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Investment Modelling at the Euro Area Level

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The aim of this research is to model the investment function at the level of the Euro zone. To achieve this main objective, we use and implement the structural equation modeling procedure for empirical analysis. Using this technique, the causal relationships established between investment and influencing factors are estimated and tested. Also, in the process of modeling structural equations, we examine empirical data sets related to the Euro area's Member States.

Keywords: *investment, interest rate, taxes, gross domestic product, Euro Area*

JEL Classification: *E22*

1. Introduction

This paper started from the Keynes's statement (1936, p.199) that defined the function of investment demand as a function meant to link the rate of aggregate investment with the marginal efficiency of the capital determined to the level of the aggregate investment rate.

According to Keynesian theory, the investment depends on what he called "marginal efficiency of capital" - that is, the expected rate of return for the acquisition cost of the capital goods. This is compared with the market interest rate. If the marginal efficiency of the capital is higher than the interest rate, the investment will increase, and if it is lower, the investment will decrease. Keynes (1936) stated that "the investment rate will increase to the point where the marginal efficiency of capital in general is equal to the market interest rate". Thus, given the "propensity to consume" and "incentive to invest" (determined jointly by the marginal efficiency of capital and the market interest rate), the employment rate is uniquely determined.

In this paper, we will eliminate the limitation according to which the investment function is a function dependent on interest rate and we will introduce in the analysis the aspect related to fiscal pressure that European economies are experiencing. Starting from this aspect, this work seeks to model the investment function at the Euro area level and to identify the causal relationships that are established in this model.

2. Literature Review

The analysis of investment represents the research objective of many researchers who approach, on the one hand, investments at a macroeconomic level and their relationships with consumption, and on the other hand, investments on financial markets. Therefore, the analysis presented in this article falls into the following research framework.

Eslamloueyan and Jafari (2014, pp.209-220) used the correlated effects mean group (CCEMG) technique to a set of balanced panel error correction model and they studied the repercussions of the 1997's

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Asian financial crisis and of 2008's global financial crisis on the savings and investing behavior in East Asian countries. Eslamloueyan and Jafari (2014, pp.209-220) found that the rates of both savings and investments are highly dependent across countries of East Asia.

García-Belenguer and Santos (2013, pp.150-169) explored a simple version of the neoclassical growth model and studied empirically the main determinants of aggregate investment across countries. In their work, the neoclassical growth model predicts that aggregate investment may be influenced by income growth, capital income share, relative price of capital, taxes, and other market distortions (García-Belenguer and Santos, 2013, pp.150-169).

Using a fully general specification for the instantaneous utility function, Furlanetto and Seneca (2014, pp.111-126) presented that the size of the wealth effect on labor supply is largely inconsequential for macroeconomic dynamics.

Lim (2014, pp.160-177) analyzed 129 developed and developing economies in terms of their institutional and structural factors related to their investment activity. The author introduced these institutional and structural factors to a standard neoclassical investment function for open economies and found that financial development and institutional quality tend to be determinants of cross-country capital formation. Nonetheless, institutional quality seemed to show o higher level of stability in its sign and significance of its coefficient.

Rieger (2012, pp.239-240) developed and proved a formula for the computation of optimal financial investments in an expected utility framework with arbitrary (not necessarily concave) utility functions.

Moreover, Di Corato, Moretto, Vergalli (2014: 80-89) introduced an analytical approximation of the short-run investment rule and presented how such an approximation can be used in order to derive the corresponding: i) steady-state distribution of the optimal stock of capital, and ii) the long-run average rate of capital accumulation.

Zhao, Shen and Wei (2014, pp.824-835) considered the consumption–investment problem with a general discount function and a logarithmic utility function in a non-Markovian framework. Their model's coefficients follow the assumption of adapted stochastic processes, including the coefficients of the interest rate, appreciation rate, and volatility of the stock. The work of Zhao, Shen and Wei (2014, pp.824-835) demonstrate that a time-consistent equilibrium consumption–investment strategy of the original problem consists of a deterministic function and the ratio of the market price of risk to the volatility. Nonetheless, the corresponding equilibrium value function can be described by the unique solution of a family of BSDEs parameterized by a time variable.

3. Research Methodology

To achieve the purpose of the research, we will use the econometric technique of structural equation modelling. A structural equation model is a set of assumptions about how the variables in an analysis are generated and related to each other (Hu and Bentler, 1999). Using this modeling econometric technique, we will be estimate and test the causal relationships within the model, using a combination of empirical data series and quantitative causal hypotheses.

