Capital Mobility and Growth: Evidence from Greece[1]

Anastasios P. Pappas
Department of Business Administration
University of the Aegean, Chios
a.pappas@ba.aegean.gr
anastasios1977@gmail.com

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Abstract
A standard argument of the advocates of unrestricted capital flows is that they boost a small country's growth by increasing the efficiency of the allocated capital. In this paper I examine the nexus between capital flows and real growth for the Greek economy during the period 1980-2000. Such a positive link is not confirmed by the analysis either for total capital flows or flows concerning exclusively Foreign Direct Investments which are considered as stable and in general valuable. These results are robust to both of estimation methods employed (Granger Causality test and OLS regressions) and pass stringent extreme bound analysis criteria (EBA). The findings of this paper support the notion that capital account liberalization is not panacea for the economic development of small open economies.

Keywords: growth, capital flows, FDI, Greece

Introduction

The era emerged after the collapse of Bretton Woods system of global monetary management was characterised, among others, by the substantial increase of capital mobility. This increase is attributed to technological innovations, which minimize transaction and information costs, but it is mainly attributed to the widespread lift of barriers impeding cross-border capital flows. The removal of capital controls was heavily promoted by the governments of the USA and England via international organizations such as the International Monetary Fund (IMF). The proposals for the removal of capital controls is based on a considerable number of theoretical arguments. According to Obstfeld (1998, p.10-11), the integration of global capital markets maybe beneficial in various ways[2]. Firstly they allow to investors to diversify the risks of their assets by investing abroad. Moreover capital inflows can smooth domestic consumption in case of a temporary recession or a natural disaster. Capital flows can also impose discipline to domestic policymakers since unsound economic polices, such as those which produce fiscal and current account deficits, may trigger substantial speculative capital outflows. However the argument in favour of free capital mobility that it is investigated in this paper is that capital inflows may promote economic growth by enhancing domestic investment without being necessary a sharp increase in saving

[1] I would like to thank Dimitris Seremetis, Associate Professor of Applied Economics (University of the Aegean, Department of Business Administration) for his helpful comments.
[2] Some arguments in favour of capital account liberalisation are also provided by Fischer and Reisen (1992, p.7-8) and Reisen (1999, p.6).

rates. In this sense the present paper will try to contribute to the related literature in a time series perspective focusing exclusively to a small open economy, investigating whether or not capital inflows in Greece do promote the growth of real GDP.

The rest of the paper is structured as follows. Section 2 considers the existing literature for the nexus between capital flows and economic growth. In Section 3 some stylized facts concerning capital flows in Greece during the period 1980-2000 are being provided. Section 4 describes variables, data and econometric methodologies used in the paper, while the robustness checks are presented into section 5. Section 6 presents the empirical results, following the main question of the paper and section 7 concludes the paper.

A brief review of the Literature

There is substantial theoretical and empirical literature considering the nexus among finance, capital mobility and GDP growth. Nevertheless the results are far from conclusive. For instance King and Levine (1993) present evidence support the view that the services provided by financial intermediaries stimulate technological innovations and economic development. Levine and Zervos (1996) find that stock market liquidity -as measured by stock trading relative to the size of the market and economy- is robustly linked with current and future rates of economic growth. Additionally Quinn (1997) finds that capital account liberalization is robustly and positively associated with economic growth. Similar are the findings of Bekaert, Harvey and Lundblad (2004) who find that both equity market and capital market liberalization increase real economic growth with the effects of the former being stronger.

On the other hand Rodrik (1998) rejects the aforementioned findings since he finds no evidence that countries without capital controls grow faster or invest more. Arestis et al. (2002), focusing exclusively in developing countries, find that financial liberalisation is a much more complex process than has been assumed by earlier literature. Moreover Petroulas (2007) finds negative association between short term capital flows on growth when developing countries are being taken into consideration. These negative results are attributed to the financial crises and the general financial instability that short term capital flows induce. The view that capital flows generates higher volatility and systematic instability is adopted even from IMF's economists [Kose et al. (2003), (2004)][3]

Stylized facts concern capital flows in Greece during 1980-2000.

With the focus of the paper being on capital flows, it is useful to provide some relative information concerning capital flows in Greek economy from the early 1980s onwards. Figure 1 (Appendix IV) presents capital inflows in the Greek economy as an absolute number. During the decade of 1980 its volume remains quite stable between two and three billion US dollars, while its volume increase reaching the nine billion US dollars in 1998. At the same time capital flows became more volatile and fluctuate substantially during 1994-1998. The capital

[3] To be noted that IMF is an institution which strongly supports capital account liberaliazation.

account remains permanently in surplus during the two decades as a necessity for financing the excessive and long-lasting deficits of the current account (figure 2-Appendix IV). Capital inflows were absorbed both from the public sector (mainly central government, central bank, public companies) and from the private sector (mainly FDI and real estate). In May of 1994 the Greek government vote a law which allowed to the short term capital to move totally freely inside and outside the Greek economy. The full liberalization of the capital account was a prerequisite for the entrance of Greece to the European Monetary Union. The full liberalization was followed by a severe speculative attack to the Greek currency, which was successfully confronted by the Greek authorities which chose to raise the interest rates than to depreciate the currency. Since now the situation remains the same with the short term capital being facilitated to enter into and exit from the Greek economy absolutely freely.

Variables, Methodology and Data Set

This section describes the methodology implied in order to detect whether or not capital flows are linked with growth in Greece during the period 1980-2000. The empirical analysis proceeds in two steps. First, I use the bivariate Granger causality test (Granger, 1969) Second, I use multivariate regressions to account for additional factors that might influence the Greek growth rates.

