THE FISHER EFFECT AND ALBANIAN APPLICATION

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Abstract

This paper is discussing The Fisher effect. Firstly, there is going to be explained in brief the theory of the Fisher equation, an identity that links the nominal interest rate to expected inflation, named after Irving Fisher. After that, there will be given examples of applications in some countries and finally we tested whether it can be applied in Albanian economy or not. The examples of the countries studied generally support the Fisher effect. There are some countries where strong Fisher hypothesis takes place, which is a one-to-one relationship; it is seen in 16 countries. There are others where simple Fisher hypothesis is verified. As for Albania, data will be taken for a period of 15 years, 1995-2009. The data used are the actual inflation and the nominal interest rates, integrated in ex-post Fisher equation. Excel program has been used to elaborate the data, using data analysis and regression functions. The outcome is supportive to Fisher effect. There exists a relationship between inflation and interest rates in Albania. This relationship is strong but not a one-to-one as implied by Irving Fisher. In years 1996 and 1997 a political and social turmoil took place in Albania. This caused an abnormality in inflation trend and figures so that unnatural high two digit numbers of inflation were registered. This slight deviation in the trend of inflation leaves intact the relationship between inflation and interest rates. Nevertheless it has some effect, i.e. negative effect, on the strength of the relationship. As a conclusion, Fisher effect theory holds true for Albania as there exists a strong relationship between inflation and interest rates.

Keywords: *Fisher effect, nominal interest rate, Albania.*

Introduction

In this paper the relationship between expected or actual inflation and interest rates will be discussed and tested. Examples taken for a vast number of countries show the empirical support for this relationship, also known as the Fisher effect. Different periods and countries have been taken into account. Generally the theory holds true and the empirical evidence, supports the strong relationship between inflation, sometimes expected and other times actual inflation due to a lack of information, and interest rates.

Information of the countries taken into account has been mined out of several books and some of the most relevant studies in the Fisher effect area. Most of the examples are taken from secondary sources. The author main part is in finding and elaborating information about Albania and how it incorporates in the Fisher theory.

According to the data being studied, there exists a fairly strong relationship between actual inflation and nominal interest rates.

The degree to which nominal interest rates respond to the expected inflation rate, with no effect in the real interest rate, is an important issue for a number of relevant questions in economics (Bajo-Rubio O., et al, 2010). Fisher hypothesis suggests that there is a positive relationship between interest rates and expected inflation. Boudoukh (1994) argues that this positive relationship exists at all horizon lengths.

Moreover, Yuhn (1996) reported that the Fisher effect is strong over long horizons in USA, Japan and Germany, and that the presence of the Fisher effect can be seen in the short-run for Germany. Therefore, the results obtained by testing for the Fisher hypothesis might be influenced by the time horizon that has been selected. Beside this, Yuhn also found that the Fisher effect is not robust to policy regime changes.

Application in other countries and the following dilemma whether the empirical evidence supports the theory or not will be tested.

The last part will include conclusions and review of how the mechanism works in Albania. The data that is studied is a 15 year long data and is used in yearly terms. Albanian case is generally supportive to the theory of the Fisher effect.

Literature Review

In economics, market equilibrium occurs when the amount that people are willing to buy, better known as demand, equals the amount that people are willing to sell, known as supply, at a given price. Equilibrium is when supply and demand congregate. The price at that specific quantity is known as equilibrium price. The quantity at that specific price is known as equilibrium quantity. Market equilibrium is a dynamic variable which changes over time in response to different shocks either on demand or supply in economy.

Similarly, in the money market, equilibrium is achieved when the quantity of money demanded (Md) equals the quantity of money supplied (Ms) (Mishkin 2004):

$$Md = Ms \qquad (1)$$

Equilibrium interest rate, where demand for money meets supply for money, determines the price of money known as the interest rate. The demand for money is the amount of cash that people prefer to keep plus checking accounts. There are three main reasons why persons would like to keep the money instead of bonds, which determines the demand for money. These motives are:

To settle transactions, since money is the medium of exchange.

As a precautionary store of liquidity, in the event of unexpected need.

To reduce the risk of a portfolio of assets by including some money in the portfolio, since the value of money is very stable compared with that of stocks, bonds, or real estate. While for the supply of money there is a different discussion. The money supply is a fixed amount which is established by the Central Bank (CB) of every country. The CB interferes whenever there is a tendency for the inflation to rise or whenever there is a shortage of money supply in the market. Instruments for doing this are direct and indirect. The CB of every country is always monitoring the market in order to preserve the level of inflation and to prevent large depreciation of domestic currency.

It is called the interest rate at which the money is borrowed, it is also known as the price of money, or the opportunity cost of it. The nominal interest rate is the real interest rate, r added by inflation, π. The interest rate is the price of money, the interest that settles the equilibrium in the market between the demand for money, Md, and the supply of money, Ms. Lenders would require a nominal interest rate to recompense them for any possible loss in the purchasing power for the duration of the loan; such a loss represents the expected inflation rate.

