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Article

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The impact of home protection schemes on non-performing loans in Greece

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Abstract

This paper explores the determinants of non-performing loans (NPLs) in Greece for the period 2002Q4 to 2018Q2, distinguishing between consumer, housing, and business loans. We contribute to the existing NPL literature by examining the impact of the home protection scheme, which has governed the Greek insolvency framework since the onset of the 2010 crisis. Consistent with previous research on NPLs, our findings indicate that the primary driver for all types of NPL classes has been the business cycle. Additionally, we uncover some evidence suggesting that the initial version of the home protection scheme may have contributed to non-repayment in specific NPL classes as property values declined. However, subsequent amendments to the scheme appear to have played a role in reducing NPL ratios, in addition to the positive effect of improving macroeconomic conditions. Our results offer valuable insights for policymakers seeking to address the burden of high NPL levels on Greece's economic recovery.

Keywords: housing; NPLs; loans; banking
JEL Classification Codes: G2, G21, G28, C22, C51

1. Introduction

The 2007-8 financial turmoil and subsequent global recessions served as a stark reminder that large amounts of Non-Performing Loans (NPLs) pose significant challenges for economies grappling with an economic crisis. In the United States, NPLs surged by 257% during the initial two years of the financial crisis in 2007-2008, followed by a gradual decline (World Bank, 2019a). Similarly, in the Euro Area, NPLs experienced a staggering increase of 355% between January 2007 and January 2014 (World Bank, 2019b).

As of 2019, just prior to the onset of the Covid-19 pandemic, more than one out of every three loans in the Greek banking system were classified as non-performing, positioning Greece as the country with the highest NPL stock in Europe (refer to Figure 1). Despite significant efforts made by the government, financial institutions, and borrowers to reduce the outstanding volume

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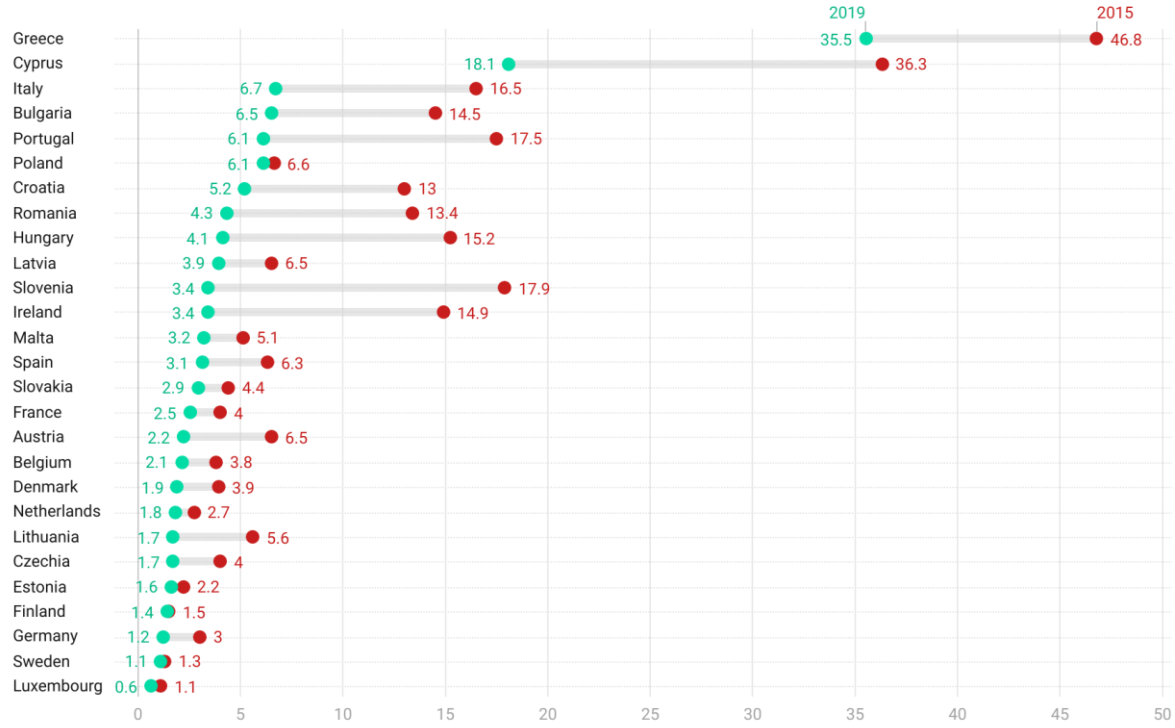
of NPLs, this persistent issue hindered the banking system from providing adequate financing to the private sector and fulfilling its role as a financial intermediary crucial for the country's financial recovery.

Figure 1. Gross non-performing loans, domestic and foreign entities as a % of gross loans.



Source: Data retrieved from European Central Bank.

This paper aims to evaluate the impact of the home protection scheme (HPS) on the accumulation of non-performing loans (NPLs), while taking into account macroeconomic and bank-specific factors, and examining key NPL classes such as consumer loans, business loans, and mortgages. The introduction of the initial HPS in 2010 has been a central topic in local policy discussions regarding NPL reduction.

The HPS operates by assessing borrowers' financial situations based on income criteria and offering debt relief measures, including interest payment reductions, extended loan repayment periods, and partial write-offs of the loan principal. Additionally, the scheme provides protection from foreclosure for primary residence mortgages, consumer loans, and social security liabilities that are less than 12 months in arrears from the restructuring application date. Table 1 below illustrates the original law establishing the HPS (3869/2010) and its significant amendments that became effective in 2013 and 2015.The HPS was introduced to mitigate the adverse consequences of collateral liquidation and encourage banks to restructure their NPLs (Dendramis et al., 2018). However, it has also faced substantial criticism from policymakers and analysts due to unintended economic repercussions. For example, Pagratis et al. (2017) suggest that the HPS gives rise to a double-sided moral hazard. On one hand, borrowers have an incentive to default on loan agreements, thereby increasing the volume of NPLs. On the other hand, creditors are motivated to restructure loans to improve their capital ratios, without necessarily ensuring the long-term sustainability of the loans.

Despite extensive policy debates, the empirical literature has paid limited attention to the role of such legislation in NPL accumulation.

Table 1. Legal Framework for Distressed Assets in Greece 2010 – 2015.

Law	Main Provisions
3869/2010	• It concerns individuals in permanent difficulty acting in good faith and debts to private entities. • It suspends all enforcement measures against the debtor until the ultimate court judgment. • The main residence may be exempt from liquidation given that specific conditions are met. • Discharge of debts is possible. • Procedure is performed in three phases (out-of-court settlement, in-court compromise, and judicial settlement)
4224/2013	• It concerns individuals and professionals given specific criteria. • The primary residence is protected from foreclosure if the cadastral value of the property is less than 200,000 Euros. • Eligibility criteria are introduced concerning the financial situation of the debtor. • It provides for minimum monthly instalment. • It does not allow the debtor to miss payment 3 payments
4336-4346/2015	• They simplify the procedures to restructure and liquidate enterprises. • They provide for mandatory submission of necessary documentation to the Secretary of the Court • They establish specific criteria for the protection of primary residence (cooperative borrower, income, and residential property value level) • They provide for government subsidy for vulnerable borrowers up to 3 years

Source: Plaskovitis (2016), Zerva (2015).

