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An Examination of Fisher Effect for Selected New EU Member States

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ABSTRACT: The relationship between interest rates and inflation which is called Fisher effect has been investigated in both theoretical and empirical economics in vast literature. The contribution of this paper to the literature is to test the Fisher effect for the selected four transition economies that are also new EU member states. The empirical analysis is conducted by allowing for a structural break that takes place in year 2004. In this study, a case-wise bootstrap approach empirical method which developed by Hatemi-J and Hacker (2005) is used and the results support a tax adjusted Fisher effect in the presence of a structural break.

Keywords: Fisher Effect; New EU Member States; Monetary Policy; Transition Economies.
JEL Classifications: E40; E43; E47; F36; P24

1. Introduction

The fisher effect hypothesis was formalized by Fisher (1930) and it states that a permanent change in the rate of expected inflation will cause an equal change in the nominal interest rate in the long run. Thereby, the real interest rate would remain unchanged in response to a monetary shock if the Fisher effect holds. In this long run relation, the Fisher effect hypothesis usually expressed as the sum of the ex-ante real interest rate and the expected inflation rate is equal to nominal interest rate.

The Fisher effect has been a widely accepted theoretical approach. Accordingly, numerous empirical analyses have been applied to test it and a variety of empirical techniques have been used for it. The evidence of these investigations has been mixed and the empirical results have been brought a debate for the validity of it. Some of these studies have been failed to find long term relation between expected inflation and nominal interest rate. However, the others have found the evidence of Fisher effect but also most of these findings are less than one-to-one relations. Among these rich empirical literature, modern debate might be traced back to Fama (1975), his evidence implied that real interest rates were essentially constant while nominal rates adjusted to any changes in expected inflation (Crowder and Sonora, 2002). By following Fama (1975), these pioneer studies have been looked over for our empirical research (Rose, 1988; Mishkin, 1992, 1995; Evans and Lewis, 1995; Crowder and Hoffman, 1996; Daniels et al., 1996; Lai, 1997; Lee et al., 1998; Koustas and Serletis, 1999; Lanne, 2001; Atkins and Coe, 2002; Hatemi-J, 2009, 2011; Acaravci et al., 2011).

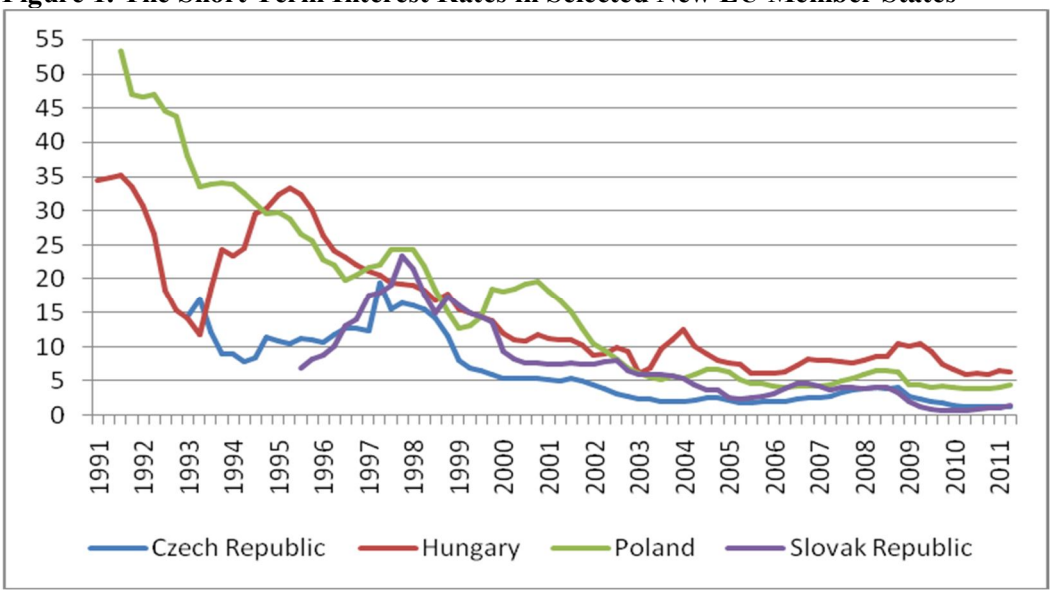
In testify of Fisher effect, a variety of empirical techniques has been used to test. However, an important reason of the studies given different results is different econometrics methods. Furthermore, the Fisher effect has been empirically investigated time and again for many countries include developed and developing countries, but also most of these investigations have been focused on the

developed countries. This study is an attempt to investigate four CEEC (Czech Republic, Hungary, Poland and Slovakia) which had a transition from central planned economy to market economy in the beginning of 1990s, and also being a member of EU in 2004. Therefore, a test of the long run relationship between nominal interest rate and inflation rate is important on understanding the effects of the monetary policy on interest rates. The existence of this relationship has important implications for policy makers, debtors and creditors.

Four CEEC which joined the EU in 2004 went through successful stabilization process, with low inflation and pressures for the nominal appreciation of domestic currencies, their central banks lowered short-term interest rates to historically low levels since the beginning of 1990s (Frait and Komarek, 2006).

