Doctoral School of International Relations and Political Science

THESIS SUMMARY

Szabó Eszter

The Transmission of Negative Interest Rates in the Euro Area

PhD Dissertation

Supervisor:

Kutasi Gábor, PhD, Dr. habil

Budapest, 2024

Department of World Economy

THESIS SUMMARY

Szabó Eszter

The Transmission of Negative Interest Rates in the Euro Area

PhD Dissertation

Supervisor:

Kutasi Gábor, PhD, Dr. habil

Budapest, 2024

Table of contents

I. Introduction

The monetary transmission mechanism is a frequently discussed area of economic research. It is crucial to understand how a central bank can influence the development of macroeconomic variables, such as inflation or output. In the last decades, several channels of monetary transmission have been identified and studied. Although monetary policy can affect the economy in many ways, its most important tool before the 2008 global financial crisis was traditional interest rate setting. However, the crisis quickly highlighted the limits of conventional monetary policy, when nominal interest rates approached zero. Central banks of several developed countries transformed their toolkits, and unconventional measures usually seemed to be appropriate to handle the most severe effects of the financial crisis. However, mainly in Europe, economic growth remained fragile, deflation proved to be a major difficulty; furthermore, debt accelerated quickly and then stabilized at a high level.

One of the most highly debated new tools of monetary policy has been definitely the negative interest rate policy (NIRP). The topic naturally received a large amount of attention from researchers and decision-makers as well. After the global financial crisis, central banks lowered the interest rates to support the economic recovery. In several developed countries, interest rates quickly reached the zero lower bound (ZLB). In spite of the extremely low rates, economic growth did not rebound, or remained fragile, in many cases. The central banks of the Euro Area, Denmark, Japan, Sweden and Switzerland, reduced their policy rates below zero to provide further stimulus to the economy[1]. However, this unprecedented move yielded mixed results. Research about the effectiveness of negative policy rates is contradictory. The most important topics regarding NIRP are the transmission of negative rates and their impacts on the banking sector. A major concern of monetary transmission at negative nominal interest rates was the assumption that deposit rates of commercial banks cannot

[1] In Denmark and Switzerland, an important motivation was the avoidance of the sharp appreciation of the domestic currency.

fall below zero, since this move would result in the withdrawal of money from banks. Furthermore, negative lending rates also seemed unreasonable. Although some commercial banks experimented with negative interest rates (Arnold, 2019; Martin, 2019; Wass, 2020), these were rather the exemptions than the rule.

In June 2014 the European Central Bank cut its deposit facility rate (DFR) below zero and it kept the DFR in negative territory until July 2022. The eight years long era of negative interest rates came to an end in the middle of 2022 with the first rate hike, which was necessary for curbing down rising inflation in the Euro Area. The closure of NIRP provides an opportunity to assess the performance of negative nominal interest rates and to draw conclusions.

II. Aim and relevance of the research

In 2022, the increase in inflation brought an end to the era of negative nominal interest rates in the Euro Area. However, the exit was not easy. The decision to end the period of negative nominal interest rates was preceded by

a long discussion about the nature of inflation (whether it was temporary or permanent). By the time the ECB decided to raise interest rates, the annual inflation rate in the Euro Area was approaching 9 percent (Eurostat, 2022b). In order to maintain credibility, central banks had to take action.

My research focuses on the interest rate channel of the monetary transmission mechanism. I study how this channel works in Eurozone countries when interest rates become negative. Although several channels through which monetary policy can affect the real economy have been identified over the past two decades, I believe that the interest rate channel still plays an important role in the transmission, if it works properly. After all, the NIRP is ultimately an interest rate policy, which the ECB used to influence, among other things, commercial bank interest rates (Boucinha et al., 2020).

