

GÁBOR KUTASI¹ – ESZTER SZABÓ²

THE EFFECTS OF NEGATIVE INTEREST RATES ON THE MONETARY TRANSMISSION MECHANISM – THE CASE OF SWITZERLAND

In this article we study how the monetary transmission mechanism (the process through which monetary policy affects aggregate demand and inflation) alters when the nominal interest rates become negative, through the case of Switzerland. The results of our models show that the effectiveness of the interest rate channel of the transmission mechanism decreases at negative nominal interest rates. However, considering the limits of the models and the unique factors affecting the monetary transmission in Switzerland, clear conclusions about the effectiveness of the interest rate channel cannot be made.

1. INTRODUCTION

Although, the transmission mechanism is a frequently discussed topic in the literature, due to its complex nature, new channels have been discovered even recently [Borio and Zhu, 2008] and the introduction of negative nominal interest rates may alter how monetary policy can influence the level of output.

Due to its safe haven currency role the Swiss franc is under appreciation pressure merely since the beginning of the global financial crisis. Although Switzerland runs a considerable current account surplus, the central bank (SNB) is committed to maintaining loose monetary policy conditions in order to avoid the deterioration of the current account balance. The expansive stance of the SNB results negative interest rates [Kutasi, 2018].

In the next section we overview the most important literature regarding this topic. In section 3 we outline the research question and the methodology. Section 4 presents the results, while section 5 contains the analysis and further implications that need to be taken into consideration. Section 6 concludes and outlines the future areas of research.

2. LITERATURE REVIEW

The overall effects of negative nominal interest rates on the economy are highly debated. Some [Jobst – Lin, 2016] say that the negative interest rate policy (NIRP) of the European Central Bank (ECB) was efficient in stimulating aggregate demand and it has not deteriorated the profitability of commercial banks. Meanwhile others [Eggertson – Juelsrud – Wold, 2017] argue that the NIRP was not expansionary and

¹ associate professor, National University of Public Service

² PhD Student, International Relations Multidisciplinary Doctoral School, Corvinus University of Budapest

therefore cannot be effective in boosting the economy since the pass-through of the changes in the policy rate to commercial bank deposit and lending rates collapses when the policy rate becomes negative.

According to the literature [Mishkin, 1996] monetary policy can still be effective when nominal interest rates reach the floor of zero since consumer and business decisions are determined by the real interest rates. A monetary expansion raises expected inflation thereby lowering the real rates which boosts the economy.

However, the 2008 crisis pointed out that even negative nominal interest rates cannot generate sufficient stimulus and inflation in some countries. The central banks of the eurozone, Denmark, Japan, Sweden and Switzerland all cut the policy rate below zero some years after the crisis but they are still struggling to support long term economic growth and reach the inflation target in a sustainable manner.

The empirical experiences raise the question whether at zero or negative nominal interest rates the monetary transmission mechanism truly works so as the literature states. Eggertsson et al. [2017] studies the transmission of the policy rate-changes in the above-mentioned countries and come to the conclusion that commercial banks do not follow the rate cuts of the central bank once their deposit rates reach or approach zero and lending rates approximately the two percent level³, so the zero lower bound (ZLB) comes effective for commercial banks and the pass-through to deposit and lending rates collapses. Consequently, the central bank cannot provide further stimulus to the economy with interest rate cuts.

In the case of Switzerland, the weakening of the interest rate channel of monetary transmission is clearly observable. The decrease of the CHF Libor and SARON has had an ever-smaller effect on lending and deposit rates. The shifting of the target range of the base rate into negative territory had basically no effect on the variable-rate mortgage loans [Kutasi, 2018].

We think that negative nominal interest rates have not been as effective in stimulating the economy as decision-makers expected them to be, so economic growth and inflation remained sluggish in the countries where the policy rate turned negative.

3. RESEARCH QUESTION AND METHODOLOGY

We studied whether the effectiveness of the interest rate channel of the monetary transmission mechanism truly declines when nominal interest rates are reduced into negative territory through the case of Swiss lending rates.