The new EU member states from central and Eastern Europe are quite different from old EU member states in many important expect. It is generally known that these countries' financial systems, measured by total financial assets or stock market capitalization are much smaller relative to GDP than those of the old EU member states (Jarocinski, 2008). However, these countries have had important economic transmission since the beginning of 1990s. Figure 1 shows the development of short term interest rates of the selected New EU member states, namely of the Czech Republic, Hungary, Poland and Slovakia (EU4). There is a significant downward trend in all rates, with the exception of Polish rate during 2000 and Hungarian policy swings during 2003. The lowest rates have been usually seen in the Czech Republic during the period monitored.

Figure 1. The Short Term Interest Rates in Selected New EU Member States



Source: OECD

2. Theoretical Model and Data

The Fisher effect hypothesis maintains that the nominal interest rate is the sum of the constant real rate and the expected change in price levels. Therefore the Fisher Hypothesis can be stated as:

$i_{jt} = r_{jt} + \pi^{e}_{jt}$ (1)

Where i_{jt} is the nominal interest rate for country j at time t, r_{jt} is the real interest rate for country j at time t and π^{e}_{jt} is the expected inflation for country j at time t. Following the implications in literature (), we make the relatively weak assumption that ex-ante expected inflation rate and the actual inflation rate differ by a stationary, zero mean forecasting error term ε_{jt}.

$\pi^{e}_{jt} = \pi_{jt} + \varepsilon_{jt}$ (2)

Hence, we can write the Fisher equation as:

$i_{jt} = r_{jt} + \pi_{jt} + \varepsilon_{jt}$ (3)

Equation (3) indicates that changes in inflation should be reflected by equal changes in inflation rates when the real interest rate is assumed to be constant. Since i_{jt} and π_{jt} are observable, this equation basis on an empirical framework to test Fisher effect.

$$i_{jt} = \alpha_{jt} + \beta_j \pi_{jt} + \varepsilon_{jt} \quad (4)$$

In equation (4), α_{jt} capture the average real interest rate which is typically assumed to be constant for country j over time t and β_{jt} measures the existence of the Fisher effect. Under the strong evidence of Fisher effect the coefficient β_{jt} is equal to one, meaning that the nominal interest rate fully incorporates expected inflation. Darby (1975) emphasized that if β_{jt} is more than one, it means that nominal interest rate is taxed and Fisher effect hypothesis implies there is a more than one-to-one relation between the nominal interest rate and inflation. Hence, if after-tax real interest rates are constant, nominal (pre-tax) interest rates must rise more than one-for-one with increases in expected inflation (Woodward 1992).

The data used from OECD and monthly observations on short-term nominal interest rates and consumer price index (CPI) inflation. The sample cover the period 1993M1 to 2011M6 for Czech Republic, 1991M1 to 2011M7 for Hungary, 1991M1 t0 2011M7 for Poland and 1995M7 to 2011M7 for Slovak republic.

3. Empirical Results

By the following Hatemi-J (2011) and allowing a structural break, we define the following regression to investigate Fisher effect:

$$i_t = \alpha_1 + \alpha_2 D_t + \beta_1 \pi_{t+1} + \beta_2 \pi_{t+1} + u_t \quad (5)$$

In the equation (5), D_t is a dummy variable that is zero before the break and it is one after break ($t \geq 2004M5$) . u_t residual that can be homoscedastic or non-normal. The break point is chosen as 2004M5 because of the four countries joined to EU in that time.

Table 1. The Results based on the case-resampling bootstrap method

Country	Intercept (α_1)	Change in the intercept (α_2)	Slope (β_1)	Change in slope (β_2)
Czech Republic	2.286 (0.0000)	-0.579 (0.0000)	-4.831 (0.0002)	-5.010 (0.0128)
Hungary	3.173 (0.0000)	-1.173 (0.0000)	-1.032 (0.0000)	1.032 (0.0000)
Poland	3.217 (0.0000)	-0.965 (0.0000)	-6.513 (0.0000)	4.680 (0.8206)
Slovakia	3.245 (0.0000)	-0.396 (0.0011)	-3.279 (0.0060)	-8.748 (0.0000)

Note: The p-values are in the parentheses

Hatemi-J and Hacker (2005) suggested a bootstrap method that is robust to the presence of heteroscedastic and non-normal error term as well as structural breaks. In this study, the $\alpha_1, \alpha_2, \beta_1$ and β_2 coefficients have been estimated with bootstrap method by simulations are implemented through a module written in GAUSS programme by Hacker and Hatemi-J (2009).

The estimation results which are on Table 1 show that there is a significant brake in the intercept for each country. α_2 shows the negative and significant change in real interest rate, its mean that the real interest rate has been decreased in each country. Another result of the estimations is that there is also a statistically significant break in the slope of each country at %1 significance level.

4. Conclusion

This study investigates the Fisher effect in selected four EU member states which are, Czech Republic, Hungary, Poland and Slovak Republic. These countries have been experienced successful

economic transformation from central planned economy to market economy since the beginning of 1990s and being members of EU in 2004.

The Fisher effect has been testified for many countries with different econometric methods. We applied the new case-wise bootstrap method that also show the shifts in sample countries. In the beginning of 1990s, the transition countries had high nominal interest rates and also inflation rates. These countries have been experienced quite low interest rates and inflations on the EU membership process, while it compared the economic transformation time in the 1990s. The result of this study shows that Fisher effect for selected new EU member states are more than one. This value might be explained by the agreement regarding taxation of the interest income.

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