Granger Causality Test

The basic idea of Granger causality (Granger, 1969) is that one time series causes another if it helps predict another beyond the series' own history.

$$Y_t = \varphi_0 + \sum_{i=1}^{lags} \alpha_i Y_{t-i} + \sum_{i=1}^{lags} \beta_i X_{t-i} + u_t$$

$$X_t = \psi_0 + \sum_{i=1}^{lags} \gamma_i Y_{t-i} + \sum_{i=1}^{lags} \delta_i X_{t-i} + e_t$$

A time series X is said to Granger-cause Y if the knowledge of X up to t-1 helps to predict the value of Y in t and the opposite. If the values of X provide statistically significant information about future values of Y, through F-tests, then X variable is considered to Granger cause variable Y. The variables of interest are on the first hand the real GDP growth (RG4Q) and the real per capita GDP growth (PERCAPRG4QANN) and on the other hand three variables related to capital mobility such as the net total capital flows as a percentage of the Greek GDP (CAPGDP) and as a percentage of total foreign reserves (CAPRES) and Foreign Direct Investment as a percentage of the Greek GDP (FDIGDP). Additionally a variable considers the intensity of capital controls in the sense of Miniane (2004, p.285,294)is also being employed.[4]

[4] Miniane (2004) constructs capital control intensity indexes based on IMFs issue of "Exchange Restrictions" for thirty four countries including Greece (Miniane, 2004, p 285, 294).

Multivariate Regressions

A possible shortcoming of bivariate Granger causality test is that it does not account for the possibility that a third variable influences both series under investigation. Therefore a multivariate regression is being run to control for interdependence among the variables. Overall the model will have the general form described below:

$$\Delta y_{i,t} = c + \alpha_1 I_{i,t} + a_2 XM_{i,t} + a_3 CAP_{i,t} + a_4 KK + a_v y_{i,t-v} + \varepsilon_{i,t} + \theta_v \varepsilon_{i,t-v}$$

Where the dependent variable (ΔY) is the rate of growth of real GDP and the independent variables are the real investment growth rates[5] (I), the trade openness of the Greek economy calculated as the sum of the value of imports and exports of products and services relative to Greek GDP[6] (XM). In addition the variables which are used in subsection 4.1 and concerns capital mobility (CAPGDP, CAPRES, FDIGDP) and the intensity of capital controls (MINIANE) are also included into the regressions. Lastly I include autoregressive terms (AR) as long with moving averages terms (MA) of the error term (ε) in order to capture two further dimensions. Firstly with the introduction of AR terms ($\alpha_v y_{i,t-v}$) the role of the initial output is explored since it has been found that the formation of previous years output is strongly related with the present output[7]. Secondly the introduction of MA terms is considered as necessary since the error term is supposed to include all the other factors affect output growth that are not included into the regressions and primary that of total factor productivity[8]. Thus the MA terms included into the regressions condensed information about the role of total factor productivity for the growth of Greek GDP during the 1980-2000 period.

Data Set

All data are used on a quarterly basis. Data sources are the "Bank of Greece" and OECD.

Robustness check / Econometric Tests

The extreme bound analysis

Regressions results can be further examined by conducting a robustness check through the application of an extreme-bounds analysis (EBA)[9]. According to the EBA methodology a set of additional explanatory variables is incorporated to the baseline regression in order to test

[5] Among others the papers of Arestis et. al (2008), Petroulas (2007), Quinn and Toyoda (2003) Beck, Levine and Loayza (1999), Mankiw, Romer and Weil (1992) introduce investment rates as an independent variable.

[6] Among others the papers of King and Levine, (1993), Bailliu (2000) Quinn and Toyoda (2003), Bekaert, Harvey and Lundblad (2004), Chinn and Ito (2005) introduce trade openness as an independent variable into growth regressions. As far as the Greek economy is concerned Dritsakis and Adamopoulos (2004) and Dritsaki and Dritsakis (2008) finds causal link between trade openness and Greek GDP growth, through the period 1960-2000.

[7] Rodrik (1998), Beck, Levine and Loayza (1999), Petroulas (2007)

[8] The papers of Klenow and Rodriguez-Clare (1997) and Hall and Jones (1999) examine TFP from different views.

[9] The extreme-bounds analysis (EBA) was first used empirically from Levine and Renelt (1992). Since then is heavily employed into regressions consider growth determinants (King and Levine, 1993), (Quinn, 1997), (Petroulas, 2007).

the significance of the coefficient of the explanatory variable of interest. More specifically consider the regression with the form:

$$\Delta\gamma = c + \alpha_{yj} Y + \alpha_{zj} Z + \alpha_{xj} X_j + \varepsilon$$

Where $\Delta\gamma$ is the change of the dependent variable, c is the constant term, Y is a set of fixed variables that always appear in the regressions, Z is the independent variable of interest (in this case the variables concern capital mobility), Xj is a vector of up to two variables taken from the pool X of N variables available and ε is the error term. The results are considered to be robust only if the coefficients of the variables tend to remain significant in all the regressions that being run through the EBA process. (The pool X of N variables that are included to EBA analysis are described briefly into the Appendix III).

Econometric Tests[10]

The significance of regressions' results is further examined by various econometric tests. Firstly all variables are passed from augmented Dickey-Fuller (Dickey and Fuller, 1979, 1981) and Phillips-Perron (Phillips and Perron, 1988) unit root tests. The test for unit roots is considered essential in order to avoid spurious regressions[11]. If the unit root hypothesis is not rejected for a particular variable, I use its' first difference [implied by D(x)] so as to ensure stationarity. Moreover the tests of Breusch-Godfrey (1981) and Engle (1982) are employed in order to account for serial correlation of the error term and its variance, respectively. Furthermore White's (1980) heteroscedasticity test is employed. In the case that heteroscedasticity is been found the coefficients are been corrected by the Newey and West (1987) methodology. As far as multicollinearity is concerned the correlation coefficient among the variables is examined. The tolerance (T) of the regression to multicollinearity is also concerned[12]. Furthermore the stability of the models is examined by the Ramsey's (1969) RESET test. Lastly three dummy variables are introduced taking the value of zero (0) until a particular date and the value of one (1) after that date in order to test for structural breaks in the time series. The dates that are been taken into consideration are the first quarter of 1989 and 1990 and the second quarter of 1994 dates which are considered as milestones of the deregulation of Greek credit, money and capital market.

Results

The results of the Granger cause test are presented in Table 1. According to the test no causal relationship between variables considers capital mobility and capital account openness on the first hand and growth on the second hand is detected. Only the variable

[10] The results of the econometric test are presented in the Appendix II.