The real interest rate, r is the real cost of borrowing money, and is given by subtracting inflation π to nominal interest rate i. This reflects more accurately the true cost of borrowing.

Real interest rate = nominal interest rate - inflation (expected or actual)

$$r = i - \pi \quad (2)$$

The real interest rate is the growth rate of purchasing power derived from an investment. By adjusting the nominal interest rate to compensate for inflation, you are keeping the purchasing power of a given level of capital constant over time.

For example, if you are earning 4% interest per year on the savings in your bank account, and inflation is currently 3% per year, then the real interest rate you are receiving is 1% (4% - 3% = 1%). The real value of your savings will only increase by 1% per year, when purchasing power is taken into consideration.

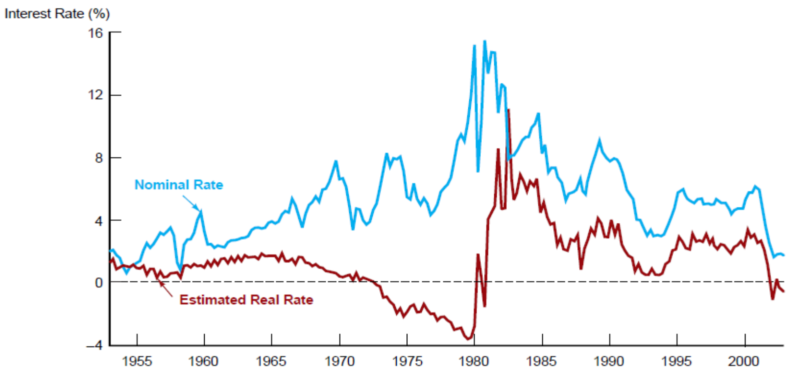

Figure 1: Nominal and real interest rates throughout the years 1955-2000 in US economy.

Source: Mishkin, p.125.

There is a distinction between interest rates according to the time they are discussed. When a borrower and a lender agree on nominal interest rate, they do not know what the inflation rate over the term of the loan will be. Therefore, a distinction must be made between real interest rate when agreement is made, called the ex-ante interest rate, and real interest actually realized, named ex-post real interest. Even though lenders and borrowers cannot predict future inflation, they have expectations. If πe is expected inflation ex-ante real interest rate is i - πe, and the ex-post real interest is i-π. It is clear that nominal interest rate cannot adjust to actual inflation, because actual inflation is not known at the time nominal interest rate is set. But it can adjust to expected inflation (Mankiw, 2007).

The Fisher effect, also named the Fisher hypothesis is defined as the one-for-one relation between the expected inflation rate and the nominal interest rate (Fisher, 1930).

“The Fisher equation is an identity that links the nominal interest rate, i, the real interest rate, r and the expected inflation rate, πe and π respectively. It can be used in ex-ante and ex-post analysis”(Horn, 2008). So there are two different versions depending on the type of information that is available.

If one can find information about the expected inflation and the nominal rate this would be the ex ante Fisher equation, which means that people adjust the cost of borrowing, or nominal rate as stated above to the expected inflation πe. Expected inflation, ex ante, is embodied in nominal interest rates. Investors want compensation for expected decreases in the purchasing power of their wealth.

The second type is the ex post Fisher equation, which decomposes the nominal interest rate, i into real interest rate, r and actual inflation rate, π. It is referring to this version later on this study when discussing about the Fisher effect. If investors feel that the prices of real goods will increase, better known as inflation, it will take increased interest rates to encourage them to place their funds in financial assets.

Mathematically the formula is:

$$i \approx ra + \pi e \Leftrightarrow ra \approx i - \pi e \text{ (ex ante)} \qquad (3)$$

and

$$i \approx r + \pi \Leftrightarrow r \approx i - \pi \text{ (ex post)} \quad (4)$$

Where:

i is the interest rate, i.e. the nominal interest rate.

r is the interest rate, i.e. the real interest rate.

ra is the actual interest rate.

πe is the expected inflation.

π is the inflation.

The actual Fisher Equation is:

$i = r + \pi + (r\pi)$ (5)

From this equation one can easily notice that a lender gets compensated for:

rent on money loaned, in this case real interest rate or r.

compensation for loss of purchasing power on the principal, in this case the inflation or π.

compensation for loss of purchasing power on the interest, in this case $r\pi$

From the equation it is shown that nominal interest rate can change for two reasons, either because real interest changes, or the inflation changes. The quantity theory of money shows that the rate of money growth determines the rate of inflation. If it is to be combined with the Fisher equation, money growth will affect nominal interest rate. Let's take an example to better understand how the lenders of the money, which in general are the investors and the financial institutions, modify or establish the nominal interest rate over their funds. Contract rate for: 1 year $1000 loan when the loan parties agree on a 3% rental rate for money and a 5% expected rate of inflation.