This methodology will be applied by using the SPSS AMOS software on empirical data to achieve the purpose of the research and examine the hypotheses. In this respect, we will use time series from 2001q1-2014q3 for macroeconomic variables that characterize the 18 Member States of the Euro area, plus the time series for the Lithuania's variables, namely a state will be a full member of the Euro zone starting January 1 2015. Lithuania's decision to be integrated in the Euro Area has already been adopted by The Council of the European Union on July 23, 2014, so it is appropriate to include the Baltic state in this empirical analysis. In this analysis, we will use the following variables: investment (EA19_I), gross domestic product (EA19_Y), interest rate (EA19_R), and taxes (EA19_T). It should be mentioned that the sources of the empirical data are Eurostat, European Commission and European Central Bank.

4. Analysis and Results

Next, in this upcoming paper and research, the investments' function will be achieved, and also factors determining the investments will be identified. Following the proposed model, it results in a form of the model according to the type of Euro Area and the influence of interest rates and taxes.

To determine and test the investment model at the level of the Euro area, following hypotheses were identified:

H1: GDP influences interest rates in the Euro area

H2: Interest rates influence the investment in the Euro area
H3: Taxes affect investment in the Euro area
H4: Taxes and GDP influence each other in the Euro area

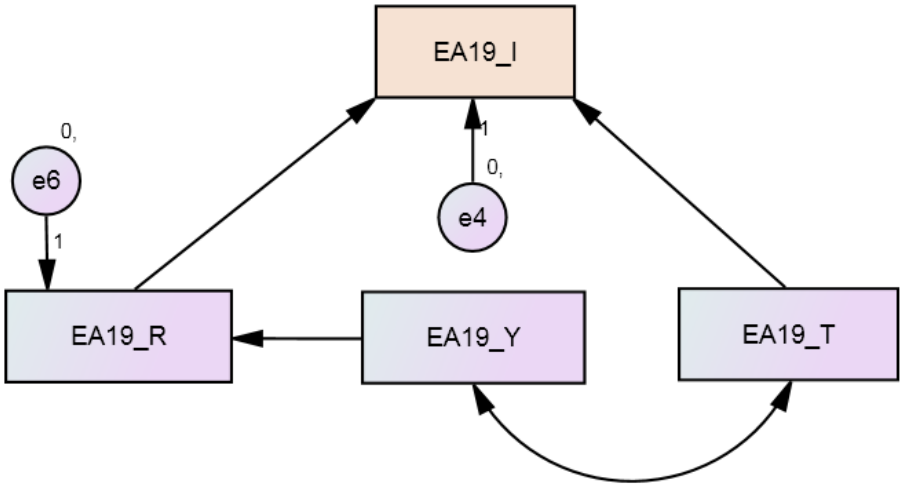

Figure 1. *Investment model proposed for the Euro Area*

Table 1. *Model accuracy*

Indicator	Model	Recommended values
χ^2	8.124 (p=0.017)	$p \leq 0.05$
χ^2 /df	4.062	≤5
NFI	0.972	≥0.90
RFI	0.916	≥0.90
CFI	0.978	≥0.90
RMSEA	0.238	≤0.10

Note: χ^2 =Chi-square, χ^2 /df = ratio of Chi-square and degrees of freedom, NFI = Normed fit index, RFI = Relative fit index, CFI = Comparative fit index, RMSEA = Root mean square error of approximation.

The results that study the relevancy of the model have met for the most part the recommended criteria (Table 1), but the root mean square error of approximation recorded a score of 0.238 which is slightly above the 0.10 level. This limitation of the study is related to the number of 55 observations introduced in the model and the operating premises of AMOS software which requires at least 100 observations. However, overall it can be stated that the proposed model, according to the included variables, is relevant.

Structural equation modeling was used to test the hypotheses for the proposed model. The results of this econometric technique are shown in Table 2 and Figure 2.