[11] For a description of spurious regressions see Granger and Newbold, (1974) and Phiilips (1986)

[12] Tolerance (T) is calculated as 1 - R^2 of the regression of each independent variable on all the other independents, ignoring the dependent. There are as many tolerance coefficients as there are the independent variables. The higher the intercorrelation of the independents is, the more the tolerance will approach zero. As a rule of thumb, if tolerance is less than 0.20, a problem with multicollinearity is indicated.

concerns capital flows to total foreign reserves is causal linked with growth, though the result is weak.

Table 1: Granger cause test results'

Time lag / Quarters	1	2	3	4
CAPGDP / RG4Q	0.001	1.065	1.371	1.033
CAPRES / RG4Q	0.499	1.026	2.632*	1.713
D(FDIGDP) / RG4Q	0.005	0.045	0.086	0.118
D(MINIANE) / RG4Q	0.375	0.758	0.465	0.378
CAPGDP / PERCAPRG4QANN	0.0005	1.112	1.379	1.079
CAPRES / PERCAPRG4QANN	0.458	1.013	2.572*	1.675
D(FDIGDP) / PERCAPRG4QANN	0.007	0.036	0.082	0.124
D(MINIANE) / PERCAPRG4QANN	0.385	0.782	0.487	0.402

Notes: 1. Values refer to F-statistics.
2. The null hypothesis is that 'x' variable does not granger cause on 'y' variable. (*), (**) and (***) implies that the null hypothesis is rejected at 10%, 5% and 1% significance level, respectively.

The results of the multivariate regressions are presented into tables 2 to 4 (Appendix I). They converge to the results of Granger Causality Test, in the sense of a link between capital flows (CAPGDP, CAPRES, FDI) and capital openness (MINIANE) variables with real growth (RG4Q) was not found. The relative variables have not been found significant in any of the eighteen regressions that were run in this paper. As far as the growth of real Greek GDP is concerned during the period 1980-2000, I found that it follows an autoregressive (AR) moving average (MA) process and it is positively and significantly influenced by investment (REALINVGROWTH) and consumption as proxied by total retail trade (LOGRATERETAIL). On the contrary real GDP growth was found to be negatively affected by the volatility of inflation rate (STDINFLATION).

Conclusions

The goal of the present paper is to provide an assessment of the nexus between capital mobility and economic growth for the Greek economy during the period 1980-2000. To accomplish this task I use as estimation techniques the Granger causality test (Granger, 1969) and the Ordinary Least Squares (OLS) regressions. Both tests convergence to the same results; no evidence was found that capital inflows contributed to real economic growth in Greece the last two decades before entering the euro zone. These results are not being changed even if the foreign direct investments (FDI's) are concerned as the explanatory variable of interest; flows which are considered as stable and valuable (Stiglitz, 2000, p.1076). According to the results real growth in Greece during the aforementioned period followed and autoregressive-moving average process, supported substantially by domestic investment and domestic consumption. To be noted that these results pass the stringent EBA criteria. Overall the results of the paper indicate that capital inflows enhanced by domestic capital account liberalization is not a clear-cut to prosperity.

Appendix I:
Results of Multivariate Regressions

Table 2: Multivariate Regressions / Variable of interest CAPGDP

Dependent Variable: **RG4Q**	Baseline Regression	(T)	EBA 1	(T)	EBA 2	(T)	EBA 3	(T)	EBA 4	(T)	EBA 5	(T)
Constant	0.01*** (0.03)		0.012*** (0.003)		0.01*** (0.003)		0.012*** (0.004)		0.01*** (0.003)/(0.003)		0.008***/** (0.003)/(0.003)	
REALINVGROWTH	0.066* (0.034)	0.65	0.072** (0.033)	0.48	0.065* (0.035)	0.58	0.07** (0.034)	0.65	0.07**/X (0.034)/(0.045)	0.60	0.062* (0.035)/(0.031)	0.63
D(XMGDP)	-0.029 (0.065)	0.67	-0.052 (0.066)	0.50	-0.029 (0.067)	0.66	-0.025 (0.064)	0.68	-0.038 (0.066)/(0.086)	0.65	-0.018 (0.063)/(0.068)	0.65
D(MINIANE)	-0.006 (0.015)	0.98	-0.013 (0.012)	0.96	-0.006 (0.012)	0.93	-0.008 (0.012)	0.93	-0.005 (0.012)/(0.013)	0.95	0.004 (0.015)/(0.013)	0.97
CAPGDP	-0.01 (0.021)	0.98	-0.014 (0.021)	0.94	-0.009 (0.022)	0.95	-0.007 (0.023)	0.97	-0.01 (0.022)/(0.011)	0.92	-0.01 (0.021)/(0.012)	0.90
AR(1)	0.661*** (0.069)		0.675*** (0.075)		0.662*** (0.07)		0.67*** (0.071)		0.666*** (0.07)/(0.043)		0.711*** (0.065)/(0.051)	
AR(3)	-0.476*** (0.061)		-0.45*** (0.072)		-0.48*** (0.061)		-0.45*** (0.072)		-0.48*** (0.063)/(0.059)		-0.55*** 0.054(0.063)	
MA(1)	-0.198*** (0.032)		-0.17*** (0.04)		-0.19*** (0.032)		-0.18*** (0.041)		-0.19*** (0.068)/(0.053)		-0.24*** (0.072)/(0.067)	
MA(3)	0.561*** (0.048)		0.47*** (0.087)		0.558*** (0.046)		0.511*** (0.083)		0.549*** (0.032)/(0.025)		0.554*** (0.076)/(0.065)	
MA(5)	0.593*** (0.042)		0.652*** (0.074)		0.591*** (0.04)		0.639*** (0.065)		0.604*** (0.77)/(0.063)		0.562*** (0.078)/(0.076)	
VBASKET			0.002 (0.052)	0.92								
STDINFLATION			-0.224* (0.126)	0.91								
EMP_GROWTH					-0.029 (0.101)	0.86						
D(FISCAL)					-0.004 (0.178)	0.76						
D(ULABCOST)							-0.002 (0.002)	0.95				
STDTRADE							-0.004 (0.008)	0.98				
D(LIFELOG)									-2.2 (2.9)/(2.2)	0.89		
LOGRATEBASKET									-0.01 (0.08)/(0.08)	0.89		
CURRENT											-0.036 (0.025)/(0.028)	0.88
LOGRATERETAIL											0.196*** (0.068)/(0.072)	0.97
Dummy 1989	1.04		0.64		0.3		0.73		0.74		0.77	
Dummy 1990	1.21		0.84		1.25		1.22		1.12		1.08	
Dummy 1994	1.66		1.38		1.74*		1.53		1.53		0.96	
RESET	*0.98 (2)*		*0.86 (2)*		*0.42 (3)*		*0.22(2)*		*0.81 (3)*		*0.59 (2)*	
White	*1.87*		*1.79*		*1.4*		*1.4*		*2.7X*		*4.18X*	
Observations	***77***		***76***		***77***		***77***		***77***		***77***	
R^2	**0.56**		**0.59**		**0.56**		**0.57**		**0.56**		**0.61**	
Adj-R^2	**0.50**		**0.52**		**0.49**		**0.49**		**0.49**		**0.54**	