The structure of the paper is as follows: Section 2 provides a concise review of the existing empirical literature on NPLs. Section 3 describes the data used in the study and outlines the methodology employed. In Section 4, we present the results obtained from the empirical models. Section 5 concludes the paper.

2. Literature background

The literature on the factors influencing the generation of non-performing loans (NPLs) and potential policy remedies is extensive and continues to grow due to the recognition that a high level of such loans is detrimental to banks' financial strength and economic recovery (Karamouzis, 2017; Balgova, Nies & Plekhanov, 2016; Kalfaoglou, 2016; Klein, 2013). Scholars have identified four main groups of factors responsible for NPL accumulation. Firstly, macroeconomic factors are related to the business cycle. Secondly, bank-specific factors pertain to the economic performance characteristics of lenders, such as measures of cost efficiency. Thirdly, borrower-specific factors relate to various aspects of borrowers' financial status, including liquidity and solvency ratios. Finally, institutional factors are associated with the regulatory and political context governing the loan generation process (Nikolopoulos & Tsalas, 2017).

Nkusu (2011) examines the effect of macroeconomic factors on NPLs and their feedback in a sample of 26 developed economies from 1998 to 2009. The author utilizes OLS, Panel Corrected Standard Error, one-step GMM, and panel VAR techniques. The study reveals a negative relationship between GDP growth, residential and stock prices, and NPLs. Conversely, a positive relationship exists between the unemployment rate and the central bank's policy rate with respect to NPLs. Furthermore, the analysis of feedback effects indicates that a shock of one standard deviation in NPLs has adverse effects on both GDP growth and asset prices.

Louzis et al. (2012) investigate the macroeconomic and bank-specific factors that contributed to the generation of NPLs in Greece during the period 2003Q1 to 2009Q3. The authors collect data on mortgages, consumer loans, and business loans from the nine largest local banks. Using GMM techniques, they identify real GDP growth rate, unemployment rate, lending rates, and public debt as the major macroeconomic factors associated with NPLs, alongside bank-specific factors such as management quality. Notably, the study finds that macroeconomic factors exert differential effects on each of the three loan classes.

Castro (2013) focuses on the macroeconomic factors of credit risk in five European countries from 1997Q1 to 2011Q3, utilizing various estimation methods including OLS, fixed effects, random effects, and GMM. The analysis incorporates variables such as real GDP growth rate, unemployment, interest rates, credit growth, outstanding private and public debt, share price and housing price indices, inflation rate, real effective exchange rate, and terms of trade. The study concludes that credit risk is significantly influenced by all the macroeconomic factors, except public debt and inflation.

Klein (2013) employs fixed effects, GMM, and panel VAR techniques using annual data from 16 Central, Eastern, and South-Eastern European countries for the period 1998-2011. The study finds that macroeconomic factors have greater explanatory power than bank-specific factors in relation to non-performing loans (NPLs). Feedback effects are also observed, as a higher NPL ratio contributes to a decrease in real GDP, credit-to-GDP ratio, and inflation, while being associated with higher unemployment.

Anastasiou et al. (2016) investigate the determinants of NPLs in the Euro area from 1990Q1 to 2015Q2 using difference GMM. In addition to the usual macroeconomic and bank-specific variables, the study examines the explanatory power of the income tax rate as a percentage of GDP and the output gap as a proxy for the business cycle. Both variables are found to be statistically significant. However, public debt, government budget deficit, GDP growth, and inflation were not found to be statistically significant, although the unemployment rate showed significance. The relationship between budget deficit and NPLs was significantly positive only for euro-area periphery countries.

Charalambakis et al. (2017) model NPL determinants for different loan types in Greece. They estimate a system of equations for the three loan categories, enforcing equality of coefficients across loan categories and utilizing Maximum Likelihood methodology. The sample period covers 2005Q1 to 2015Q4. After a break in 2012, profitability (ROA), unemployment, and inflation exhibit greater effects on NPLs, while capitalization and leverage exhibit significant effects before the break. Ultimately, the surge in Greek NPLs is attributed to deteriorating macroeconomic conditions and political uncertainty.

Dendramis et al. (2018) investigate the double-trigger hypothesis of borrowers' default using discrete time survival analysis models and data on Greek residential mortgages. The results confirm the hypothesis, as mortgage defaults depend on both economic recession, distressed financial conditions, and political instability, as well as borrowers' behaviour, which may be related to strategic defaults.

Lastly, Boumparis et al. (2019) employ a panel VAR approach for 72 countries, utilizing annual data from 1998 to 2016, with a focus on the relationship between NPLs and sovereign ratings, as well as the impact of macroeconomic and banking variables. The study finds evidence of bi-directional linkages, suggesting that the stock of NPLs influences sovereign rating decisions, while sovereign ratings negatively impact NPLs through bank ratings and loan supply.

The literature examining the determinants of NPLs remains inconclusive, as the significance of each driver varies depending on the time period, economic and political contexts of individual countries, and the modelling approaches utilized. However, there is a consensus regarding the impact of macroeconomic factors on NPL accumulation. It is well-established that the stock

of NPLs exhibits a highly counter-cyclical pattern, decreasing during periods of positive economic and employment growth, and vice versa. On the other hand, the evidence concerning banking-related variables is less consistent. While bank profitability and sector efficiency are generally identified as key factors driving NPLs, other indicators do not consistently exhibit significance across studies. Borrower characteristics and institutional factors have received less attention in the literature. However, the limited studies focusing on these factors suggest that asset ratings, political and financial instability, and prevailing macroeconomic conditions, such as sovereign default risk and inflationary pressures, play a role in driving NPLs. Our paper contributes to this literature by examining the impact of institutional aspects on the trajectory of NPLs, specifically considering the introduction of the HPS in Greece. Additionally, we go beyond the effects of macroeconomic and bank-specific conditions by investigating different NPL classes, including consumer, residential, and business loans.

3. Data and methodology

Our modeling period spans from 2002Q4 to 2018Q2, utilizing NPL data obtained from the Bank of Greece and other sources. Prior to considering the impact of the Home Protection Scheme (HPS), we examine how NPL ratios are influenced by the general macroeconomic environment. We employ multivariate regressions to analyse the annual changes in NPL ratios for consumer loans, mortgages, and business loans, using a set of macroeconomic variables. The selection of variables for the model specification is guided by previous studies in the NPL literature, specifically Louzis et al. (2012), Anastasiou et al. (2016), and Charalambakis et al. (2017).

The following set of regressors is considered: annual growth rates of CPI, the unemployment rate, real disposable income, real money (M3), real household deposits, real house prices, and total loans. Additionally, we include the annual growth rate of the Economic Sentiment indicator, the ECB's Country-level Index of Financial Stress (CLIFS), real interest rates for consumer loans, mortgages, and business loans (derived by subtracting the annual CPI growth), and the nominal yield of the government's 10-year bonds.

Figure 2. Annual GDP growth rate and changes in NPL ratios.