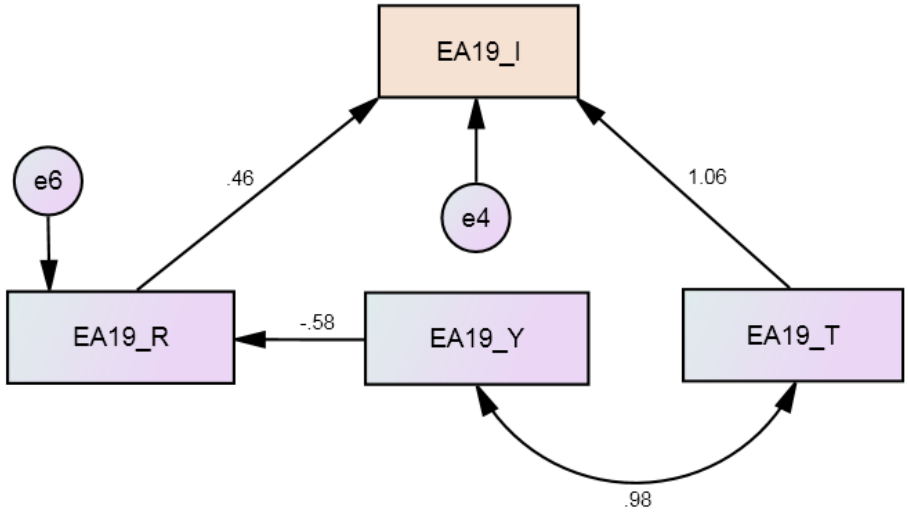

Figure 2. *Standardized results of the structural equations model*

Table 2. *Structural equation modelling results for the investment model proposed for the Euro area*

Hypotheses	Standardized Regression Weights	Standard Error	Significance	Hypothesis Result
H1: EA19_Y → EA19_R	-0.576	0.000	***	Confirmed
H2: EA19_R → EA19_I	0.458	5356.791	***	Confirmed
H3: EA19_T → EA19_I	1.057	0.154	***	Confirmed
H4: EA19_T ↔ EA19_Y	0.985		***	Confirmed

*** Significant at a 0.001 level (Two-tailored)

The proposed investment in the Euro area meets the prerequisites of a relevant model as it we can observed from the results calculated in Tables 1 and 2, following the recommendations of Hu and Bentler (1999, p.27). The probability value associated with the null hypothesis that the test is zero is displayed in the column marked 'Significance'. All regression coefficients of this model are significantly different from zero beyond the level of 0.001.

5. Conclusions

From table 2 and figure 2, we can note that at the Euro area level, investments are determined by taxes and interest rate. Following this present research, a new model regarding the investment function was identified. The results obtained confirm the three proposed hypotheses, namely:

H1: GDP influences interest rates in the Euro area
H2: Interest rates influence the investment in the Euro area
H3: Taxes affect investment in the Euro area
H4: Taxes and GDP influence each other in the Euro area

Regarding the limits of this research it should be mentioned that the RMSEA value in Table 1 shows that the new model of investments needs a development by using a time series that should surpass 100 observations.

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References

Di Corato, L., Moretto, M., and Vergalli, S., 2014. Long-run investment under uncertain demand. *Economic Modelling,* 41, pp.80-89.

Eslamloueyan, K. and Jafari, M., 2014. Financial crisis and saving–investment dynamics in the presence of cross-sectional dependence: The case of East Asia. *China Economic Review,* 30, pp.209-220.

Furlanetto, F., and Seneca, M., 2014. Investment shocks and consumption. *European Economic Review,* 66, pp.111-126.

García-Belenguer, F. and Santos, M.S. 2013. Investment rates and the aggregate production function. *European Economic Review,* 63, pp.150-169.

Hu, L., Bentler, P., 1999. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), pp.1-55

Keynes, J. M., 1936. *The General Theory of Employment, Interest, and Money.* London: MacMillan

Lim, J.J., 2014. Institutional and structural determinants of investment worldwide. *Journal of Macroeconomics* 41, pp.160-177.

Opreana, A., 2013. A New Approach of Investment for the Future Economic Policies. *Expert Journal of Economics,* 1(1), pp.4-12

Opreana, A., 2014. Modelling Investment Function in Relationship to Specific Factors from European Economies. Paper presented at *Joint International Conference of Doctoral and Post-Doctoral Researchers, Craiova, 12-13 September 2014*

Rieger, M.O., 2012. Optimal financial investments for non-concave utility functions. *Economic Letters*, 114, pp. 239-240

Vinerean, S., 2013. Applying Online Behavioral Models in Internet Retailing. LAP Lambert Academic Publishing, Saarbrucken, Germany

Zhao, Q., Shen, Y., Wei, J., 2014. Consumption–investment strategies with non-exponential discounting and logarithmic utility. *European Journal of Operational Research*, 238, pp. 824-835