Notes:

1. Standard Errors are reported into parentheses.
2. (*), (**) and (***) implies 1%, 5% and 10% significance level, respectively.
3. The AR(n) and MA(n) refer to autoregressive and moving average terms of "n" quarter.
4. The columns with (T) refer to model's "tolerance" for multicollinearity. Tolerance below 0.2 was not found in either of the models.
5. Dummies of 1989/90/94 are not found to be significant in a 5% level in either of the models, implies no structural breaks in the series.
6. RESET refers to Ramsey (1969) test for the stability of the regressions. The fitted values are referred into brackets. X implies stability error in a 5% significance level.
7. White refers to White's (1980) test for heteroscedasticity. A heteroscedasticity error in a 5% significance level is implied by X. In that case coefficients are been corrected by the Newey and West (1987) methodology. The corrected coefficients are reported next to the initial estimations for regressions' coefficients.

Table 3: Multivariate Regressions / Variable of interest CAPRES

Dependent Variable: **RG4Q**	Baseline Regression	(T)	EBA 1	(T)	EBA 2	(T)	EBA 3	(T)	EBA 4	(T)	EBA 5	(T)
Constant	0.01*** (0.003)		0.012*** (0.003)		0.009*** (0.003)		0.01* (0.005)		0.01*** (0.003)/(0.003)		0.008***/** (0.0029)/(0.003)	
REALINVGROWTH	0.067* (0.034)	0.66	0.069** (0.034)		0.07** (0.033)	0.59	0.075** (0.033)	0.66	0.072**/X (0.035)/(0.045)	0.6	0.061* (0.034)/(0.032)	0.64
D(XMGDP)	-0.03 (0.065)	0.67	-0.044 (0.067)		-0.014 (0.062)	0.66	-0.016 (0.06)	0.67	-0.038 (0.065)/(0.084)	0.65	-0.022 (0.063)/(0.065)	0.64
D(MINIANE)	-0.006 0.012	0.98	-0.013 (0.013)		-0.006 (0.012)	0.94	0.013 (-0.009)	0.94	-0.006 (0.012)/(0.014)	0.95	0.004 (0.015)/(0.014)	0.98
CAPRES	-0.001 (0.006)	0.97	-0.002 (0.006)		-0.001 (0.006)	0.96	-0.0002 (0.006)	0.87	-0.0003 (0.006)/(0.004)	0.77	-0.003 (0.006)/(0.004)	0.73
AR(1)	0.659*** (0.069)		0.66*** (0.071)		0.624*** (0.087)		0.624*** (0.087)		0.667*** (0.067)/((0.044)		0.695*** (0.067)/((0.051)	
AR(3)	-0.475*** (0.062)		-0.46*** (0.07)		-0.46*** (0.071)		-0.447*** (0.071)		-0.481 (0.076)/((0.082)		-0.56*** (0.056)/(0.062)	
MA(1)	-0.2*** (0.032)		-0.18*** (0.043)		-		-		-0.2*** (0.028)/(0.034)		-0.25*** (0.081)/(0.072)	
MA(3)	0.56*** (0.048)		0.496*** (0.093)		0.418*** (0.098)		0.402*** (0.096)		0.545*** (0.091)/(0.093)		0.566*** (0.1)/(0.073)	
MA(5)	0.594*** (0.043)		0.63*** (0.074)		0.536*** (0.099)		0.561*** (0.101)		0.605*** (0.028)/(0.034)		0.549*** (0.083)/(0.081)	
VBASKET			0.003 (0.055)									
STDINFLATION			-0.208 (0.13)									
EMP_GROWTH					-0.04 (0.141)	0.88						
D(FISCAL)					-0.03 (0.173)	0.75						
D(ULABCOST)							0.0005 (0.003)	0.87				
STDTRADE							-0.005 (0.007)	0.96				
D(LIFELOG)									-2.063 (3.061)/(2.41)	0.88		
LOGRATEBASKET									-0.014 (0.085)/(0.085)	0.78		
CURRENT											-0.039 (0.027)/(0.026)	0.71
LOGRATERETAIL											0.19*** (0.069)/(0.07)	0.97
Dummy 1989	0.8		0.56		0.74		0.69		0.79		0.62	
Dummy 1990	1.34		0.71		1.21		1.32		1.13		0.93	
Dummy 1994	1.63		1.24		1.72*		1.58		1.49		0.85	
RESET	*2.27(2)*		*1.22(2)*		*1.13(2)*		*1.35(2)*		*1.96(2)*		*7.77(2)X*	
White	*1.898*		*1.8*		*1.28*		*1.25*		*2.73X*		*4.21X*	
Observations	***77***		***76***		***77***		***77***		***77***		***77***	
R^2	**0.56**		**0.58**		**0.52**		**0.53**		**0.56**		**0.60**	
Adj-R^2	**0.50**		**0.51**		**0.45**		**0.45**		**0.49**		**0.54**	

Notes:

