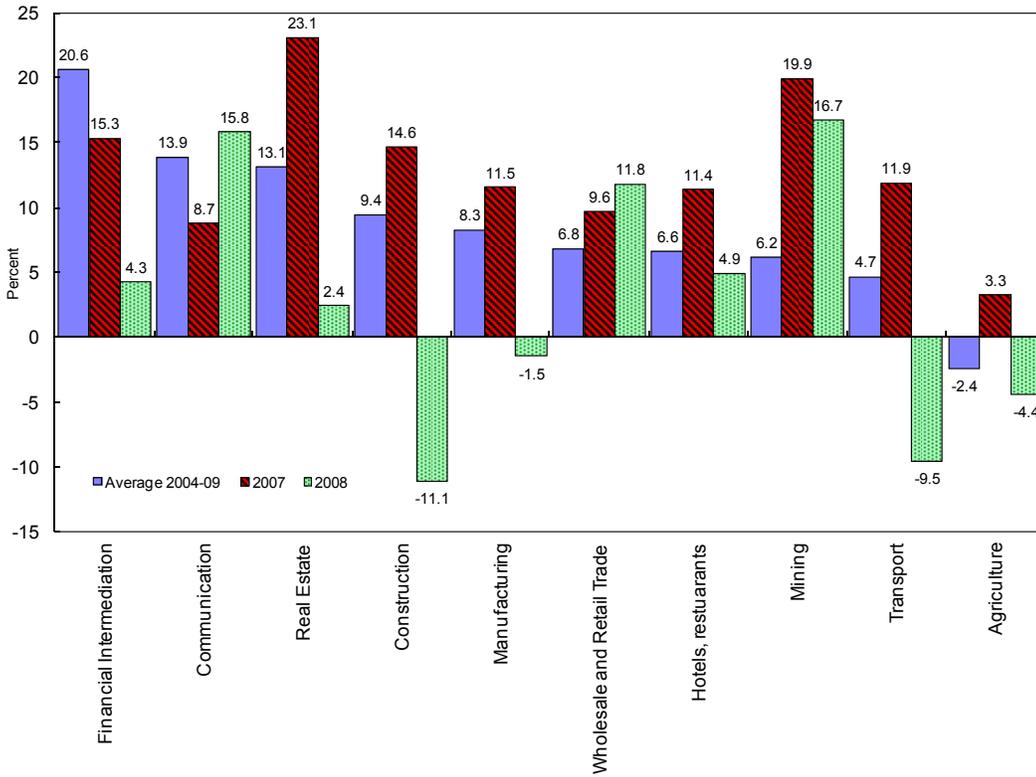
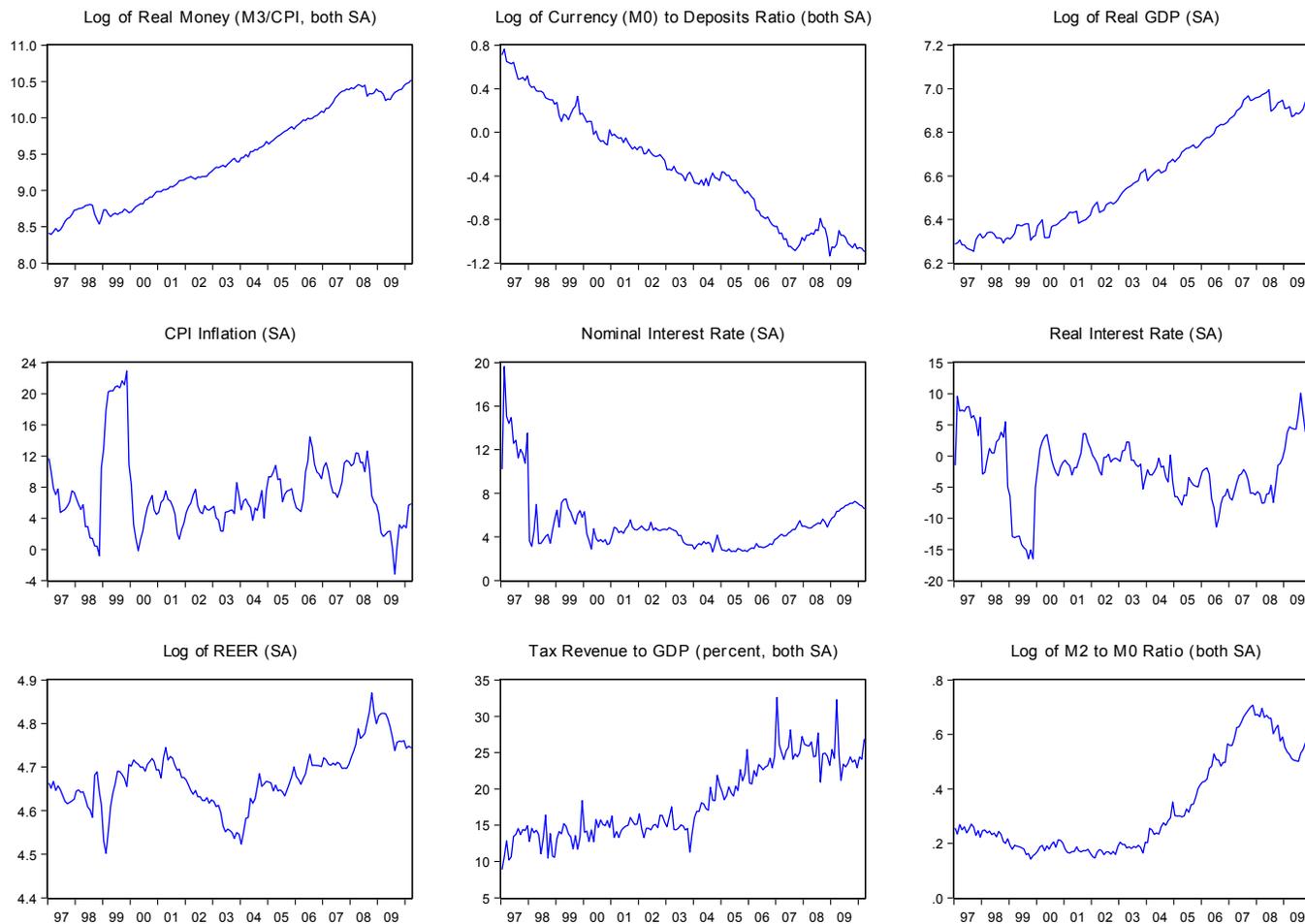## Figure 