The major goal of my research is to explore how negative rates are transmitted into commercial bank rates by using relatively simple econometric models. It is important to understand how negative interest rates affect the

economy which was studied by several researchers with complex macroeconomic models. I concentrate on a smaller part of this process, the first step of the monetary transmission. I narrowed down the focus to the Euro Area and I am also interested in the possible differences among member states. In relation to negative interest rates, researchers usually examine all countries that adopted NIRP, the Eurozone (or some larger economy, such as Germany) and the usage of bank level data is also popular. Extending the analysis to all member states and the reliance on simpler econometric tools may provide some new information.

2.1. Research questions and hypotheses

I have formulated the following three research questions and hypotheses for my research:

Research question 1: How does monetary transmission through the interest rate channel change in Euro Area countries if the policy rate becomes negative?

- **Hypothesis 1:** Monetary transmission through the interest rate channel weakens in Euro Area countries if the policy rate becomes negative.

After reviewing the theoretical and empirical literature I assume that the adoption of a negative interest rate policy alters the functioning of the interest rate channel. An interest rate cut in negative territory may have different effects than in positive territory. I also assume that the interest rate channel of the transmission mechanism becomes less effective, when interest rates are negative. Experience shows that commercial banks have been quite reluctant to pass on negative interest rates to their clients, which suggests that the influence of policy rates on commercial bank interest rates may have diminished.

Research question 2: Does negative interest rate policy have similar effects on the interest rate transmission across Euro Area countries?

- **Hypothesis 2:** The negative interest rate policy has different effects on the interest rate transmission in Euro Area countries.

This hypothesis is based on the assumption that there are differences in the monetary policy transmission mechanism, macroeconomic processes, the financial sector and other factors across Euro Area member states, and that the impact of negative interest rates may therefore vary.

Research question 3: How does the negative interest rate policy affect monetary transmission through the interest rate channel in the corporate and in the household sectors?

- **Hypothesis 3:** The monetary transmission mechanism is less effective in the household sector than in the corporate sector when the policy rate is negative.

I suppose that the monetary transmission mechanism is less effective in the household sector than in the corporate sector in a negative interest rate environment. Commercial banks are less likely to pass on negative interest rates to households, because in this segment cash can be a good alternative to negative interest rates on

bank deposits. If deposit rates cannot be lowered, profitability considerations are likely to prevent lending rates from being lowered. However, the composition of a bank's assets and liabilities does matter, since the evolution of deposit and lending rates affects net interest income.

Another important factor is that the maturity of loans differs between the household and corporate sectors. As Yun & Cho (2022) write, the impact of monetary policy on corporate loans is more significant than on household loans. Because of the shorter maturity, a large share of corporate loans is refinanced more frequently than household loans, which have longer maturities.

Finally, household loans can be subsidized to protect households from negative economic effects. Subsidies can serve important economic policy objectives and can be justified, but they weaken the transmission mechanism of monetary policy.

I test the hypotheses by estimating two types of error correction models (ECM) and vector autoregressive

models (VAR). The approach is discussed in detail in the methodological part.

III. Methodology and results

Within the framework of the monetary transmission mechanism, my research focuses on the first step of the transmission via the interest rate channel; the pass through of the changes in the policy interest rates into the interest rates of commercial banks. In many countries, the interest rate channel plays a crucial role in the transmission mechanism of monetary policy. Consequently, it is important to understand how this channel functions when interest rates fall below zero.

3.1. Data

I used time series analysis to examine the transmission of interest rates across Euro Area member states[2]. I collected monthly data from the websites of the European Central Bank and estimated error correction and vector

[2] On the 1st of January 2023 Croatia joined the Euro Area, however, the ECB already quitted the negative interest rate policy by that time, so Croatia is not part of the current analysis.

autoregressive models in Stata and EViews, which are statistical software packages.