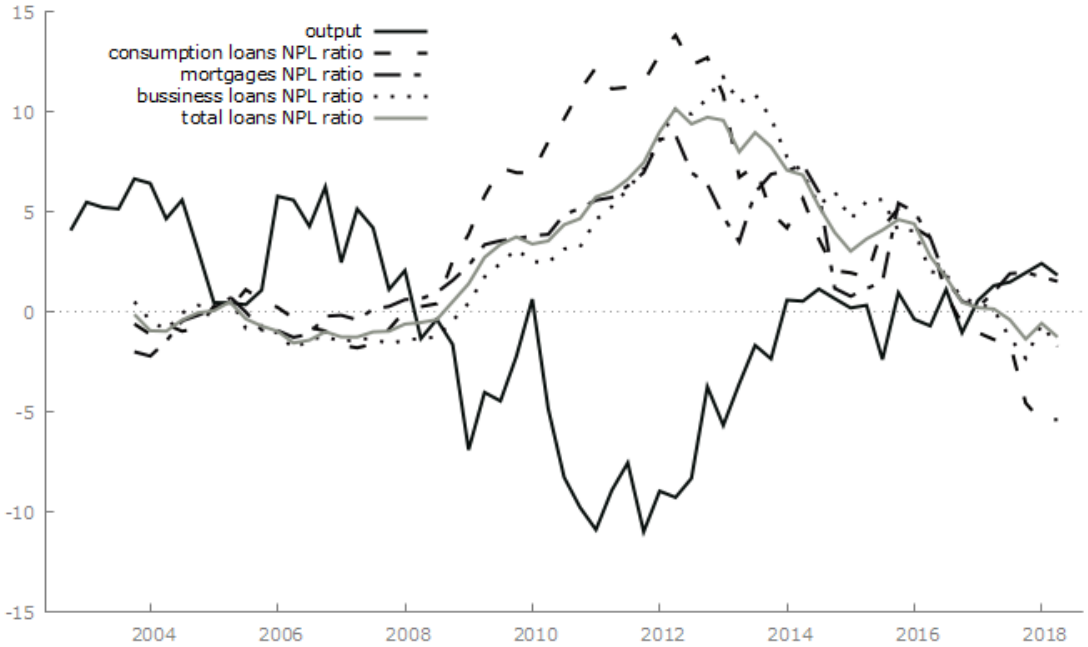
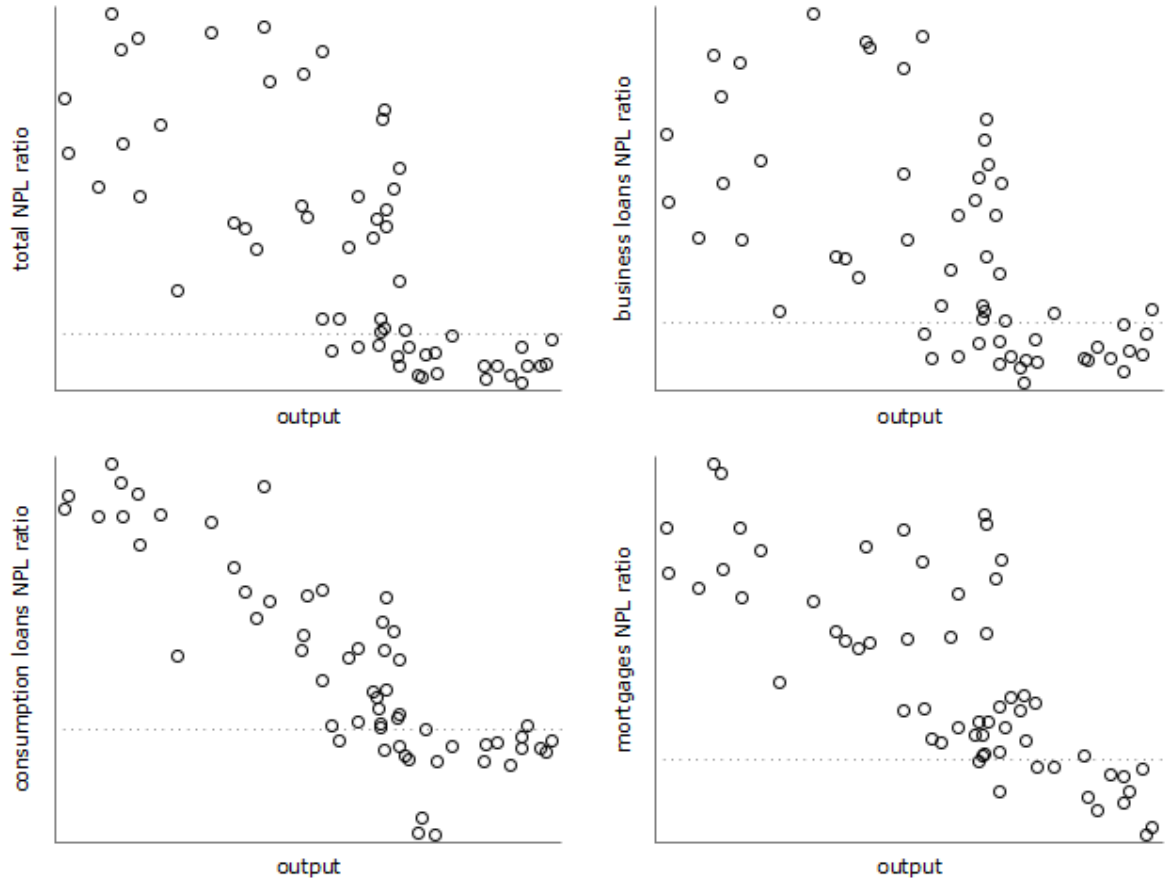


Figure 3. Changes in NPL ratios vs annual GDP growth.



Figures 2 and 3 visually depict the relationship between changes in NPL ratios and GDP. It is evident that following the crisis of 2010 and the subsequent economic downturn, output and different NPL classes exhibit a similar pattern, albeit with varying magnitudes.

We also incorporate various banking variables specific to the Greek banking sector in our analysis. These variables include the solvency ratio, deposits to loan ratio, concentration ratio (measuring the assets held by the four largest banks relative to total banking system assets), and the cost efficiency ratio. Recognizing the potential influence of fiscal developments on the Greek banking system processes (as discussed in Anastasiou et al., 2016), we include ratios of current taxes, deficit, and debt to GDP. Data for these variables were sourced from the local Statistics Authority (ELSTAT), the Bank of Greece, and the European Commission. All series were deflated using the Consumer Price Index (CPI).

Table 1A presents the descriptive statistics of all variables, including their sources. Table 1B displays the correlations among the regressors. To capture changes over time, we employ the annual changes or growth rates of the variables. Table 1C presents unit root tests of the first differences of the variables in the baseline specification, which includes total NPLs and other NPL ratios. The use of first differences is necessary to establish stationarity, as annual growth rates or changes tend to exhibit persistence, and unit root tests cannot reject the null hypothesis in such a short sample period. In addition, since $X_t - X_{t-4} = X_t - X_{t-1} + X_{t-1} - X_{t-2} + X_{t-2} - X_{t-3} + X_{t-3} - X_{t-4} = \Delta X_t + \Delta X_{t-1} + \Delta X_{t-2} + \Delta X_{t-3}$, the annual change is the sum of four stationary variables and is thus stationary, despite that it is more persistent and unit root tests have less power.

