

Financial and macroeconomic drivers of bank profitability: *Evidence from Greek systemic banks during 2009-2019*

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Presentation Structure

Background and Motivation



Literature Review



Methodology



Research Results



Policy Implications and Conclusions

Background and Motivation

- *2009-2019*: Structural transformation in EU & GR banking
- *Competition*: Tech advances in banks, financial innovation, (de)regulation, interlinks, NPL constraints
- *Importance*: Financial System Protection, NPLs, financing of real economy and investment, bank recapitalization
- Mostly international literature

Literature Review

Banks and crisis timeline

2008	“Greece is shielded from the global/US financial crisis.”
2009	Existing structural weaknesses and macro imbalances draw investors’ attention.
2010	Support mechanism (EU & IMF) - 110 bn EUR.
2011	New loan / conditionality by EU & IMF - 130 bn EUR. Green light for PSI.
2012	Implementation of PSI.
2013	Bank bail out (4 systemic banks). Mergers & acquisitions of banking institutions.
2014	2 ⁿ recapitalisation with private capital - 8,2 bn EUR.
2015	Political turmoil → Capital controls.
2016	Improved banking sector image.
2017	ESM & ESFS: Debt reprofiling & repayment terms.
2018	Exit from support mechanisms / strict conditionality programme.
2019	Improved economic sentiment / confidence in banking sector.

Literature Review

Kouretas, G. & Vlamis, P. (2010). The Greek Crisis: Causes and Implications. *Panoeconomicus*, 57 (4), pp. 391-404.

Debt crisis in Europe revealed endogenous structural issues in various countries, Eurozone's limitations and the need for structural reforms.

Vousinas, G. (2015). Recapitalization of the Greek Banking System & the Fallacy of PSI: An Empirical Analysis with Future Prospects. *International Case Studies Journal*, 4 (1), pp. 47-60. PSI was not necessary; bank recapitalisation would have sufficed.

Sompolos, Z. & Mavri, M. (2018). Estimating the efficiency of Greek banking system during the last decade of world economic crisis: An econometric approach. *Benchmarking: An International Journal*, 25 (6), pp. 1762-1794.

Operational efficiency of banks peaked in 2008 and kept falling until 2013. Profitability fell by 30-40%.

Louri, H. & Migiakis, P. (2019). Financial economic growth in Greece: lessons from the crisis. *Bank of Greece Working paper*, No 262.

Deterioration of balance sheets of Greek banks between 2001-2018, affecting credit growth. Recapitalisations were only temporary solutions.

Karafolas, S. (2019). Consequences of the Greek Economic Crisis on the Structure of the Greek Banking System. *Financial Studies*, 24 (4), pp. 6-20.

Austerity → reduced bank number and employees in the sector → banking sector concentration / improved productivity indices.

Literature Review

Cheng & Mevis (2019). Large, diversified EU banks negatively hit due to Lehman Brothers and investment in securities. Small, retail-specialised EU banks hit due to macro environment and bad loan portfolio quality.

Pasiouras & Kosmidou (2007), Staikouras & Wood (2004), Kanas, Vasiliou & Eriotis (2012), Van Dooren (2017), etc.: Factors, such as Equity (+), Cost-to-Income (-), Size (-), GDP (?), Inflation (?), Concentration (?), etc... such as Management decisions, Interest rates, Business cycle, loan portfolio structure, Capital adequacy...

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2 Groups of factors that affect bank profitability (Alexiou & Voyazas, 2009):

- 1) Bank specific
- 2) Macro environment

We follow same logic and distinguish between Macro vs. Financial Factors.