As dependent variables, I chose two composite cost of borrowing indicators for firms and households. These indicators are accurate and comparable measures of the borrowing costs in the corporate and in the household sectors in Euro Area countries (Feraboli et al., 2015). Precisely, the indicators capture cost of borrowing for new loans to non-financial corporations and the cost of borrowing for new loans to households for house purchase. Borrowing costs are expressed as a percentage. As explanatory variables, I used three maturities (3, 6 and 12-month) of the Euro Interbank Offered Rate (Euribor)[3]. Since key interest rates of the ECB can be unchanged for a prolonged period of time, they are not really suitable for econometric analysis, therefore I chose the Euribor, which is an important reference rate. Euribor is also

[3] „The Euribor rates are based on the average interest rates at which a large panel of European banks borrows funds from one another. The Euribor rates are considered to be the most important reference rates in the European money market. The interest rates do provide the basis for the price and interest rates of all kinds of financial products." https://www.euribor-rates.eu/en/

measured in percentage terms. The earliest available data regarding the cost of borrowing indicators is January 2003, so this is the starting point of the analysis. The models were run until the Euribor was negative. The end points vary in line with the maturity of the Euribor. The 3-month rate was negative until June 2022, the 6-month rate until May 2022 and the 12-month rate until February 2022.

3.2. Error correction models with dummy variable and interaction term

I started the analysis by constructing error correction models (ECMs). The ECM can describe both long and short-term relationships between two or more variables, so it is suitable for studying how the interest rate channel of the monetary transmission mechanism functions. The long run equation of the model can be written in the following way:

$$y_t = ß_0 + ß_1 x_t + u_t \quad (1)$$

where y_t represents the dependent variable in time period *t*, which is the cost of borrowing indicator in this case, $ß_0$

is a constant, x_t represents the explanatory variable in time period *t*, which is the Euribor, $ß_1$ is its coefficient and u_t is the error term of the model. If $ß_1$ equals to 1, changes in the explanatory variable are fully transmitted into the dependent variable. However, if for example, the loan supply is not fully elastic or the banking sector is not characterized by perfect competition, the transmission is not full and $ß_1$ is smaller than 1 (Sander & Kleimeier, 2004).

I used the Engle-Granger two-step method (Engle & Granger, 1987), so I first estimated the long run equation (*Equation 1*), obtained the OLS residuals and included them in the short run equation (*Equation 2*).

The short run equation of the error correction model is similar to a model used by Claeys (2021) and is written in the following form:

$$\Delta y_t = \beta_0 + \sum_{i=1}^{n} \beta_i \Delta y_{t-1} + \sum_{i=1}^{n} \gamma_i \Delta x_{t-1} + \lambda e_{t-1} + \ldots$$
$$\ldots + \delta I_{x_t < 0} + \zeta(I_{x_t < 0} * \Delta x_{t-1}) + \varepsilon_t \qquad (2)$$

The equation is estimated in first differences, which is marked by Δ. The dependent (cost of borrowing

indicator) and the explanatory (Euribor) variables are represented by *y* and *x*, respectively. The model takes into account the lags of the dependent and explanatory variables. The error correction term, e_{t-1} is the first lag of the OLS residuals from *Equation 1* and its coefficient, λ shows the speed of adjustment. If there is a deviation from the long-term equilibrium value, λ reveals what proportion of this deviation is corrected during one period. A dummy variable, $I_{xt < 0}$, is introduced in the equation, which takes the value of one when the Euribor is negative and it is 0 otherwise. The interaction variable, ($I_{xt < 0} * \Delta x_{t-1}$), captures the additional effect of the changes in the Euribor on the cost of borrowing indicator, when the interest rate (represented here by the Euribor) is negative. If the coefficient of the interaction variable, ζ, is not zero and statistically significant, the transmission mechanism changes when interest rates become negative. Finally, ε_t is the error term of the model.

3.3. Two-period error correction models

In order to better understand interest rate transmission at negative rates, I followed the analysis with estimations of two-period error correction models. I divided the sample I used in the previous section into two time periods. In the first period the Euribor is positive, while in the second one it is negative.

The long-term error correction models were not changed compared to the previous section (*Equation 1*).