2. Assets of the Banking Sector
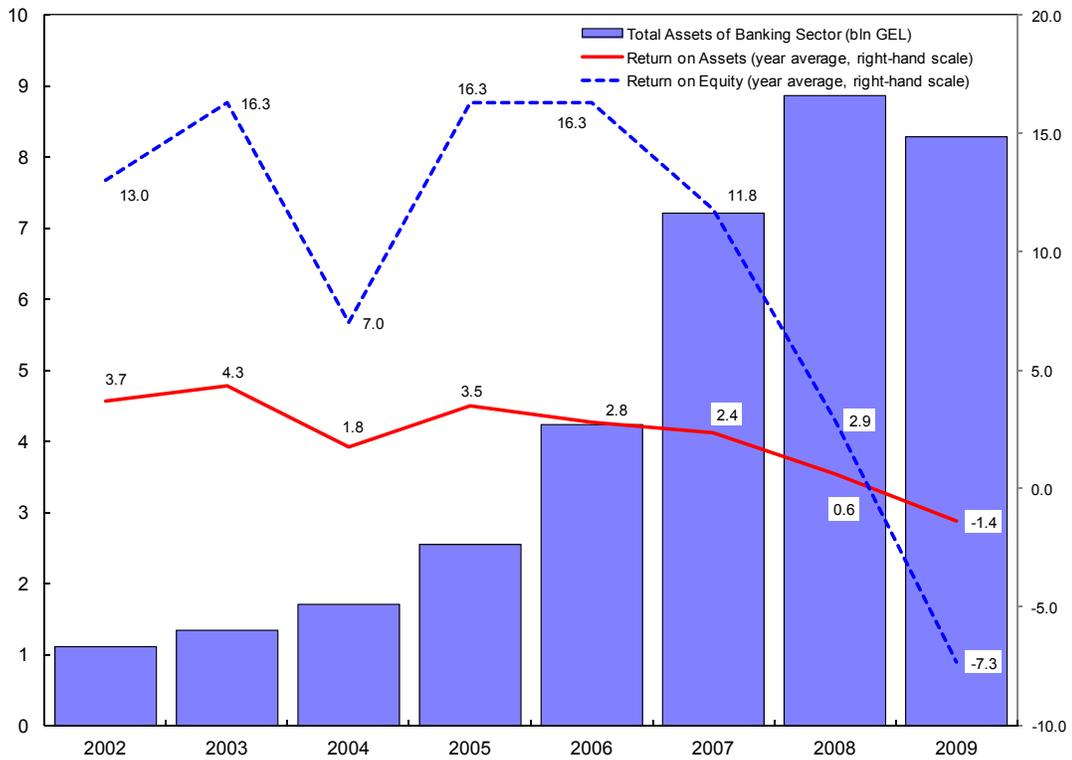
Figure 3. Depositary Base