The transmission mechanism of monetary policy is usually studied with the error correction model (ECM) supposing that the policy rate and the examined market interest rates are cointegrated, namely they follow a common trend over the long run. The ECM is able to reveal the short and the long term relationship between the policy rate and the market interest rates. This relationship can be written as:

$$\Delta y_t = \beta_0 + \sum_{i=1}^n \beta_i \Delta y_{t-i} + \sum_{i=1}^n \delta_i \Delta x_{t-i} + \lambda e_{t-1} + \varepsilon_t$$

where Δy_t is the first difference of the dependent variable (e.g. commercial bank deposit or lending rates) β_0 is a constant, Δy_{t-1} is the first difference of the lagged dependent variable, while, Δx_{t-1} is the first difference of the lagged independent variable (e.g. the policy rate), e_{t-1} is the lag-

³ The dispersion of lending rates is larger than the deposit rates' in the countries studied.

ged variable of the OLS residuals from the long run cointegrating equation of $y_t = \beta_0 + \beta_1 x_t + \varepsilon_t$, while the intercept of e_{t-1} , λ shows the speed of the adjustment, finally ε_t is the error term.

The value of λ shows that if the commercial bank interest rate deviates from its equilibrium level, what proportion of this deviation is corrected during one period (during one month in the case of monthly data) [Sander – Kleimeier, 2004; Varga, 2016].

A further matter of importance is the value of β_1 in the long run equation. If $\beta_1 = 1$, in the long run the changes of the policy rate are fully transmitted into the commercial bank interest rates. If this is not the case, market interest rates do not follow completely the policy rate which may indicate that the transmission of monetary policy is not perfect, the central bank may not be able to orient the markets through the interest rate channel of the transmission mechanism.

3.1. DATA AND MODEL SPECIFICATIONS

We used monthly data and studied the transmission of the changes of the 3-month CHF Libor to the time series of three lending rates: ten and one year fixed interest rate mortgage loans and the variable rate mortgage loan, in two different periods of time: from January 2008 to November 2014 and from December 2014 to February 2019. In the first period the CHF Libor was positive, while in the second one it was negative. Our expectation was to confirm that the interest rate channel of the transmission mechanism weakens in the second period when the Libor was negative. This means that either the value of λ from the error correction equation or the value of β_1 from the long run cointegrating equation becomes smaller in the second period. A smaller λ would indicate that the adjustment process of the examined lending rates has slowed down compared to the first period. While a smaller β_1 would mean that the changes of the Libor are transmitted to the lending rates to a lesser extent. In both cases assuming that the other coefficient moves to the same direction or remains unchanged, the results point to the weakening of the interest rate channel.

4. RESULTS

With the error correction model, we studied how the changes of the CHF Libor are transmitted to the Swiss lending rates. We found that the interest rates of the ten and one year mortgage loans do not even cointegrate with the Libor which means that they do not follow a common trend on the long run and the ECM cannot be applied.

The interest rate of the variable rate mortgage loan and the Libor are cointegrated, so we could study their relationship with the ECM. In the first time period (November 2008⁴ – November 2014) the value of λ is -0,78 which means that if the interest rate of the variable rate mortgage loan deviates from its equilibrium level, 78 percent of the difference is corrected within one month. However, the value of β_1 equals to 0.26 which means that the changes of the Libor are not fully transmitted to the interest rate of the variable rate mortgage loan.

In the second period (December 2014 – February 2019) a model with the same variables and the same lag structure is estimated. The value of λ is -0.0004, much smaller than in the first

⁴ Data is available from September 2008 for variable interest rate mortgage loans on the website of the SNB and two months fall out from the model because of the lags.

period. This means that only 0.04 percent of the deviation is corrected within one month. The value of also β_1 decreases, it is 0.02. These results indicate that the interest rate channel of the transmission mechanism indeed becomes less effective at negative nominal interest rates.

1. Table: Results of the error correction models

Error correction model				
	1 st period		2 nd period	
	Coefficient	Std error	Coefficient	Std error
λ	-0.780755	0.03797	-0.000395	0.00067
R-squared	0.912775		0.014405	
Number of observations	73		51	
Long run cointegrating model				
	1 st period		2 nd period	
	Coefficient	Std error	Coefficient	Std error
β_1	0.263072	0.006099	0.023904	0.052331
R-squared	0.977501		0.017176	
Number of observations	75		51	

Source: authors' calculations based on SNB and FRED data

5. ANALYSIS AND FURTHER IMPLICATIONS

Although, the results of the models confirm our hypothesis that the interest rate channel of the monetary transmission mechanism has become less effective in Switzerland after the reduction of the Libor into negative territory. However, we cannot make clear conclusions because all of the models contain relatively few observations which can make the results unreliable. Furthermore, the R-squared of the models examining the second period are extremely low and the standard errors are bigger than the coefficients of the variables both in the ECM and the long run cointegrating model.