The short-term equation is estimated without the dummy variable and the interaction term:

$$\Delta y_t = \beta_0 + \sum_{i=1}^{n} \beta_i \Delta y_{t-1} + \sum_{i=1}^{n} \gamma_i \Delta x_{t-1} + \lambda e_{t-1} \qquad (3)$$

3.4. Extended error correction models

In the next section, I extended the two-period error correction models with several other variables that may have a role in the transmission mechanism. I tried to capture the macroeconomic environment with inflation, industrial production, the exchanges rate, the money

supply and unemployment[4]. I also tested the effects of the ECB's assets and its two-tier system for remunerating excess reserve holdings on the cost of borrowing indicators.

I have again divided the sample into positive and negative interest rate periods. The long-term equations of the error correction models were not changed compared to the previous sections (*Equation 1*).

In the first period, the short-term equation of the previously estimated error correction model is extended to include other independent variables as follows:

$$\Delta CB_t = \beta_0 + \sum_{i=1}^{n} \beta_i \Delta CB_{t-1} + \sum_{i=1}^{n} \gamma_i \Delta EUR_{t-1} + \ldots$$
$$\ldots + \sum_{i=1}^{n} \zeta_i \Delta ECB_{t-1} + \sum_{i=1}^{n} \eta_i \Delta FX_{t-1} + \ldots$$
$$\ldots + \sum_{i=1}^{n} \theta_i \Delta CPI_{t-1} + \sum_{i=1}^{n} \iota_i \Delta IND_{t-1} + \ldots$$
$$\ldots + \sum_{i=1}^{n} \kappa_i \Delta M1_{t-1} + \sum_{i=1}^{n} \mu_i \Delta UNRATE_{t-1} + \ldots$$
$$\ldots + \lambda e_{t-1} + \varepsilon_t \qquad (4)$$

[4] I did not want to reduce the number of observations, therefore I could only use monthly data. Consequently an important macroeconomic indicator, GDP is not included in the models, since it is published quarterly.

The variables that are included in the equation are the following: cost of borrowing (CB), Euribor (EUR), ECB assets (ECB), exchange rate (FX), inflation (CPI), industrial production (IND), money supply (M1) and unemployment rate (UNRATE).

The dummy variable for the two-tier system ($TT_{xt<0}$) is added to *Equation 4* in the second period:

$$\Delta CB_t = \beta_0 + \sum_{i=1}^{n} \beta_i \Delta CB_{t-1} + \sum_{i=1}^{n} \gamma_i \Delta EUR_{t-1} + \ldots$$
$$\ldots + \sum_{i=1}^{n} \zeta_i \Delta ECB_{t-1} + \sum_{i=1}^{n} \eta_i \Delta FX_{t-1} + \ldots$$
$$\ldots + \sum_{i=1}^{n} \theta_i \Delta CPI_{t-1} + \sum_{i=1}^{n} \iota_i \Delta IND_{t-1} + \ldots$$
$$\ldots + \sum_{i=1}^{n} \kappa_i \Delta M1_{t-1} + \sum_{i=1}^{n} \mu_i \Delta UNRATE_{t-1} + \ldots$$
$$\ldots + \nu TT_{xt<0} + \lambda e_{t-1} + \varepsilon_t \quad ...(5)$$

3.5. Vector autoregressive models

Cost of borrowing in some countries is not cointegrated with any maturities of the Euribor. In these cases, the transmission of negative interest rates is studied by vector autoregressive (VAR) models.

A simple VAR model can be written as (Wooldridge, 2015):

$$y_t = \delta_0 + \alpha_1 y_{t-1} + \gamma_1 z_{t-1} + \alpha_2 y_{t-2} + \gamma_2 z_{t-2} + \ldots$$
$$\ldots + \alpha_k y_{t-k} + \gamma_k z_{t-k} \quad (6)$$

$$z_t = \eta_0 + \beta_1 y_{t-1} + \rho_1 z_{t-1} + \beta_2 y_{t-2} + \rho_2 z_{t-2} + \ldots$$
$$\ldots + \beta_k y_{t-k} + \rho_k z_{t-k} \quad (7)$$

I used this model by the estimation of the two-period VAR models.