Figure 4. Deposit Dollarization

Figure 5. Variables Used in the Regressions

Log of Real Money (M3/CPI, both SA)

Log of Currency (M0) to Deposits Ratio (both SA)

Log of Real GDP (SA)

CPI Inflation (SA)

Nominal Interest Rate (SA)

Real Interest Rate (SA)

Log of REER (SA)

Tax Revenue to GDP (percent, both SA)

Log of M2 to M0 Ratio (both SA)

Sources: NBG. Ministry of Finance. authors' calculations

Figure 6. Log of Real Money—Actual and Fitted Values
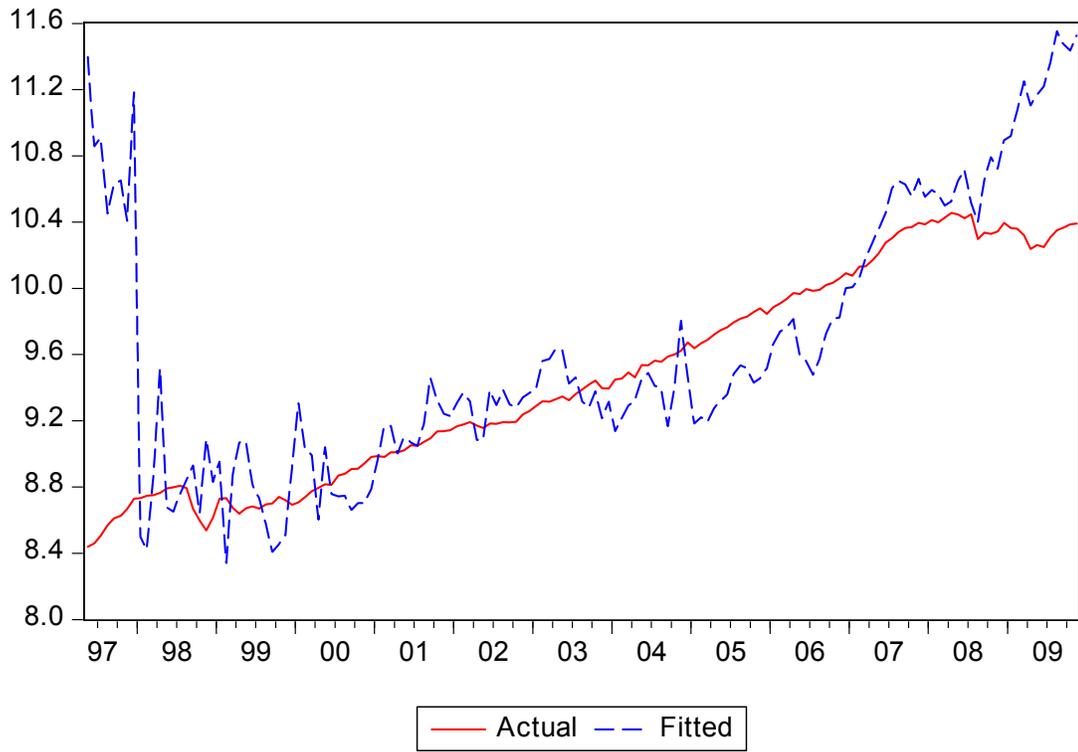
Figure 7. Log of Currency-Deposit Ratio—Actual and Fitted Values
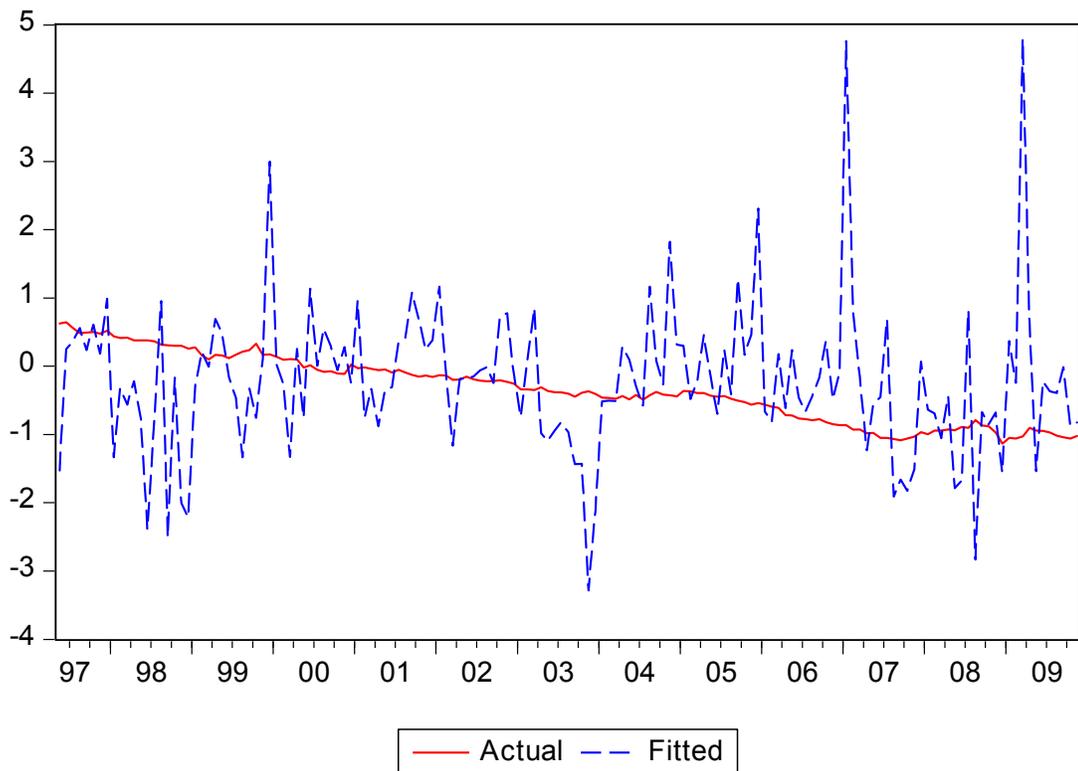
Figure 8. Real Deposits—Actual and Fitted (Exponential, MA) Values
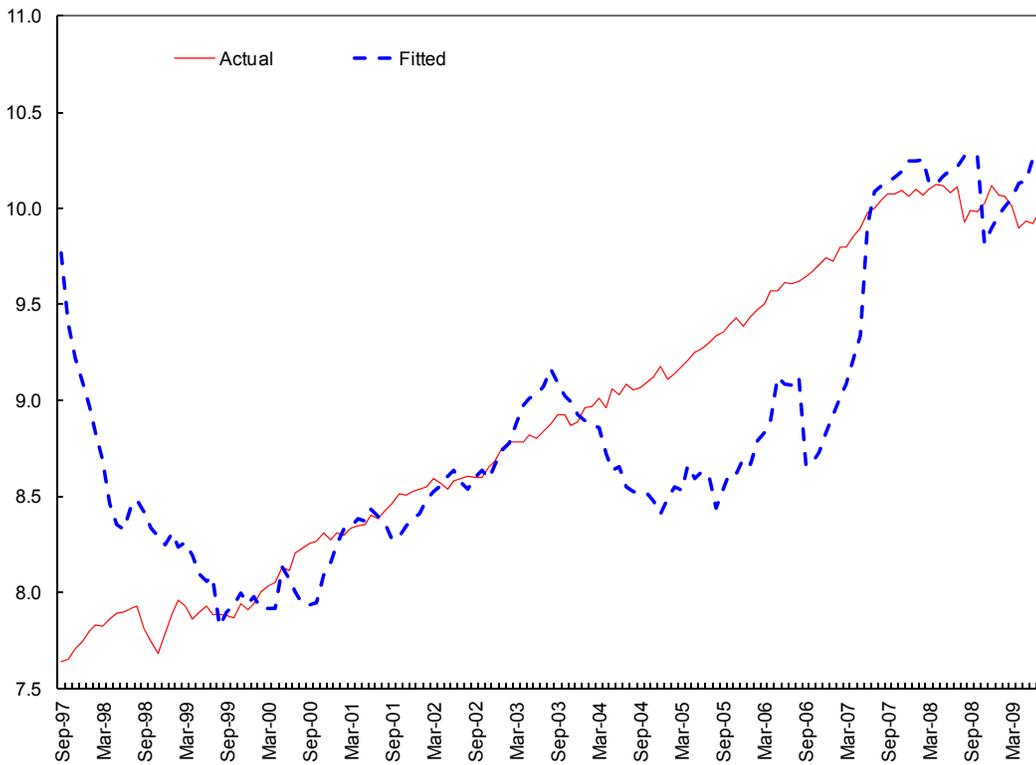
Figure 9. Contribution of Fundamentals to Estimated Real Deposits