Our generic model, estimated using OLS, is specified as follows:

$$\Delta^4\left(\frac{NPL_{\mathrm{i}}}{L_{\mathrm{i}}}\right) = b_0 + a(L)\Delta^4\left(\frac{NPL_{\mathrm{i}}}{L_{\mathrm{i}}}\right) + b_1\Delta^4 ln(GDP_{t-1}) + b_2 ROA_{t-1} + \sum_{\mathrm{i}} b_i X_{jt-1} + \sum_{h} b_h D_h + u_t$$

Where, $\Delta^4\left(\frac{NPL_{\mathrm{i}}}{L_{\mathrm{i}}}\right)$, stands for change in the gross NPL ratio out of total gross loans i from $t-4$ to t, and i stands for the loan class, i.e., total private sector loans, consumer loans, mortgages, or business loans. We also include two lags of the dependent variable, one lag of the annual growth rate of GDP, and one lag of Return on Assets (ROA).

Considering the numerous potential regressors identified in the literature, our specifications include a selection procedure that iterates through all candidate variables and selects the ones that minimize the Bayesian Information Criterion (BIC)[1]. This specific-to-general procedure is chosen over the theoretically preferable General-to-Specific procedure advocated by Krolzig and Hendry (2001) due to the large number of regressors in the full model, which is not suitable for the available sample size.

Table 1A provides the correlation between the variables used in the BIC selection process, helping to identify potential relationships and interdependencies among the variables.

To account for the different variants of the HPS, we include dummy variables to capture the effects of each of them. Specifically, we use a dummy variable for the main bankruptcy law, 3869/2010, taking the value of 1 from 2010Q4 onwards. Additionally, we incorporate two more dummies for the periods of 2014Q1 and 2016Q1 onwards, representing the amendments to the main law, 4224/2013 and 4336-4346/2015, respectively. These variables, denoted as HPS, HPS 2, and HPS 3, reflect the introduction of the HPS and its subsequent amendments.

Furthermore, we control for the presence of the international and local debt crisis by adding a dummy variable for 2008Q1 onwards, as well as subsequent laws governing the HPS.

It is important to acknowledge that the use of time dummies in our identification strategy has limitations. It can be argued that multiple shocks hit the Greek economy concurrently during the period under study, such as the implementation of economic adjustment programs and the introduction of capital controls, which are not explicitly captured by our model. However, including dummies for these events would overlap considerably with the dummies used for the HPS, making it difficult to estimate the specific impact of the HPS on NPL stocks, which is the central focus of our paper. Nevertheless, we did not find any significant breaks during 2010-2012 in any of the equations, and the dummies for the crisis and the HPS did not exhibit significant effects across all the specifications employed.[2]

[1] In each round, the procedure iterates between all variables and adds each one sequentially as a regressor, estimating the OLS equation and saves the BIC; once all possible models are estimated, it keeps only one variable in each round, the one with the minimum BIC criterion, adds the corresponding variables to the list of regressor, the one from the model with minimum BIC; that variable will appear in all subsequent models, and is subtracted from the set of regressors that will be used in the next round. In the next round this procedure is repeated for the remaining regressors. Rounds continue until no further variables reduce BIC. In each round only one variable is chosen and the procedure is not sensitive to the order of the variables.

[2] As discussed in the following section, the second variant of the HPS appears to have a more pronounced impact on consumer loans and mortgages. Therefore, it is reasonable to assume that the first two adjustment programs, which had the most substantial effect on the economy, did not have any additional impact on the evolution of non-performing loans (NPLs) apart from their influence on the macroeconomic environment that contributed to the increase in NPLs. The third round of austerity measures and the introduction of capital controls did not have a comparable impact on economic growth as the initial two schemes. Hence, it is justifiable to conclude that the relevant dummy variable (which is only significant in certain specifications) effectively captures the effect of the most recent variant.

4. Empirical results

Tables 2, 3, 4, and 5, present the empirical results of our specifications for predicting the determinants of total NFL as well as of business, consumer and mortgage NPL ratios respectively. All models indicate a high goodness of fit of over 90%.

Table 2 presents the results for the NPL ratio across all loan types. It is evident that the NPL ratio exhibits a highly persistent process, as indicated by the lag of the ratio's growth rate, which consistently has a coefficient higher than 0.8 and is statistically significant in all specifications.

Several macroeconomic and banking variables are found to have a statistically significant impact on NPL reductions. These variables include profitability, measured by return on assets (ROA), fiscal tightening as measured by the government deficit to GDP ratio, and the evolution of housing prices (HP). On the other hand, the 10-year government bond yield is associated with increases in the stock of NPLs.

No structural break is identified in the estimation process, and the first Home Protection Scheme (HPS) is not found to have a significant effect on the NPL ratio when considering all loan types collectively. Interestingly, the only dummy variable that exhibits a significant effect on NPLs is HPS 3, representing the laws 4336 and 4346/2015. The coefficient for this dummy variable has a negative sign, indicating that NPLs are reduced at a faster pace than what would be expected based on the improving macroeconomic environment from 2016Q1 onwards. The key policy changes introduced by these amendments were aimed at increasing means-testing by tightening the criteria for protection and expanding the number of juridical staff personnel involved in processing cases, thereby enhancing the efficiency of the scheme.

We proceed by analyzing the decomposition of the non-performing loan (NPL) stock into its key classes: business NPLs, consumer NPLs, and mortgage NPLs. As shown in Table 3, business NPLs also exhibit a persistent process, and they are moderately associated with the business cycle, as evidenced by changes in the unemployment rate. Additionally, financial market turbulence, represented by the CLIFFS indicator, is found to increase business NPLs. No evidence of structural breaks is observed, and the effects of the Home Protection Scheme (HPS) laws are not consistently significant. Specifically, law 4224/2013 only has a statistically significant negative effect in one out of four models, while laws 4335 and 4346/2015 have a marginally significant effect in only one out of three cases, which contrasts with the significant results in Table 2.

Moving on to consumer NPLs, Table 4 presents the results for this category. Like business NPLs, consumer NPLs display a persistent process and are strongly associated with the business cycle, as indicated by the GDP regressor. Among the banking variables, high profitability (ROA) and strong capitalization (SOLVRAT) appear to decrease the stock of consumer NPLs. However, higher interest rates for consumer loans and fiscal tightening are found to increase consumer NPLs. Surprisingly, cost efficiency has an unexpected negative effect, suggesting that credit standards have been relaxed while banks strive for more efficient operations.

Significantly, the HPS, as captured by the period when law 4224/2013 was in effect, seems to have had a positive impact on the consumer NPL ratio, indicating potential strategic default behaviour. This may be attributed to the fact that the protection provided by law 4224/2013 was still quite broad, and the cadastral value of €200,000 was sufficient to cover most primary residences, while many more expensive primary residences were already protected by the previous law, 3869/2010. Furthermore, the amendments made by laws 4335 and 4346/2015 did not have any effect on NPLs in this loan category, possibly because households in financial distress had already taken advantage of the higher level of protection offered by existing schemes, while new consumer loans were scarcely being issued.

Lastly, focusing on NPL mortgages as presented in Table 5, we observe a relatively less persistent process compared to the previous categories. The business cycle, represented by GDP, and profitability, measured by ROA, have the expected negative effects on NPLs, while house

Table 2. Regression results: Total NPL Ratio.