Consequently, we should definitely take into consideration the role of other tools central banks can use for smoothing the cyclical movements of the economy and further channels of monetary transmission. Due to the safe haven role of the Swiss franc the exchange rate channel is considered to be the strongest one in Switzerland. After the crisis investors withdrew a large amount of capital from emerging market economies, so the demand for safe haven currencies such as the Swiss franc considerably increased, therefore the SNB needed to ease monetary conditions in order to be able to support the recovery of the economy and avoid the sharp appreciation of the franc.

To return to the interest rate channel, some economies that followed a different path proved to be more successful. In the United States the Federal Reserve cut the policy rate to 0-0.25 percent in 2008 and started the first QE program. An interesting fact that according to the Taylor-rule the federal funds rate should have been cut well below zero (approximately minus 2-4 percent) [Malkin – Nechio, 2012] but the Fed (not surprisingly) decided otherwise and successfully

supported the recovery of the US economy without introducing negative nominal rates. Only the real interest rates fell below zero since inflation was usually around 2 percent in the period of the near zero percent policy rate.

Nonetheless, the Fed is in a special position since it does not have to worry about the size of its balance sheet and as the issuer of the global currency, the dollar, the US economy can accumulate a large amount of debt without the fear of losing investor confidence. Other countries are of course not as fortunate as the US. Although, the ECB's balance sheet also increased considerably due to the asset purchasing program, investors were not willing to finance some heavily indebted member states of the eurozone.

Another country where the recovery was successful is Hungary. Although the easing of monetary conditions started late, only in 2013, the central bank supported economic growth with various measures such as interest rate cuts, swap tools or the Funding for Growth Scheme (FGS).

The above-mentioned empirical experiences can point toward an important implication. They suggest that negative rates can be effective if inflation is around or approaching the central bank's target. Countries that introduced negative nominal rates failed to reach sustainable growth because in spite of the extremely expansionary monetary policy their central banks have been conducting, inflation usually did not increase yet alone approach the inflation target. On the other hand, in countries like the United States or Hungary, the policy rate remained slightly above zero and as inflation rose the real interest rates became negative, which supported investments and consumption.

It seems that the transmission mechanism works so as literature [Mishkin, 1996] states: a monetary expansion raises expected inflation thereby lowering the real rates which stimulates the economy, if the central bank keeps the policy rate at a sufficiently low level and inflation converges to the target. However, if the policy rate turns negative, the transmission collapses and consequently further rate cuts are not effective in boosting aggregate demand.

A further fact worth considering is that differences can exist among the countries regarding the main channels of the transmission and the overall effects of monetary policy on the real variables. As it mentioned above, in Switzerland the role of the exchange rate channel is extremely important. Valid conclusions can be made only if the major channels of monetary transmission in every country are identified.

The case of Switzerland points out a further important implication. According to the last Quarterly Bulletin of the SNB [SNB, 2019] the output gap (the deviation of actual GDP from estimated aggregate potential output) has closed which means that the factors of production in the economy are well utilized. The fact that output is close to its potential level suggests that the real interest rate is near to its natural level which is definitely an interesting thought taking into consideration that the real interest rate is currently in negative territory.

6. CONCLUSION AND FURTHER AREAS OF RESEARCH

We believe the issue of negative rates is worth studying for various reasons. The topic is quite new and unexplored. Negative nominal interest rates have become a reality only in 2014 when the ECB cut the policy rate below zero for the first time. This of course was a major event but as only a limited amount of data was available for some time, a reliable econometric analysis could not be conducted.

Now, a couple of years later with more countries following the ECB's example the issue of negative rates can be studied with panel econometric methods. Empirical research is useful in this area as it can provide important implications for monetary policy decision-making. It is essential to know what tools are efficient in stimulating aggregate demand once the zero lower bound comes effective. Furthermore, it is also necessary to be familiar with the possible unintended consequences of these policies. According to [Eggertson et al., 2017] the interest rate channel of the transmission mechanism does not work anymore once the policy rate turns negative which is of course an undesired effect.