1. ***Standard Errors are reported into parentheses.***
2. ***(*), (**) and (***) implies 1%, 5% and 10% significance level, respectively.***
3. ***The AR(n) and MA(n) refer to autoregressive and moving average terms of "n" quarter.***
4. ***The columns with (T) refer to model's "tolerance" for multicollinearity. Tolerance below 0.2 was not found in either of the models.***
5. ***Dummies of 1989/90/94 are not found to be significant in a 5% level in either of the models, implies no structural breaks in the series.***
6. ***RESET refers to Ramsey (1969) test for the stability of the regressions. The fitted values are referred into brackets. x implies stability error in a 5% significance level.***
7. ***White refers to White's (1980) test for heteroscedasticity. A heteroscedasticity error in a 5% significance level is implied by X. In that case coefficients are been corrected by the Newey and West (1987) methodology. The corrected coefficients are reported next to the initial estimations for regressions' coefficients.***

Table 4: Multivariate Regression / Variable of interest FDIGDP

Dependent Variable: **RG4Q**	Baseline Regression	(T)	EBA 1	(T)	EBA 2	(T)	EBA 3	(T)	EBA 4	(T)	EBA 5	(T)
Constant	0.009*** (0.003)		0.012*** (0.003)		0.01*** (0.003)		0.01*** (0.005)		0.01**/*** (0.003)/(0.003)		0.007***/** (0.0027)/(0.0029)	
REALINVGROWTH	0.069* (0.035)	0.66	0.074** (0.035)	0.48	0.069* (0.036)	0.59	0.078** (0.034)	0.66	0.073**/X (0.035)/(0.048)	0.6	0.066* (0.034)/(0.034)	0.64
D(XMGDP)	-0.031 (0.066)	0.68	-0.05 (0.068)	0.5	-0.029 (0.068)	0.66	-0.017 (0.061)	0.67	-0.04 (0.066)/((0.088)	0.65	-0.011 (0.063)/(0.07)	0.65
D(MINIANE)	-0.007 (0.014)	0.98	-0.015 (0.014)	0.98	-0.007 (0.014)	0.94	-0.011 (0.014)	0.94	-0.007 (0.014)/(0.014)	0.95	0.003 (0.015)/(0.013)	0.98
D(FDIGDP)	0.007 (0.068)	0.99	0.0002 (0.072)	0.91	0.008 (0.07)	0.98	0.014 (0.064)	0.98	0.01 (0.069)/(0.04)	0.98	0.016 (0.067)/(0.048)	0.97
AR(1)	0.662*** (0.069)		0.675*** (0.074)		0.663*** (0.07)		0.626*** (0.085)		0.666*** (0.067)/(0.043)		0.683*** (0.068)/(0.052)	
AR(3)	-0.472*** (0.062)		-0.45*** (0.072)		-0.48*** (0.062)		-0.44*** (0.071)		-0.479*** (0.078)/(0.082)		-0.538*** (0.054)/(0.064)	
MA(1)	-0.198*** (0.032)		-0.17*** (0.041)		-0.19*** (0.033)		-		-0.196*** (0.03)/(0.034)		-0.2*** (0.059)/(0.06)	
MA(3)	0.557*** (0.048)		0.471*** (0.088)		0.554*** (0.044)		0.397*** (0.094)		0.543*** (0.093)/(0.095)		0.562*** (0.067)/(0.066)	
MA(5)	0.596*** (0.045)		0.648*** (0.074)		0.59*** (0.041)		0.57*** (0.099)		0.607*** (0.03)/(00.034)		0.59*** (0.066)/(0.076)	
VBASKET			-0.002 (0.057)	0.87								
STDINFLATION			-0.212* (0.126)	0.90								
EMP_GROWTH					-0.019 (0.176)	0.88						
D(FISCAL)					-0.035 (0.101)	0.76						
D(ULABCOST)							-0.0006 (0.003)	0.95				
STDTRADE							-0.005 (0.007)	0.98				
D(LIFELOG)									-2.103 (3.016)/(2.24)	0.9		
LOGRATEBASKET									-0.015 (0.083)/(0.084)	0.94		
CURRENT											-0.032 (0.024)/(0.029)	0.95
LOGRATERETAIL											0.197*** (0.066)/(0.071)	0.95
Dummy 1989	0.79		0.66		0.89		0.67		0.62		0.98	
Dummy 1990	1.17		0.82		1.19		1.32		1.03		1.13	
Dummy 1994	1.63		1.33		1.75*		1.61		1.46		1.06	
RESET	*0.78(2)*		*2.23(3)*		*0.24(3)*		*0,4(4)*		*1.99(2)*		*0.12(2)*	
White	*1.86*		*1.73*		*1.4*		*1.26*		*2.61X*		*4.42X*	
Observations	***77***		***76***		***77***		***77***		***77***		***77***	
R^2	**0.56**		**0.58**		**0.56**		**0.53**		**0.56**		**0.62**	
Adj-R^2	**0.50**		**0.51**		**0.49**		**0.45**		**0.48**		**0.55**	

Notes:

1. ***Standard Errors are reported into parentheses.***
2. ***(*), (**) and (***) implies 1%, 5% and 10% significance level, respectively.***
3. ***The AR(n) and MA(n) refer to autoregressive and moving average terms of "n" quarter.***
4. ***The columns with (T) refer to model's "tolerance" for multicollinearity. Tolerance below 0.2 was not found in either of the models.***
5. ***Dummies of 1989/90/94 are not found to be significant in a 5% level in either of the models, implies no structural breaks in the series.***
6. ***RESET refers to Ramsey (1969) test for the stability of the regressions. The fitted values are referred into brackets. X implies stability error in a 5% significance level.***
7. ***White refers to White's (1980) test for heteroscedasticity. A heteroscedasticity error in a 5% significance level is implied by X. In that case coefficients are been corrected by the Newey and West (1987) methodology. The corrected coefficients are reported next to the initial estimations for regressions' coefficients.***

Appendix II: Results of Econometric tests

Table 5: Tests for Unit Roots (Levels)