Dependent variable: NPLs									
NPL_{-1}	0.8679**	0.8547**	0.8528**	0.7668**	0.8256**	0.7856**	0.8276**	0.8245**	0.7831**
	(0.1090)	(0.1128)	(0.1182)	(0.1120)	(0.1275)	(0.1154)	(0.1293)	(0.1299)	(0.1234)
NPL_{-2}	-0.1145	-0.1069	-0.09864	-0.06657	-0.07822	-0.09466	-0.08168	-0.07664	-0.08301
	(0.09566)	(0.09753)	(0.1067)	(0.09332)	(0.1113)	(0.1012)	(0.1138)	(0.1148)	(0.1065)
GDP_{-1}	-0.0291	-0.03508	-0.03179	-0.04309	-0.03025	-0.03916	-0.03278	-0.03079	-0.04334
	(0.02747)	(0.03005)	(0.02877)	(0.02682)	(0.02769)	(0.02747)	(0.03076)	(0.02905)	(0.02709)
ROA_{-1}	-0.1493**	-0.1515**	-0.1507**	-0.1425**	-0.1568**	-0.1384**	-0.1564**	-0.1567**	-0.1380**
	(0.05894)	(0.05955)	(0.05961)	(0.05625)	(0.06041)	(0.05679)	(0.06107)	(0.06107)	(0.05835)
DEF_{-1}/GDP_{-1}	-0.07799**	-0.07503**	-0.07367**	-0.057**	-0.06741**	-0.0638**	-0.0681**	-0.0670**	-0.0616**
	(0.01419)	(0.01543)	(0.01894)	(0.01603)	(0.02168)	(0.01841)	(0.02216)	(0.02265)	(0.02089)
$10YBOND_{-1}$	0.07182**	0.06863**	0.07403**	0.07725**	0.06796**	0.07314**	0.06724**	0.06866**	0.07965**
	(0.02431)	(0.02528)	(0.02534)	(0.02328)	(0.02517)	(0.02405)	(0.02570)	(0.02737)	(0.02460)
HP_{-1}	-0.04130*	-0.05003*	-0.04373*	-0.0535**	-0.0463**	-0.0499**	-0.04939*	-0.04662*	-0.0516**
	(0.02155)	(0.02762)	(0.02283)	(0.02116)	(0.02304)	(0.02182)	(0.02790)	(0.02361)	(0.02215)
$CONSLOANS_{-1}$	0.01944	0.02763	0.03045	0.07861	0.05263	0.06283	0.05004	0.05331	0.06451
	(0.05595)	(0.05861)	(0.06468)	(0.05870)	(0.07606)	(0.06275)	(0.07797)	(0.07751)	(0.07294)
$CRISISDUMMY$		-0.1438					-0.06599		
		(0.2813)					(0.3341)		
$HPSDUMMY$			-0.1102			0.2444		-0.02431	
			(0.3156)			(0.3318)		(0.3549)	
$HPS2DUMMY$					-0.2284		-0.1847	-0.2163	0.1224
					(0.3521)		(0.4190)	(0.3972)	(0.3693)
$HPS3DUMMY$				-0.5792**		-0.6638**			-0.6153**
				(0.2400)		(0.2672)			(0.2657)
QLR test	2.73								
QLR pvalue	0.06								
N	57	57	57	57	57	57	57	57	57
Adj. R2	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
lnL	-34.03	-33.87	-33.95	-30.7	-33.77	-30.36	-33.75	-33.77	-30.63

Note: Standard errors in parentheses; * indicates significance at the 10 percent level; ** indicates significance at the 5 percent level.

Table 3. Regression results: Business NPL Ratio.

Dependent variable: Business NPLs									
$BUSNPL_{-1}$	0.5629**	0.5627**	0.5631**	0.5402**	0.5530**	0.5036**	0.5520**	0.5193**	0.5451**
	(0.1265)	(0.1277)	(0.1280)	(0.1270)	(0.1257)	(0.1297)	(0.1268)	(0.1257)	(0.1281)
$BUSNPL_{-2}$	0.2572**	0.2598**	0.2576**	0.2800**	0.3015**	0.2677**	0.3018**	0.3148**	0.2978**
	(0.1140)	(0.1159)	(0.1168)	(0.1147)	(0.1178)	(0.1145)	(0.1188)	(0.1164)	(0.1191)
GDP_{-1}	-0.01271	-0.0175	-0.01309	-0.03007	-0.03088	-0.01342	-0.02053	-0.009513	-0.03334
	(0.03513)	(0.04444)	(0.04050)	(0.03752)	(0.0374)	(0.03965)	(0.0441)	(0.03924)	(0.038)
ROA_{-1}	-0.1082	-0.108	-0.1085	-0.1168	-0.1335*	-0.09851	-0.1383*	-0.1316*	-0.1293
	(0.07748)	(0.07823)	(0.07978)	(0.07733)	(0.0792)	(0.07831)	(0.0805)	(0.07802)	(0.0805)
ΔU_{-1}	0.00232**	0.00225**	0.00232**	0.00196**	0.001311	0.00225**	0.001339	0.0008059	0.001473
	(0.00059)	(0.00071)	(0.0007)	(0.00065)	(0.0009)	(0.00069)	(0.001)	(0.00099)	(0.0010)
$CLIFFS_{-1}$	0.03123**	0.03160**	0.03120**	0.02851**	0.0312**	0.02870**	0.0302**	0.03518**	0.0299**
	(0.00948)	(0.00980)	(0.00972)	(0.00967)	(0.0094)	(0.00961)	(0.0097)	(0.00960)	(0.0099)
$CRISISDUI$		-0.059					0.1651		
		(0.3296)					(0.3641)		
$HPSDUMM$			-0.005905			0.5156		0.714	
			(0.2997)			(0.4150)		(0.4506)	
$HPS2DUM$					-0.4792		-0.5598	-1.143**	-0.3175
					(0.3577)		(0.4020)	(0.5474)	(0.5204)
$HPS3DUM$				-0.3499		-0.6917*			-0.1732
				(0.2767)		(0.3891)			(0.4017)
QLR test	2.04								
QLR pvalue	0.41								
n	58	58	58	58	58	58	58	58	58
Adj. R**2	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
lnL	-55.45	-55.43	-55.45	-54.54	-54.43	-53.64	-54.31	-52.98	-54.32

Note: Standard errors in parentheses; * indicates significance at the 10 percent level; ** indicates significance at the 5 percent level.

Table 4. Regression results: Consumer NPL Ratio.