Methodology

$$\widehat{ROA} = b_0 + b_{CAR} \times CAR + b_{\Delta\%Deposits} \times \Delta\%Deposits + b_{PCL} \times PCL + b_{LnDebt} \times LnDebt + b_{PSI} \times PSI$$

(Financial)
(Macro)
(Dummy)

- **Literature Imposed:** CAR & PCL
- **Important for Greece:** Deposits, Debt, PSI
- **Sources:** Thomson-Reuters & Annual Financial Statements

Table 1. Variables of the linear regression model

Variable		Description
Y	ROA	Return on assets ratio
X ₁	CAR	Capital adequacy ratio
X ₂	Δ%Deposits	Annual percentage change in deposits
X ₃	PCL	Provision for credit losses ratio
X ₄	LnDebt	Natural logarithm of public debt
X ₅	PSI	Dummy variable for the year that banks were affected by the haircut of Greek government bonds

Research Results: *Stylised Facts*

Return on Assets (ROA)



Loan-to-Deposits (LTD)



Capital Adequacy Ratio (CAR)



Non-Performing Loans (NPL)



Deposits (mil. €) per employee



Research Results: *Regression*

\widehat{ROA}

$$= 0.207289 \times CAR + 0.051853 \times \Delta\% \text{Deposits} - 0.561679 \times \text{PCL} - 0.003596 \times \text{LnDebt} - 0.054572 \times \text{PSI}$$

<i>Regression Statistics</i>								
Multiple R	0.944308177							
R Square	0.891717933							
Adjusted R Square	0.854971054							
Standard Error	0.012388319							
Observations	44							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	5	0.04929017	0.009858034	64.23408859	1.70646E-17			
Residual	39	0.005985347	0.00015347					
Total	44	0.055275518						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t-Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 99%</i>	<i>Upper 99%</i>
Intercept*	0	--	--	--	--	--	--	--
X ₁ =CAR	0.207289431	0.051469027	4.027459688	0.000252248	0.103183499	0.311395364	0.067915775	0.346663088
X ₂ = $\Delta\%$ Deposits	0.051852754	0.012821781	4.044114589	0.00023996	0.025918253	0.077787254	0.017132483	0.086573025
X ₃ =PCL	-0.561678727	0.101218794	-5.549154521	2.1886E-06	-0.76641306	-0.356944394	-0.835770433	-0.287587021
X ₄ =LnDebt	-0.003595896	0.001519387	-2.366675237	0.023009208	-0.006669146	-0.000522645	-0.007710264	0.000518472
Dummy X ₅ =PSI	-0.054571906	0.009801396	-5.56776869	2.06235E-06	-0.0743971	-0.034746711	-0.081113235	-0.028030576

* Constant term not statistically significant.

Research Results: *Tests*

Further tests:

- **Statistical significance of coefficients:** Only b_0 not statistically significant
- **Correlation analysis:** Correlation matrix

	Y=ROA	X1=CAR	X2= $\Delta\%$ Deposits	X3=PCL	X4=LnDebt
Y=ROA	1				
X1=CAR	0,711014967	1			
X2= $\Delta\%$ Deposits	0,524846678	0,17672628	1		
X3=PCL	-0,411494942	-0,064306834	-0,136955567	1	
X4=LnDebt	-0,43133419	-0,653935323	0,106254368	-0,140220508	1

- **Multicollinearity:** VIF (variance inflation factor) Coefficients, using independent variable as dependent variables: No correction needed (VIF<5, no correction needed).

X_j	Without pseudo-variables		With pseudo-variables	
	R_j^2	VIF _j	R_j^2	VIF _j
X_1	0.505288	2.021377	0.55778	2.261317
X_2	0.120419	1.136905	0.354736	1.549754
X_3	0.065601	1.070207	0.090943	1.100041
X_4	0.502481	2.009974	0.648801	2.847391

Policy Implications and Conclusions

Considerations for banks and policy makers:

- How to improve bank profitability, by using financial decisions (capital adequacy, provision for credit losses), as well as interpreting the impact of the macro environment and related factors (debt level, deposits, haircut).
- How to do bank supervision, by examining factors and instruments of financial regulators (loan provision, capital adequacy, asset quality, risks for bank customers, etc.).
- $R^2 = 89.2\%$, high explainability
- *Findings in line with literature:*
 - PSI (-)
 - PCL (-)
 - Deposits (+)
 - CAR (+)
 - Debt (-)
- *Further research:* Channel of PSI negative shock transmission (direct through assets held by banks or indirect through overall negative repercussions of the PSI).

Thank you!

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