Variables	ADF[1]			PP[2]		
	Intercept	Trend & Intercept	None	Intercept	Trend & Intercept	None
PERCAPRG4QANN	-5.305***	-5.4***	-4.743***	-5.22***	-5.33***	-4.814***
RG4Q	-5.308***	-5.398***	-4.368***	-5.228***	-5.398***	-4.446***
CAPGDP	-9.633***	-9.572***	-0.354X	-9.158***	-9.111***	-5.014***
CAPRES	-1.337X	-2.283X	-1.283X	-4.835***	-6.365***	-4.205***
FDIGDP	-2.245X	-4.461***	-0.759X	-1.86X	-2.457X	-1.21X
REALINVGROWTH	-7.922***	-7.989***	-3.399***	-19.085***	-34.863***	-9.949***
CURRENT	-2.698*	-2.502X	-0.396X	-7.834***	-7.847***	-4.713***
STDTRADE	-6.79***	-6.959***	-1.782*	-6.734***	-6.843***	-3.97***
TRADE	-1.313X	-6.178***	0.504X	-5.502***	-6.176***	0.687X
XMGDP	-1.512X	-1.018X	0.067X	-4.086***	-3.866**	-0.599X
MINIANE	-0.545X	-1.906X	-1.677X	-0.512X	-1.904X	-1.709*
FISCAL	-2.223X	-2.705X	-0.769X	-1.937X	-2.302X	-0.605X
STDINFLATION	-7.489***	-9.901***	-1.513X	-7.692***	-10.612***	-4.111***
LOGRATEBASKET	-8.132***	-8.945***	-1.866*	-8.132***	-8.958***	-5.326***
VBASKET	-6.289***	-6.516***	-4.338***	-6.275***	-6.458***	-4.338***
LOGRATERETAIL	-10.234***	-10.26***	-10.253***	-10.212***	-10.251***	-10.245***
LOGRATEULABCOST	-0.691X	-2.761X	-1.617*	-1.518X	-3.39*	-1.226X
EMP_GROWTH	-4.146***	-4.221***	-2.887***	-4.232***	-4.226***	-3.401***
LIFELOG	-3.54***	-1.211 X	1.627*	-1.61 X	-1.125 X	2.977***

Notes: 1. ADF refers to augmented Dickey and Fuller test.
2. PP refers to Phillips and Perron test.
3. ***, **, * imply that the null hypothesis of a unit root is rejected at a 1%, 5% and 10% level, respectively.
4. "x" implies a unit root
5. Values refer to t-statistics. Critical values are obtained from McKinnon (1991)

Table 6: Test for Unit Roots (1st difference)

Variables	ADF[1]			PP[2]		
	Intercept	Trend & Intercept	None	Intercept	Trend & Intercept	None
D(FDIGDP)	-9.662***	-9.615***	-9.718***	-11.265***	-11.208***	-11.335***
D(TRADE)	-10.277***	-10.4***	-10.301***	-26.664***	-33.082***	-24.946***
D(XMGDP)	-12.904***	-13.036***	-12.993***	-12.475***	-24.208***	-12.571***
D(MINIANE)	-9.245***	-9.189***	-9.00***	-9.254***	-9.197***	-9.00***
D(FISCAL)	-5.022***	-5.263***	-5.052***	-5.078***	-5.346***	-5.106***
D(LOGRATEULABCOST)	-3.112***	-3.112X	-2.735***	-4.877***	-4.744***	-4.865***
D(LIFELOG)	-2.137 X	-3.931**	-1.368 X	-5.144***	-5.499***	-4.513***

Notes: 1. ADF refers to augmented Dickey and Fuller test.
2. PP refers to Phillips and Perron test.
3. ***, **, * imply that the null hypothesis of a unit root is rejected at a 1%, 5% and 10% level, respectively.
4. "x" implies a unit root
5. Values refer to t-statistics. Critical values are obtained from McKinnon (1991)

Table 7: Correlation Matrix

	RG4Q	REALINV GROWTH	D(XMGDP)	D (MINIANE)	CAP GDP	CAP RES	D (FDIGDP)	VBASKET	STD INFLATION	EMP_ GROWTH	D(FISCAL)	D(ULAB COST)	STD TRADE	D (LIFELOG)	LOGRATE BASKET	CURRENT	LOGRATE RETAIL
RG4Q	1.00	0.272	0.109	0.063	-0.13	-0.19	-0.083	-0.138	-0.202	-0.161	0.127	0.081	-0.109	0.045	-0.02	0.058	0.337
REALINV GROWTH	0.27	1.00	0.684	0.147	-0.17	-0.16	-0.132	-0.124	0.001	0.089	0.323	-0.026	0.101	0.128	-0.078	0.102	0.116
D(XMGDP)	0.10	0.684	1.00	0.059	-0.1	-0.17	-0.094	-0.003	-0.139	0.063	0.299	0.032	0.031	-0.085	-0.015	-0.011	0.035
D(MINIANE)	0.06	0.147	0.059	1.00	0.07	0.04	-0.009	0.0008	-0.062	-0.078	-0.107	-0.186	-0.064	-0.1	0.053	-0.013	0.073
CAPGDP	-0.13	-0.173	-0.102	0.065	1.00	0.55	0.347	0.135	-0.063	0.123	-0.04	-0.067	0.009	-0.126	0.221	-0.276	-0.02
CAPRES	-0.19	-0.161	-0.174	0.036	0.55	1.00	0.109	0.319	0.223	-0.034	-0.169	-0.303	0.139	0.207	0.447	-0.489	-0.066
D(FDIGDP)	-0.08	-0.132	-0.094	-0.009	0.35	0.11	1.00	-0.225	0.079	-0.072	-0.039	0.08	0.031	0.03	0.061	-0.03	-0.147
VBASKET	-0.13	-0.124	-0.003	0.0008	0.14	0.32	-0.225	1.00	0.166	0.05	0.085	-0.275	0.04	0.33	0.294	-0.15	-0.16
STD INFLATION	-0.20	0.001	-0.139	-0.062	-0.06	0.22	0.079	0.166	1.00	0.035	0.0006	-0.167	0.035	0.181	0.367	0.138	0.113
EMP_ GROWTH	-0.16	0.089	0.063	-0.078	0.12	-0.03	-0.072	0.05	0.035	1.00	-0.148	-0.079	-0.151	-0.147	-0.184	-0.048	0.019
D(FISCAL)	0.13	0.323	0.299	-0.107	-0.04	-0.17	-0.039	0.085	0.0006	-0.148	1.00	-0.018	0.066	0.098	-0.004	0.12	-0.051
D(ULAB COST)	0.08	-0.026	0.032	-0.186	-0.07	-0.30	0.08	-0.275	-0.167	-0.079	-0.018	1.00	-0.051	0.001	-0.227	0.24	-0.12
STD TRADE	-0.11	0.101	0.031	-0.064	0.01	0.14	0.031	0.04	0.035	-0.151	0.066	-0.051	1.00	0.118	0.015	-0.027	-0.042
D(LIFELOG)	0.05	0.128	-0.085	-0.1	-0.13	0.21	0.03	0.33	0.181	-0.147	0.098	0.001	0.118	1.00	0.187	-0.108	-0.068
LOGRATE BASKET	-0.02	-0.078	-0.015	0.053	0.22	0.45	0.061	0.294	0.367	-0.184	-0.004	-0.227	0.015	0.187	1.00	-0.303	-0.055
CURRENT	0.06	0.102	-0.011	-0.013	-0.28	-0.49	-0.03	-0.15	0.138	-0.048	0.12	0.240	-0.027	-0.108	-0.303	1.00	0.096
LOGRATE RETAIL	0.34	0.116	0.035	0.073	-0.02	-0.07	-0.147	-0.16	0.113	0.019	-0.051	-0.12	-0.042	-0.068	-0.055	0.096	1.00