Dependent variable: Consumer NPLs									
$CONSNPL_{-1}$	0.7677**	0.7096**	0.7660**	0.7759**	0.7616**	0.7728**	0.7310**	0.7615**	0.7530**
	(0.1568)	(0.1596)	(0.1597)	(0.1597)	(0.1478)	(0.1619)	(0.1532)	(0.1506)	(0.1508)
$CONSNPL_{-2}$	0.02438	0.07546	0.02943	0.01259	0.04132	0.02455	0.06706	0.04138	0.05398
	(0.1382)	(0.1406)	(0.1514)	(0.1429)	(0.1305)	(0.1531)	(0.1349)	(0.1428)	(0.1356)
GDP_{-1}	-0.1377**	-0.09196	-0.1397**	-0.1429**	-0.1392**	-0.1502**	-0.1145*	-0.1392**	-0.1339**
	(0.06250)	(0.06880)	(0.06755)	(0.06457)	(0.05892)	(0.07227)	(0.06670)	(0.06369)	(0.06098)
ROA_{-1}	-1.675**	-1.611**	-1.678**	-1.656**	-1.435**	-1.660**	-1.424**	-1.435**	-1.443**
	(0.3839)	(0.3813)	(0.3893)	(0.3904)	(0.3730)	(0.3948)	(0.3747)	(0.3786)	(0.3770)
DEF_{-1}/GDP_{-1}	-0.06073	-0.04183	-0.05939	-0.06122	-0.0913**	-0.05743	-0.07821*	-0.09129**	-0.0922**
	(0.03871)	(0.04024)	(0.04206)	(0.03908)	(0.03828)	(0.04267)	(0.04177)	(0.04150)	(0.03870)
$COSTEFF_{-1}$	-1.434**	-1.352**	-1.435**	-1.418**	-1.206**	-1.420**	-1.184**	-1.206**	-1.211**
	(0.3824)	(0.3814)	(0.3870)	(0.3880)	(0.3706)	(0.3921)	(0.3730)	(0.3753)	(0.3742)
$RCONSNPL_{-1}$	0.04977	0.05925	0.05161	0.02839	-0.08699	0.02874	-0.06863	-0.08696	-0.0717
	(0.1316)	(0.1301)	(0.1347)	(0.1442)	(0.1344)	(0.1457)	(0.1369)	(0.1376)	(0.1412)
$SOLVRATIO_{-1}$	-0.1368**	-0.1883**	-0.1331*	-0.1153	-0.2556**	-0.09955	-0.2717**	-0.2556**	-0.2828**
	(0.05096)	(0.06090)	(0.06690)	(0.07633)	(0.06574)	(0.1025)	(0.06899)	(0.07854)	(0.09620)
$CRISISDUMMY$		0.8317					0.4459		
		(0.5540)					(0.5577)		
HPS DUMMY			-0.07242			-0.2108		-0.0008481	
			(0.8362)			(0.9015)		(0.7890)	
HPS 2 DUMMY					2.275**		2.054**	2.275**	2.379**
					(0.8591)		(0.9056)	(0.8689)	(0.9075)
HPS 3 DUMMY				-0.2913		-0.3595			0.2938
				(0.7652)		(0.8261)			(0.7551)
QLR test	1.25								
QLR pvalue	0.90								
n	57	57	57	57	57	57	57	57	57
Adj. R**2	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
lnL	-75.96	-74.63	-75.96	-75.87	-72	-75.84	-71.6	-72	-71.9

Note: Standard errors in parentheses; * indicates significance at the 10 percent level; ** indicates significance at the 5 percent level.

Table 5. Regression results: Mortgage NPLs

Dependent variable: Mortgage NPLs										
$MORTNPL_{-1}$	0.9327**	0.9865**	1.041**	1.015**	0.9917**	1.108**	1.000**	1.110**	1.119**	1.118**
	(0.1185)	(0.1249)	(0.1296)	(0.1283)	(0.1316)	(0.1383)	(0.1314)	(0.1394)	(0.1418)	(0.1372)
$MORTNPL_{-2}$	-0.4028**	-0.4057**	-0.4172**	-0.4290**	-0.4060**	-0.4532**	-0.4398**	-0.4499**	-0.4501**	-0.4796**
	(0.1041)	(0.0867)	(0.08618)	(0.08988)	(0.08756)	(0.08832)	(0.09214)	(0.08920)	(0.0894)	(0.08955)
GDP_{-1}	-0.1114**	-0.1143**	-0.08455	-0.09986*	-0.1127**	-0.09122*	-0.1013*	-0.08205	-0.0946*	-0.09619*
	(0.04366)	(0.0519)	(0.05555)	(0.05393)	(0.05358)	(0.05210)	(0.05434)	(0.05519)	(0.0532)	(0.05173)
ROA_{-1}	-0.1766*	-0.2238**	-0.2253**	-0.2133**	-0.2229**	-0.2061**	-0.2128**	-0.2098**	-0.2083**	-0.2058**
	(0.1045)	(0.0893)	(0.08839)	(0.08994)	(0.09041)	(0.08760)	(0.09055)	(0.08855)	(0.0885)	(0.08677)
HP_{-1}	-0.09922**	-0.0567*	-0.03158	-0.0513	-0.05616	-0.04827	-0.05182	-0.03854	-0.04962	-0.05029
	(0.03663)	(0.0335)	(0.03767)	(0.03393)	(0.03407)	(0.03296)	(0.03417)	(0.03778)	(0.0334)	(0.03268)
$GDP_{-1}XDUM2013Q3$		-0.1082	-0.1751	-0.1579	-0.1149	-0.2206	-0.1452	-0.2305	-0.2165	-0.2068
		(0.1349)	(0.1418)	(0.1442)	(0.1446)	(0.1449)	(0.1466)	(0.1472)	(0.1465)	(0.1439)
$ROA_{-1}XDUM2013Q3$		1.158**	1.178**	1.169**	1.150**	1.221**	1.218**	1.219**	1.229**	1.354**
		(0.4026)	(0.3988)	(0.4029)	(0.4104)	(0.3942)	(0.4133)	(0.3972)	(0.3981)	(0.4022)
$HP_{-1}XDUM2013Q3$		-0.2766**	-0.2820**	-0.2639**	-0.2794**	-0.2921**	-0.2414**	-0.2917**	-0.3035**	-0.2672**
		(0.0895)	(0.08874)	(0.09051)	(0.09266)	(0.08775)	(0.09815)	(0.08842)	(0.0924)	(0.08878)
$MORTNPL_{-1}\ XDUM2013Q3$		-0.2520*	-0.3136**	-0.2798**	-0.2610*	-0.4086**	-0.2426	-0.4084**	-0.4284**	-0.3934**
		(0.1339)	(0.1396)	(0.1369)	(0.1501)	(0.1555)	(0.1505)	(0.1567)	(0.1634)	(0.1544)
$CRISISDUMMY$			0.5404					0.241		
			(0.3853)					(0.4467)		
$HPSDUMMY$				0.3068			0.4661		-0.1887	
				(0.3132)			(0.4076)		(0.4361)	
$HPS2DUMMY$						0.6126*		0.5043	0.757	0.9909**
						(0.3303)		(0.3887)	(0.4717)	(0.4269)
$HPS3DUMMY$					0.04287		-0.2444			-0.5294
					(0.3075)		(0.3963)			(0.3837)
QLR test	5.49	2.71								
QLR pvalue	0.00	0.16								
Break date	2013Q3									
n	58	58	58	58	58	58	58	58	58	58
Adj. R**2	0.90	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
lnL	-72.31	-58.18	-56.99	-57.6	-58.17	-56.13	-57.36	-55.95	-56.02	-54.96

Notes: Standard errors in parentheses; * indicates significance at the 10 percent level; ** indicates significance at the 5 percent level.

prices exhibit a negative effect. Importantly, we identify a structural break in 2013Q3, indicating that the protection provided by law 4224/2013 may be a contributing factor. Explicitly incorporating this break reduces the persistence of the process, which is likely associated with the impact of laws 4335 and 4346/2015. These laws accelerated the deceleration of mortgage NPLs by introducing more specific criteria for the protection of primary residences. Furthermore, the structural break reveals two additional significant effects. First, the effect of house prices becomes stronger in the post-break period, suggesting that the schemes may indeed lead to strategic default behaviour, as suggested by existing literature. Second, after the break, profitability is found to increase NPLs, indicating that lower profits compel commercial banks to address this category of NPLs more promptly, while higher profits allow banks to defer difficult decisions. In the case of mortgage NPLs, the coefficients related to the business cycle remain stable. Once again, no robust effects of the dummy variables are observed. However, a relatively smaller and less significant positive effect of law 4224/2013 on NPLs in mortgages can still be discerned, in addition to the previously mentioned contribution of house prices on NPLs.