In line with keynesian economics, fiscal and monetary policy should smooth the cyclical movement of the economy, which means boosting aggregate demand during recessions. However, after 2008 an effective fiscal stimulus could not be implemented in countries with high debt ratios. So, the role of monetary policy has appreciated in a great extent and central banks introduced unprecedented policies, that might have altered the transmission mechanism, as [Eggertson et al., 2017] argue.

A further reason why the issue of negative interest rates is worth studying is that – as we mentioned in the beginning of this article – the overall effects of negative nominal rates on the economy is highly debated. Although, [Eggertson et al., 2017] analysis is convincing, others [Jobst and Lin, 2016] come to the conclusion that negative rates were efficient in stimulating aggregate demand. Albeit, the latter paper studies only the Euro Area. We strongly believe that a clarification is necessary in order to assess this tool of monetary policy and better understand the processes.

The fact that the Swiss GDP is near to its potential level at below 1 percent inflation and negative interest rates indicates that significant changes might have appeared and we are heading to a new era of low rates. The concept of the natural real interest rate and the potential output of course should be consistent. If the natural interest rate is above the actual rate monetary policy is stimulative, while it is considered to be tight if the natural rate of interest is lower than the actual rate. Studying the Euro Area, Germany and the United States Garnier and Wilhelmsen [2005] found that the natural real interest rate declined gradually in the eurozone and Germany but remained quite stable in the US during the reference period (1960s – 2000s). Considering these findings, it easily can be that the natural real interest rates declined further in the eurozone and also in Switzerland, and therefore macroeconomic stability can be reached at lower interest rates.

These assumptions provide a further reason to study negative interest rates. If lower rates or even negative rates are the new norm that definitely will have effects on the transmission of monetary policy and requires a new approach toward crisis management from central banks, since a major tool of monetary policy (interest rate cuts) may easily become ineffective in the new era of low rates.

REFERENCES

- Borio, C. - Zhu, H. (2008): Capital regulation, risk-taking and monetary policy: a missing link in the transmission mechanism? Bank for International Settlements, Basel, Working Paper No. 268
- Eggertson, G. B. - Juelsrud, R. E. - Wold, E. G. (2017): Are negative nominal interest rates expansionary? National Bureau of Economic Research, Working Paper 24039
- Garnier, J. - Wilhelmsen, B. J. (2005): The natural real interest rate and the output gap in the euro area, European Central Bank, Working Paper Series, No. 546., <https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp546.pdf?138eb74fc52db27cba6436b610546441>, Accessed: 13. 04. 2019.

- Jobst, A. – Lin, H. (2016): Negative Interest Rate Policy (NIRP): Implications for Monetary Transmission and Bank Profitability in the Euro Area, International Monetary Fund, Washington, D. C., IMF Working Paper 16/172
- Kutasi, G. (2018): *Van-e élet a negatív kamatok világában? - A svájci példa.* Ecomomania, <https://mnbtanszekeblog.hu/2018/01/08/van-e-élet-a-negatív-kamatok-világában/>, Accessed: 30. 03. 2019.
- Malkin, I. - Nechio, F. (2012): U.S. and Euro Area Monetary Policy by Regions, Federal Reserve Bank of San Francisco, Economic Letter, <https://www.frbsf.org/economic-research/publications/economic-letter/2012/february/us-europe-monetary-policy/>, Accessed: 12. 01. 2019.
- Mishkin, F. S. (1996): The Channels of Monetary Transmission: Lessons for Monetary Policy, National Bureau of Economic Research, Working Paper 5464, Cambridge, Massachusetts
- 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.* Vol. 23: 461-492.
- SNB (2019): Quarterly Bulletin 1/2019 March, Schweizerische Nationalbank, https://snb.ch/en/mmr/reference/quartbul_2019_1_komplett/source/quartbul_2019_1_komplett.en.pdf, Accessed: 07. 04. 2019.
- Varga, J. Z. (2016): “A bankközi likviditási többlet hatása a vállalati és bankközi kamatokra” *Pénzügyi Szemle.* 2016(1): 95-110.

DATASETS

<https://fred.stlouisfed.org/series/CHF3MTD156N#0>

<https://data.snb.ch/en/warehouse/BSTA#!facets>