Table 8: Breusch-Godfrey Serial Correlation LM Test

Lags	1 quarter	2 quarters	3 quarters	4 quarters	5 quarters	6 quarters
Variable of interest: **CAPGDP**						
Baseline Regression	0.18	0.11	0.08	0.096	0.14	0.842
EBA 1	0.001	0.028	0.027	0.147	0.23	0.684
EBA 2	0.138	0.091	0.06	0.068	0.131	0.794
EBA 3	1.08	0.737	0.489	0.378	0.299	0.876
EBA 4	1.498	0.863	0.589	0.437	0.347	1.176
EBA 5	2.337	1.368	0.917	0.796	0.633	1.04
Variable of interest: **CAPRES**						
Baseline Regression	2.952	1.465	0.967	0.715	0.738	1.493
EBA 1	0.024	0.013	0.025	0.179	0.289	0.723
EBA 2	0.244	0.267	0.338	0.252	0.221	0.784
EBA 3	0.328	0.275	0.252	0.187	0.163	0.777
EBA 4	1.381	0.782	0.521	0.385	0.316	1.062
EBA 5	2.415	1.409	0.941	0.859	0.679	1.147
Variable of interest: **D(FDIGDP)**						
Baseline Regression	0.183	0.113	0.086	0.114	0.158	0.795
EBA 1	0.0002	0.023	0.027	0.182	0.271	0.677
EBA 2	0.126	0.087	0.059	0.075	0.151	0.757
EBA 3	0.33	0.29	0.26	0.19	0.166	0.759
EBA 4	1.59	0.963	0.646	0.477	0.386	1.068
EBA 5	1.59	0.8	0.53	0.485	0.382	0.91

Notes: Values refer to F-Statistic. The null hypothesis of serial correlation is rejected in a 5% level, for all regressions.

Table 9: ARCH LM TEST

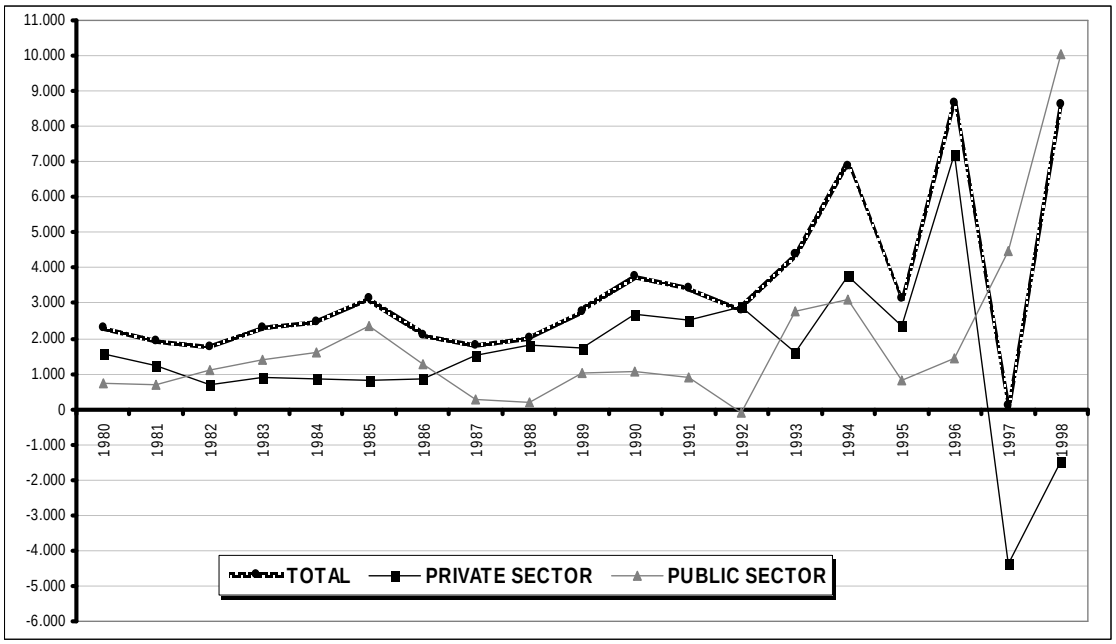
Lags	1 quarter	2 quarters	3 quarters	4 quarters	5 quarters	6 quarters
Variable of interest: **CAPGDP**						
Baseline Regression	0.172	0.17	0.719	0.539	0.407	0.604
EBA 1	0.025	0.012	0.748	0.536	0.459	0.442
EBA 2	0.134	0.144	0.612	0.46	0.346	0.558
EBA 3	0.015	0.065	0.635	0.483	0.372	0.573
EBA 4	0.063	0.863	0.598	0.774	0.339	0.563
EBA 5	1.383	1.415	1.096	0.88	0.916	1.968
Variable of interest: **CAPRES**						
Baseline Regression	0.165	0.161	0.713	0.534	0.403	0.584
EBA 1	0.047	0.018	0.593	0.422	0.354	0.366
EBA 2	0.001	0.048	1.183	0.875	0.722	0.686
EBA 3	0.009	0.036	1.497	1.119	0.876	0.797
EBA 4	0.058	0.047	0.591	0.442	0.335	0.512
EBA 5	1.367	1.343	1.079	0.892	0.877	1.844
Variable of interest: **D(FDIGDP)**						
Baseline Regression	0.157	0.143	0.715	0.537	0.405	0.556
EBA 1	0.019	0.017	0.72	0.517	0.449	0.401
EBA 2	0.123	0.122	0.61	0.46	0.349	0.515
EBA 3	0.01	0.032	1.575	1.17	0.915	0.822
EBA 4	0.055	0.044	0.601	0.451	0.341	0.518
EBA 5	1.12	1.089	0.824	0.63	0.612	1.36