5. Concluding remarks

Our findings provide additional evidence that the business cycle plays a significant role in driving all classes of NPLs. Specifically, the introduction of the HPS appears to have had a substantial negative effect on the motivation to repay mortgage loans, particularly during periods of house price declines. Conversely, the amendments made to the HPS in late 2015 seem to have contributed to the reduction of NPL ratios, as indicated by the significant coefficient for this dummy variable in the model of total NPLs and the stronger negative effect of the coefficient for house prices after the structural break in the model of mortgages. On the other hand, fiscal factors do not seem to have a substantial influence on the accumulation of NPLs. Additionally, the return on equity has a notable positive effect on mortgage NPLs, suggesting that higher profits provide incentives for banks to delay resolving relevant loans.

Based on these findings, our first key message is that favourable macroeconomic conditions can significantly reduce NPL stocks. Therefore, macroeconomic policies should prioritize measures that foster economic growth and contribute to reducing NPLs. Secondly, future HPS initiatives need to be carefully designed to identify and exclude strategic defaulters. This approach will enable indebted households to regain their financial stability while assisting banks in reducing their NPL ratios. Future research on the role of HPS in the evolution of NPLs could benefit from employing a micro-econometric framework to better identify strategic default behaviour among borrowers.

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References

Anastasiou, D., Louri, H. & Tsionas, M. (2016) “Determinants of non-performing loans: Evidence from Euro-area countries”, Finance Research Letters, 18, pp. 116-119

Balgova, M., Nies, M. & Plekhanov, A. (2016) “The economic impact of reducing non-performing loans”, European Bank for Reconstruction and Development, Working Paper No 193, (October)

Boumparis, P., Milas, C., & Panagiotidis, T. (2019). Non-performing loans and sovereign credit ratings. International Review of Financial Analysis, 64, 301-314.

Castro, V. (2013) "Macroeconomic determinants of the credit risk in the banking system: The case of the GIPSI", Economic Modelling, 31, pp. 672-683

Charalambakis E., Dendramis, Y., & Tzavalis, E. (2017) On the determinants of NPLs: lessons from Greece. In Political Economy Perspectives on the Greek Crisis (pp. 289-309). Palgrave Macmillan, Cham.

Dendramis, Y., Tzavalis, E. & Adraktas, G. (2018) "Credit risk modelling under recessionary and financially distressed conditions", Journal of Banking and Finance, 91, pp. 160-175

Kalfaoglou, F. (2016) "Alternative NPLs Resolution Regimes. A Case Studies Approach", Bank of Greece Economic Bulletin, No. 41 (July), pp. 45-70

Karamouzis, N. (2017) "The Road to Recovery: Are Greek Banks Able to Finance Greece's Economic Recovery?", in Monokroussos, P. & Gortsos, C. (Eds) Non-Performing Loans and Resolving Private Sector Insolvency. Experiences from the EU Periphery and the Case of Greece, Palgrave Macmillan

Klein, N. (2013) "Non-Performing loans in CESEE: Determinants and macroeconomic performance", IMF Working Paper, WP/13/72, March

Krolzig, H. M. & Hendry, D. (2001) "Computer automation of general-to-specific model selection procedures," Journal of Economic Dynamics and Control, Elsevier, vol. 25(6-7), pp 831-866

Louzis, D. P., Vouldis, A. T. & Metaxas, V. L. (2012) "Macroeconomic and bank-specific determinants of non-performing loans in Greece: A comparative study of mortgage, business and consumer loan portfolios", Journal of Banking and Finance , 36, 1012-1027

Nikolopoulos, K. & Tsalas, A. (2017) "Non-Performing Loans: A Review of the Literature and the International Experience" in Monokroussos, P. &Gortsos, C. (Eds) Non-Performing Loans and Resolving Private Sector Insolvency. Experiences from the EU Periphery and the Case of Greece, Palgrave Macmillan

Nkusu, M. M. (2011) "Nonperforming loans and macrofinancial vulnerabilities in advanced economies." International Monetary Fund, Working Paper WP/11/161.

Pagratis, S., Lolou, C. and Vettas, N., 2017. Existing corporate and household insolvency frameworks: Characteristics, weaknesses and necessary reforms. In Non-Performing Loans and Resolving Private Sector Insolvency (pp. 337-362). Palgrave Macmillan, Cham.

Plaskovitis, I. S. (2016) "Greek Banks after the Recapitalization: The Agenda for NPL Resolution", EBRD/BoG Workshop: Distressed Loans in the Greek Banking System: Restructuring Portfolios, Reviving Enterprises, Athens, 10 March 2016, available at https://www.bankofgreece.gr/RelatedDocuments/20160310_The_Agenda_for_NPL_Resolution.pdf

World Bank (2019a) Bank Non-Performing Loans to Gross Loans for United States [DDSI02USA156NWDB], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/DDSI02USA156NWDB, February 4, 2019.

World Bank (2019b) Bank Non-Performing Loans to Gross Loans for Euro Area (DISCONTINUED) [DDSI02EZA156NWDB], retrieved from FRED, Federal Reserve Bank of St. Louis.

Zerva, A. (2015) "Existing Legal Framework for Distressed Assets in Greece", International Conference: Commercial Property Market Indices and Strategic Actions for Distressed Property Assets in Greece, Athens. 13 March 2015, available at https://www.bankofgreece.gr/RelatedDocuments/Existing_legal_framework_for_distressed_assets_in_Greece_150313_Zerva.pdf

Appendix A

Table 1A. Descriptive statistics.

