Macroeconomic Influences on Baltic Housing Loan Flows

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Abstract. This study investigates the impact of macroeconomic factors on housing loan flows in the Baltic region post-2008 housing bubble. Using stepwise regression, Lasso regression, and pooled regression, data is analyzed from Estonia, Latvia, and Lithuania spanning 2014 to 2023. Results reveal the significant influence of borrowing costs, wages, unemployment, and inflation rates on loan flows.

Keywords: housing loans, macroeconomics, LASSO regression, linear regression, pooled regression, Baltic region.

1 Introduction

Despite studies on credit and housing in Eastern Europe [1] , research specifically focusing on the influence of macroeconomic factors on housing loan flows in the Baltics after the housing bubble burst in 2008 remains relatively understudied. This study addresses this gap by examining loan data in the Baltics. Two approaches are employed: analyzing loan flows in each Baltic state (Estonia, Latvia, Lithuania) and using pooled regression analysis across region. This study aims to provide a comprehensive understanding of how macroeconomic factors spanning from 2014 to 2023, and for Lithuania from 2015 to 2023, influence housing loan flows patterns in the Baltics.

2 Methods & Results

In this study, stepwise regression [2] with the “both” method was used to construct a regression model of loan flows for house purchases based on macroeconomic factors. Stepwise regression was chosen for its systematic approach to predictor selection, balancing model complexity and goodness of fit using the Akaike Information Criterion (AIC). This method selects

DOI: https://doi.org/10.15388/LMITT.2024.17

predictors, starting with an empty model, and sequentially adding and removing predictors based on their statistical significance until no further improvement in model fit is observed. AIC guided model selection, with lower AIC values indicating a better fit. The resulting model coefficients, see Table 1, highlight the significant impacts of borrowing costs (*Borr_cost_house*) and wages across countries. Higher borrowing costs were associated with reduced loan accessibility for households, while increasing wages positively influenced loan accessibility. Inflation (*HICP*) positively impacts housing loan flows in Lithuania and Estonia, while unemployment (*Unemploy*) negatively affects loan flows in Lithuania.

Least Absolute Shrinkage and Selection Operator (LASSO) regression [3] aims to minimize prediction error by constraining variables and coefficients. LASSO regression, adept at handling multicollinearity, aided in identifying significant predictors while ensuring model simplicity through coefficient shrinkage. The selection of the shrinkage parameter (λ) was performed using k-fold cross-validation. Results showed in Table 2, it is observed that the coefficients related to private consumption *(Priv_consum*) were shrunk to zero in the Lasso regression analysis, indicating their lack of statistical significance, consistent with the findings from linear regression and pooled regression for a region. However, borrowing costs (*Borr_cost_house*) and wages variables retained their coefficients in the Lasso regression, suggesting their consistent and significant impact on loan flows for house purchases. Additionally, Lasso regression highlighted the influence of unemployment (*Unemploy*) solely in Lithuania, with no effect observed in other countries.

The pooled regression model was utilized to offer a thorough perspective on the Baltic region. This method treated all observations equally, assuming homogeneity across both countries and time periods. Analysis (Table 1) reveals that borrowing costs (*Borr_cost_house*) and wages exhibit consistent and significant impacts across all regions, mirroring their individual effects observed at the country level. Similarly, unemployment (*Unemploy*) and inflation rates (*HICP*) emerge as significant factors influencing the entire region, despite their prior examination being confined to specific countries. A noteworthy regional finding is the discernible influence of government consumption (Gov_consum) on housing loan flows, this insight was exclusively revealed by the Lasso regression and was not evident in the linear regression.

Table 1. Regression results.

	Dependent variable:			
	Housepurch_l			
	Lithuania (1)	Estonia (2)	Latvia (3)	Pooled Regression
Unemploy	-2.862** (1.396)			-9.015*** (0.855)
HICP	0.896*** (0.305)	1.513*** (0.282)		0.787*** (0.242)
log(Wages)	65.965*** (5.804)	77.887*** (8.950)	52.755*** (3.959)	36.564*** (3.636)
Borr_cost_house	-13.429*** (1.691)	-12.424*** (2.013)	-6.924*** (1.066)	-8.814*** (1.526)
Gov_consum				-10.405*** (2.162)
OutlierLt	-130.660*** (13.238)			
OutlierLv		110.752*** (8.432)		
Constant	-376.857*** (42.470)	-448.368*** (56.692)	-337.136*** (26.261)	-127.422*** (25.886)
AIC	540.83	630.9	500.01	1041.21
Observations	105	117	117	339
R2	0.831	0.687	0.781	0.613
Adjusted R2	0.823	0.679	0.775	0.607
Residual Std. Error	12.836 (df = 99)	14.620 (df = 113)	8.331 (df = 113)	21.306 (df = 333)
F Statistic	97.617***(df = 5; 99)	82.861***(df = 3; 113)	134.165***(df = 3; 113)	105.303(df = 5; 333)
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 2. LASSO coefficients.

	Lithuania	Estonia	Latvia
Unemploy	-1.504	0	0
HICP	0.887	1.623	0
log(Wages)	66.385	68.512	52.319
Priv_consum	0	0	0
Invest	0.836	-0.111	-0.039
Gov_consum	5.635	3.898	-0.208
Borr_cost_house	-12.993	-9.690	-6.607
OutlierLt	-132.471	0	0
OutlierLv	0	0	108.203
Constant	-392.580	-396.241	-335.134

Research [4] supports the notion that as interest rates increase, housing affordability declines. Conversely, increasing wages positively impact loan accessibility, as highlighted by [5] article, which suggests that rising wages

contribute to greater household wealth, thereby stimulating demand for loans, including those for house purchases, and indicating improved well-being. Article [6] suggests that inflation has an impact on loan flows as borrowers seek loans to mitigate the negative effects of inflation on their purchasing power. Study [7], which focuses on the US, offers relevant insights indicating that unemployment can reduce disposable income and increase credit risk for borrowers. This diminishes their attractiveness as loan candidates, resulting in negative impacts on loan applications.

3 Conclusion

Through a synthesis of empirical evidence and existing literature this study contributes to the understanding of housing loan dynamics in the Baltic region following the housing bubble burst. By employing stepwise regression, LASSO regression, and pooled regression techniques, it is systematically analyzed the influence of macroeconomic factors on loan flows. Findings underscore the significance of borrowing costs, wages, unemployment, and inflation rates in shaping loan accessibility across the region.

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