In the next section, a dummy variable, $I_{xt < 0}$, is added to the VAR model, which takes the value of 1 when the Euribor is negative and 0 otherwise:

$$y_t = \delta_0 + \alpha_1 y_{t-1} + \gamma_1 z_{t-1} + \alpha_2 y_{t-2} + \gamma_2 z_{t-2} + \ldots$$
$$\ldots + \alpha_k y_{t-k} + \gamma_k z_{t-k} + I_{xt < 0} \quad (8)$$

$$z_t = \eta_0 + \beta_1 y_{t-1} + \rho_1 z_{t-1} + \beta_2 y_{t-2} + \rho_2 z_{t-2} + \ldots$$
$$\ldots + \beta_k y_{t-k} + \rho_k z_{t-k} + I_{xt < 0} \quad (9)$$

3.6. Results

My doctoral research focuses on the interest rate channel of the monetary transmission mechanism. I study how this channel operates in Euro Area countries when nominal interest rates become negative.

I followed a joint approach, the results of the error correction and the vector autoregressive models have to be interpreted together, as the use of both types of models was necessary due to the lack of cointegration with the Euribor in some countries. The models are suitable for testing all three hypotheses and the two-period models have made the results of the dummy variable models more robust.

In the corporate sector, the dependent variable, the cost of borrowing, is cointegrated with the independent variable, the Euribor, in twelve countries and the Euro Area. In the error correction models, the dummy variable, the interaction term or both proved to be significant in eight countries and in the Euro Area. In the household sector, cointegration was found for thirteen countries. In eight member states, the dummy variable, the interaction term or both were significant in the error correction models. In the corporate sector, the coefficients of the dummy variable and the interaction term are negative in all countries where they are significant. In the household

sector, the coefficients are negative in six out of eight countries.

In the next part of the research, I divided the time frame of the analysis into two periods. In the first period the Euribor was positive, while in the second one it was negative. The error correction models confirm the relationship between corporates' cost of borrowing and the Euribor in the first period. The dependent variable adjusts to its equilibrium value in every country and in the Euro Area, although considerable differences can be observed regarding the speed of this adjustment. In nine out of twelve countries, the previously existing relationship falls apart when the Euribor is negative. In the second period, the Euribor also becomes insignificant in the case of the Eurozone. In the household sector, the results are similar. In eleven out of thirteen member states, the relationship between households' cost of borrowing and the Euribor collapses in the second period, when the Euribor is negative. I extended the error correction models with several additional variables that may capture the macroeconomic environment. However,

the results proved to be quite similar to the outcomes of the non-extended models.

In the VAR models, the dummy variable for negative interest rates was significant in two countries for the corporate sector, while it was insignificant in all cases for the household sector. The two-period models provided more information on interest rate transmission in those countries where no cointegration was found. Although there are differences in the magnitude and duration of the shock, in the first period, cost of borrowing responds positively to a change in the Euribor in both the corporate and household sectors. In the corporate sector, in two out of five countries, cost of borrowing stops responding to changes in the Euribor when interest rates become negative. In the other three countries, the response is smaller and disappears more quickly. In the household sector, the magnitude of the shock is also smaller in the second period and the duration becomes shorter as well.

After reviewing the results, the research questions can now be answered:

Research question 1: How does monetary transmission through the interest rate channel change in Euro Area countries if the policy rate becomes negative?

- **Hypothesis 1:** Monetary transmission through the interest rate channel weakens in Euro Area countries if the policy rate becomes negative.

Based on the ECM and the VAR models, I can confirm the first hypothesis. Monetary transmission through the interest rate channel weakens in most Euro Area countries if the policy rate becomes negative. The error correction model with dummy variable and interaction term already suggested the weakening of transmission (they are negative in the majority of cases), and the two-period ECM and VAR models made it clear that in most countries transmission through the interest rate channel weakens or even collapses when the Euribor turns negative.