	Mean	Median	S.D.	Min	Max	Source
NPL ratio (annual change)	2.66	1.71	3.64	-1.56	10.14	Bank of Greece (BOG)
Business Loans NPL ratio (annual change)	2.64	1.74	4.06	-2.33	11.72	Bank of Greece
Consumer Loans NPL ratio (annual change)	3.35	1.94	5.12	-5.47	13.81	Bank of Greece
Mortgages NPL ratio (annual change)	2.54	1.60	2.94	-2.22	8.83	Bank of Greece
Real GDP (annual percentage change)	-0.47	0.52	4.76	-11.00	6.64	National statistical Authority (ELSTAT)
Employment (annual percentage change)	-0.70	1.02	3.77	-10.10	3.38	ELSTAT
Real Disposable Income (annual percentage change)	-1.58	-0.35	6.99	-20.25	10.87	ELSTAT
Unemployment rate (annual change)	0.62	-0.58	2.61	-2.45	7.31	ELSTAT
M3 (real)	-0.51	3.09	9.59	-22.66	12.14	BoG& authors calculations
Real Household Deposits (annual percentage change)	-1.70	0.43	10.97	-28.23	15.19	BoG& authors calculations
Real House Prices (annual percentage change)	-2.70	-2.54	6.54	-14.77	9.56	BoG& authors calculations
Total Loans (real) (annual percentage change)	3.79	1.97	10.95	-15.20	21.30	BoG& authors calculations
Consumer Loans (real) (annual percentage change)	3.35	-0.29	14.97	-20.93	31.94	BoG& authors calculations
Mortgages (real) (annual percentage change)	6.61	4.76	12.40	-14.98	33.20	BoG& authors calculations
NFC Deposits (real) (annual percentage change)	-0.88	4.80	17.03	-41.03	24.97	BoG& authors calculations
Business Loans (real) (annual percentage change)	2.68	1.93	10.74	-16.16	21.54	BoG& authors calculations
Economic Sentiment Indicator	-0.15	1.03	9.33	-28.80	13.60	Eurostat
CLIFFS	17.34	10.57	13.24	3.31	56.77	ECB
CPI inflation (annual percentage change)	1.76	2.56	2.11	-2.41	5.39	National statistical Authority
10 year Gov. Bond rate	7.77	5.48	5.18	3.41	25.40	ECB
Real Interest on Con. Loans	6.75	6.88	1.57	3.89	9.60	BoG& authors calculations
Real Interest on Mortgages	1.90	1.73	1.56	-1.80	5.01	BoG& authors calculations
Real Interest on Bus. Loans	3.96	3.69	2.13	0.38	8.43	BoG& authors calculations
Solvency Ratio	11.81	8.06	6.02	4.00	24.25	Bankscope& authors calculations
Deposits to Loans Ratio	100.40	100.50	22.12	67.88	140.80	BoG& authors calculations
Return on Assets (ROA) of Banks	-0.36	-0.02	2.39	-11.49	2.08	Bankscope& authors calculations
Interest Rate Margin	2.58	2.665	0.3443	1.884	3.195	Bank of Greece
Concentration Ratio	71.76	68.38	10.23	58.65	90.27	Bankscope& authors calculations
Cost Efficiency	0.7732	0.5694	1.166	0.1942	9.632	Bankscope& authors calculations
Taxes to GDP	36.01	34.67	3.809	30.87	43.35	ELSTAT & authors calculations
Gov. Deficit to GDP	-7.228	-7.342	5.352	-29.32	2.148	ELSTAT & authors calculations
Gov. Debt to GDP	557.4	556.3	129.8	401.2	725.2	ELSTAT & authors calculations
Return on Equity (ROE) of Banks	1.123	4.888	25.72	-95.71	28.28	Bankscope& authors calculations

Table 1B. Correlation table.

Variables	**Real GDP**	**M3 (real)**	**Total Loans (real)**	**Real Interest on Con. Loans**	**Solvency Ratio**	**Return on Assets (ROA) of Banks**	**Concen-tration Ratio**	**Taxes to GDP**
Real GDP	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Employment	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Real Disposable Income	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unemployment rate	-0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
M3 (real)	0.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0
Real Household Deposits	0.4	0.9	0.0	0.0	0.0	0.0	0.0	0.0
Real House Prices	0.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Total Loans (real)	0.4	0.5	1.0	0.0	0.0	0.0	0.0	0.0
Consumer Loans (real)	0.5	0.5	0.9	0.0	0.0	0.0	0.0	0.0
Mortgages (real)	0.5	0.5	0.9	0.0	0.0	0.0	0.0	0.0
NFC Deposits (real)	0.5	0.8	0.3	0.0	0.0	0.0	0.0	0.0
Business Loans (real)	0.3	0.5	1.0	0.0	0.0	0.0	0.0	0.0
Economic Sentiment Indicator	0.4	0.0	-0.2	0.0	0.0	0.0	0.0	0.0
CLIFFS	-0.6	-0.5	-0.2	0.0	0.0	0.0	0.0	0.0
CPI inflation	-0.1	0.0	0.4	0.0	0.0	0.0	0.0	0.0
10 year Gov. Bond	-0.7	-0.7	-0.6	0.0	0.0	0.0	0.0	0.0
Real Interest on Con. Loans	-0.1	-0.2	-0.6	1.0	0.0	0.0	0.0	0.0
Real Interest on Mortgages	0.2	0.2	-0.2	0.8	0.0	0.0	0.0	0.0
Real Interest on Bus. Loans	0.0	0.0	-0.3	0.8	0.0	0.0	0.0	0.0
Solvency Ratio	0.1	-0.1	-0.7	0.7	1.0	0.0	0.0	0.0
Deposits to Loans Ratio	-0.2	-0.4	-0.7	0.6	0.9	0.0	0.0	0.0
Return on Assets (ROA) of Banks	0.1	0.4	0.3	-0.3	-0.3	1.0	0.0	0.0
Interest Rate Margin	0.6	0.1	0.2	-0.2	0.0	0.0	0.0	0.0
Concentration Ratio	0.0	-0.1	-0.5	0.7	0.8	-0.4	1.0	0.0
Cost Efficiency	-0.1	-0.3	-0.3	0.3	0.2	-0.7	0.3	0.0
Taxes to GDP	-0.1	-0.3	-0.7	0.7	0.9	-0.3	0.9	1.0
Gov. Deficit to GDP	0.4	0.0	-0.3	0.2	0.7	-0.1	0.4	0.6
Gov. Debt to GDP	-0.3	-0.4	-0.9	0.8	0.8	-0.4	0.8	0.9
Return on Equity (ROE) of Banks	-0.2	0.0	0.0	0.0	-0.1	0.7	0.0	0.0

Table 1C. Unit root tests of first differences of NPL ratios and variables of the baseline model.

	ROA	**10 year bond**	**output**	**real house prices**	**Debt/ GDP**	**Consumer loans**	**NPL ratio of consumer loans**	**NPL ratio of mortgages**	**NPL ratio of business loans**	**total loan NPL ratio**
ADF no constant	-1.61	-4.37	-1.69	-2.26	-9.06	-2.59	-1.92	-0.78	-1.24	-1.66
pval	0.10	0.00	0.09	0.02	0.00	0.01	0.05	0.38	0.20	0.09
ADF constant	-1.69	-4.33	-1.77	-2.51	-9.54	-2.56	-2.18	-4.70	-1.59	-1.95
pval	0.44	0.00	0.40	0.11	0.00	0.10	0.21	0.00	0.49	0.31
ADF constant & trend	-2.36	-4.33	-1.42	-2.46	-9.47	-4.17	-2.11	-1.04	-0.35	-0.24
pval	0.40	0.00	0.86	0.35	0.00	0.00	0.54	0.94	0.99	0.99
PP no constant	-3.08	-4.36	-5.91	-3.05	-9.06	-2.31	-2.50	-3.29	-3.37	-2.45
pval	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.01
PP constant	-3.17	-4.32	-5.92	-3.54	-9.43	-2.26	-3.16	-4.70	-4.17	-3.16
pval	0.03	0.00	0.00	0.01	0.00	0.19	0.03	0.00	0.00	0.03
PP constant & trend	-4.35	-4.31	-6.09	-3.68	-9.37	-4.19	-3.11	-5.12	-4.41	-3.32
pval	0.01	0.01	0.00	0.03	0.00	0.01	0.11	0.00	0.00	0.07