Notes: Values refer to F-Statistic. The null hypothesis of serial correlation of the variance of the error term (ARCH effect) is rejected in a 5% level, for all regressions.

Appendix III:
Variables included into Extreme Bound Analysis (EBA)

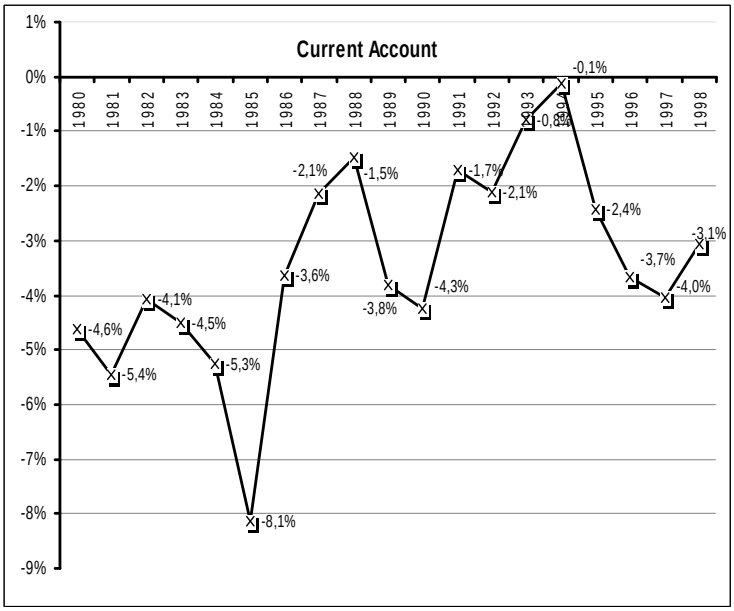
- **FISCAL**: Fiscal Balance as a ratio of Greek GDP [(Chinn and Ito, 2005) (Petroulas, 2007)].
- **LOGRATEBASKET**: The rate of depreciation (log difference between two successive quarters) of the Greek currency (drachma) against the value of a basket of important foreign currencies (BASKET), balanced according to their relative value to the Greek external transactions (goods, services and capital) during the period 1980-2000. The weight of each currencies into the basket is: German mark for 43.3%, US dollar for 23.2%, French franc for 15,1%, Great Britain's pound for 14,1% and Japanese yen for 4,3%.
- **VBASKET**: The volatility of the Greek currency compared to the aforementioned basket of currencies, calculated by the rolling standard deviation of its rate of change (Sala-i-Martin, 1997b).
- **STDINFLATION**: The volatility of inflation rate [(King and Levine, 1993) (Petroulas, 2007)].
- **STDTRADE**: The volatility of trade balance.
- **ULABCOST**: The Unit Labor cost, based to the relative OECD index (log difference between two successive quarters), as a proxy of labor productivity [(Levine and Zervos, 1996) (Beck, Levine and Loyala, 2003)].
- **EMP_GROWTH**: Growth of Labor Force, calculated as the log difference of two successive quarters [(Demetriades and Law, 2004) (Petroulas, 2007)].
- **LIFELOG**: Log of Life Expectancy, of both men and women, at birth [(Sala-i-Martin, 1997a) (Bekaert, Harvey and Lundblad 2004)].
- **CURRENT**: Current account balance as a ratio of Greek GDP (Chinn and Ito, 2005)
- **LOGRATERETAIL**: Total retail trade based to the relative OECD index (log difference between two successive quarters), as a proxy of private consumption in Greece during the period 1980-2000.

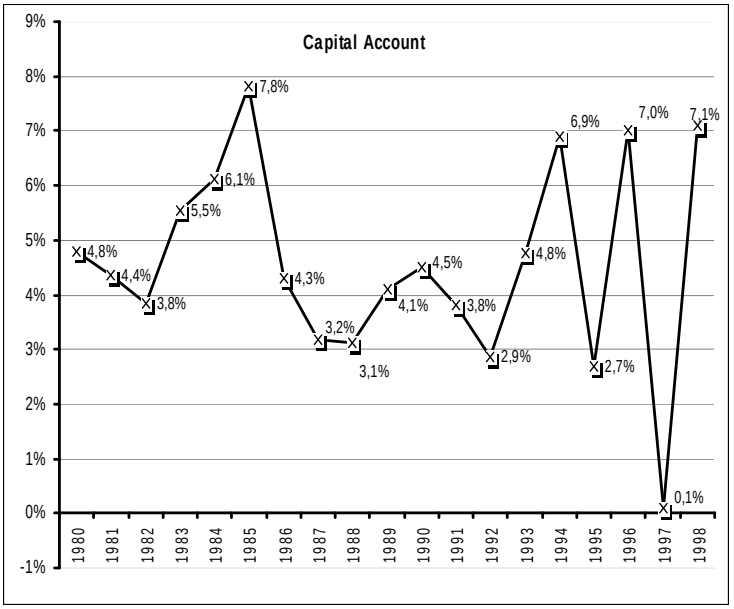
Appendix IV:
Figures



Source: Bank of Greece

Figure 1: Capital Flows - Total and Sectoral (private & public) in million USD





Source: Bank of Greece

Figure 2: Current and Capital Account deficit/surplus as a percentage of Greek GDP (1980-1998)

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