The second research question and hypothesis focused on the differences across the Eurozone member states.

Research question 2: Does negative interest rate policy have similar effects on the interest rate transmission across Euro Area countries?

- **Hypothesis 2:** The negative interest rate policy has different effects on the interest rate transmission in Euro Area countries.

When I formulated this research question and hypothesis, I did not expect that the speed of adjustment or the size and duration of a shock would be the same or quite similar across Euro Area countries. I was only interested in the direction of the relationship. In other words, if interest rate transmission is weakening, is it weakening in all countries or not? In a monetary union, it is reasonable to expect that member countries will converge over time.

According to my research, considerable differences exist across the Eurozone. In most countries, the transmission mechanism through the interest rate channel weakens when the Euribor turns negative. However, in some cases I have found no change or a positive impact. So, I can also confirm the second hypothesis. The negative interest rate policy has different effects on the interest rate

transmission in Euro Area countries. The confirmation of this hypothesis is supported by both types of error correction models in the corporate and household sectors, and by both types of vector autoregressive models in the corporate sector. (The VAR models in the household sector gave rather similar results across countries).

A comprehensive and detailed analysis of heterogeneity across Euro Area member states is beyond the scope of this dissertation. What can be stated, based on the visual interpretation of the cost of borrowing indicators, is that the range (between the member states with the lowest and the highest borrowing costs) in the corporate sector has widened somewhat compared to the early 2000s. In the household sector, however, the range is basically the same. Heterogeneity within the Euro Area is certainly an interesting research topic. Analyzing bank-level data, Altavilla et al. (2020) find a reduction in heterogeneity due to unconventional monetary policy instruments. Meanwhile, looking at macroeconomic data, Coudert et al. (2020) conclude that Euro Area members have not

structurally converged. So the direction of progress is not clear.

The third research question and hypothesis were formulated along the lines of sectoral differences:

Research question 3: How does the negative interest rate policy affect monetary transmission through the interest rate channel in the corporate and in the household sectors?

- **Hypothesis 3:** The monetary transmission mechanism is less effective in the household sector than in the corporate sector when the policy rate is negative.

Based on the results of both types of error correction and vector autoregressive models, the third hypothesis can also be confirmed. In the ECM models, the adjustment to the equilibrium value is faster in the corporate sector, implying that interest rate transmission is more effective. In the VAR models, the response of the cost of borrowing in the corporate sector tends to be somewhat larger than in the household sector.

IV. References

Altavilla, C., Canova, F., & Ciccarelli, M. (2020). Mending the broken link: Heterogeneous bank lending rates and monetary policy pass-through. *Journal of Monetary Economics*, *110*, 81-98. https://doi.org/10.1016/j.jmoneco.2019.01.001

Arnold, M. (2019, August 26). *German banks wade into negative rate debate*. Financial Times. https://www.ft.com/content/6a0be970-c6b5-11e9-a1f4-3669401ba76f, Accessed: 10. 12. 2022.

Boucinha, M., Burlon, L., & Kapp, D. (2020). Negative rates and the transmission of monetary policy. *Economic Bulletin Articles*, *3*. https://www.ecb.europa.eu/press/economic-bulletin/articles/2020/html/ecb.ebart202003_02~4768be84e7.en.html

Claeys, G. (2021). *What Are the Effects of the ECB's Negative Interest Rate Policy?*. Monetary Dialogue Papers. Publication for the committee on Economic and Monetary Affairs, Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament, Luxembourg, 2021. https://www.europarl.europa.eu/cmsdata/235691/02.%20BRUEGEL_formatted.pdf

Coudert, V., Couharde, C., Grekou, C., & Mignon, V. (2020). Heterogeneity within the euro area: New insights into an old story. *Economic Modelling, 90*, 428-444. https://doi.org/10.1016/j.econmod.2019.11.028

Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: journal of the Econometric Society*, *55*(2), 251-276. https://doi.org/10.2307/1913236

Eurostat (2022b). *Inflation.* https://ec.europa.eu/eurostat/databrowser/view/prc_hicp_midx/default/table?lang=en

Feraboli, K., Häkkinen, H., & Gutiérrez, J. M. P. (2015). A new indicator for the cost of borrowing in the euro area. In Irving Fisher Committee (Eds.), *Indicators to support monetary and financial stability analysis: data sources and statistical methodologies*. *IFC Bulletin No 39* (pp. 1-11). Bank for International Settlements. https://www.bis.org/ifc/publ/ifcb39.pdf

Martin, E. (2019, August 12). *Danish bank offers mortgages with negative 0.5% interest rates – here's why that's not necessarily a good thing*. CNBC. https://www.cnbc.com/2019/08/12/danish-bank-is-offering-10-year-mortgages-with-negative-interest-rates.html, Accessed: 17. 12. 2022.

Sander, H. – Kleimeier, S. (2004). Convergence in euro-zone retail banking? What interest rate pass-through tells us about monetary policy transmission, competition and

integration. *Journal of International Money and Finance*, *23*(3), 461-492. https://doi.org/10.1016/j.jimonfin.2004.02.001

Wass, S. (2020, September 23). *Nordea expands negative interest rates on deposits in Denmark*. S&P Global. https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/nordea-expands-negative-interest-rates-on-deposits-in-denmark-60444307, Accessed: 17. 12. 2022.

Wooldridge, J. M. (2015). *Introductory econometrics: A modern approach*. Cengage Learning.

Yun, Y., & Cho, B. (2022). Does monetary policy affect bank lending to households and firms differently?. *Economic Modelling*, *109*, 105783.

V. Publication list of the author

Journal articles in English

Czeczeli, V., Kutasi, G., & Szabó, E. (2021). The assessment of government incentives on savings, Hungary 2006–2019. *Acta Oeconomica, 71*(4), 569-585. https://doi.org/10.1556/032.2021.00040

Kutasi, G., Lőrincz, A., & Szabó, E. (2019). Impact of savings on capitalization: Case of Southeast Asian Economies. *European Journal of Business Science and Technology*, *5*(1), 30-40. http://dx.doi.org/10.11118/ejobsat.v5i1.155.

Kutasi, G., & Szabó, E. (2019). The effects of negative interest rates on the monetary transmission mechanism – The case of Switzerland, *Köz-Gazdaság, 14*(3), 286-292. https://doi.org/10.14267/RETP2019.03.24

Journal articles in Hungarian

Kolok, A. B., Szabó, E., & Virág, B. (2022). Gazdasági felzárkózás a veszélyek korában= Economic convergence in times of danger. *Polgári Szemle: Gazdasági És*

Társadalmi Folyóirat, *18*(4), 33-53. https://doi.org/10.24307/psz.2022.1204

Book chapters in Hungarian

Soós, G. D., & Szabó, E. (2020). Állovasból sereghajtó: a 2000-es évek. In: Virág, B. (szerk.) Tízszer tíz év számokban – Magyarország elmúlt 100 évének gazdaságtörténete, Magyar Nemzeti Bank, Budapest

Virág, B., Kolok, A. B., & Szabó, E. (2024). Gazdasági felzárkózás a veszélyek korában. In: Kutasi, G. (szerk.) Domi esse et in Europa et in mundo : Ünnepi tanulmányok a 70 éves Halmai Péter tiszteletére. Ludovika Egyetemi Kiadó, Budapest

Other in English

Kutasi, G., & Szabó, E. (2020). Hungarian Government Incentives and Structural Breaks of Savings. In: Smuk, P. (szerk.) Társadalmi fenntarthatóság. Ludovika Egyetemi Kiadó, Budapest