Table1: Example on how the lenders adjust interest rates to inflation

items to pay	calculation	amount $
principal		$1,000.00
rent on money	$1,000 x 3%	30.00
purchasing power loss on principal	$1,000 x 5%	50.00
purchasing power loss on interest	1,000 x 3% x 5%	1.50
total compensation		$1,081.50

The third term, i.e. purchasing power loss on interest, in the Fisher equation is a very small number almost equal to zero, so it is dropped in many applications. The resulting equation is referred to as the approximate Fisher equation and is the following $i = r + \pi$.

If inflation rises from a constant level for instance, 4% per year, to a constant level, say 8% per year, currency's interest rate would eventually increase to get to the level of the higher inflation, rising by 4 points from its initial level. These changes leave the real return on that currency unaffected. When expected inflation rises, the supply curve shifts to the right, and the demand curve shifts left. The equilibrium moves from point 1 to point 2, with the result that the equilibrium bond price falls from initial price P1 to final price P2 and the equilibrium interest raises from i1 to i2.

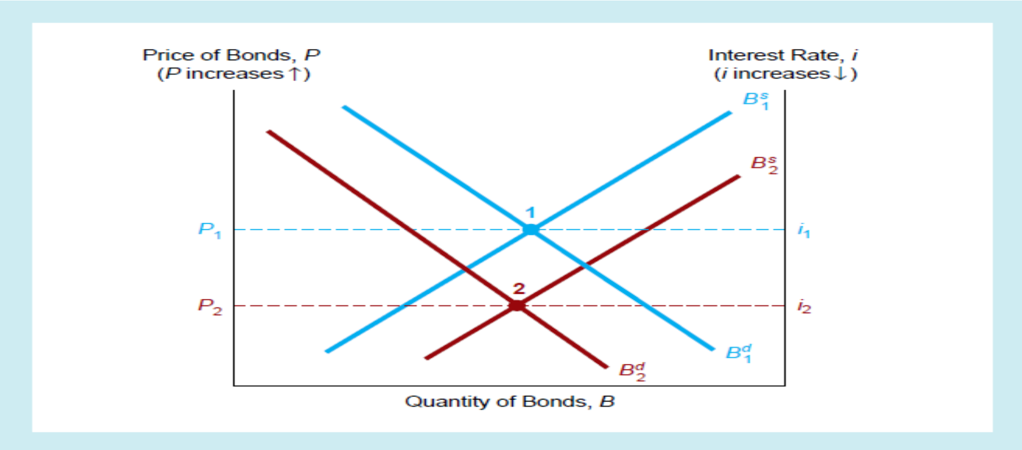

Figure 2: Example of the Fisher effect in bonds

Source: Mishkin, p.151.

The Fisher effect is evidence that in the long-run, purely monetary developments will have no effect on that country's relative prices, so when expected inflation rate increases, the nominal interest rates also increase, while the real interest rate stays the same.

In this part many countries are being studied. Data about inflation and interest rates have been taken in long periods to test the Fisher hypothesis. In many countries there exists the one-to-one relationship as implied by the theory. In some others there is just the weak form of the Fisher effect, where expected or actual inflation move in the same direction as interest rates, with the direction being from inflation to interest rates.

The Fisher equation has some interesting implications:

$$i \approx r + \pi$$

a. If $\pi = 0$, then i = r. In this case money is neither loosing nor gaining any value. Thus, the cost of holding money is equal to its opportunity cost, the real return on assets.

Under this condition r cannot be negative, as i $\geq$ 0

b. If $\pi > 0$, then $i > r$. For a positive inflation rate, nominal interest rates will always exceed real interest rates.

c. If $\pi < 0$, then $i < r$. For a negative inflation rate (= an expected deflation), real interest rates will always exceed nominal interest rates.

d. For a given i, the higher π, the lower r: $\frac{\delta r}{\delta \pi} = -1$

This case is particularly relevant if an economy is in a liquidity trap where i cannot be influenced by the central bank anymore. This is argued about Japan below.

Can Interest Rates Be Negative? The Case Of Japan

The answer is: nominal interest rates cannot be negative whereas real interest rates can.

The nominal interest rate, i is supposed not to be negative. If i was negative, holding money would be profitable. So it would be profitable to borrow infinite amounts of money and keep it until the end of agreement. But no individual or institution would agree to lend money under these circumstances.

Based on the definition of the cost of holding money: $i = r - (-\pi)$, it can also be concluded that holding money would be more attractive than investing in assets other than money:

If i was negative the cases would either be:

a negative real return on assets other than money: $r < 0$, or

a positive real return of holding money (that is a deflation): $(-\pi) > 0$), or

both

Nevertheless, there exists a rational explanation of negative nominal interest rates. If holding money was dangerous under some circumstances, or in some places, individuals would prefer to hold bonds or “pay a fee” in order to keep the money safe. This is a rational decision under some given conditions. A similar reason explains the occurrence of negative T-Bill rates in Japan in November 1998 where banks yielded an interest rate of -0.004% on their T-Bills because holding T-Bills was more convenient for them than holding cash.

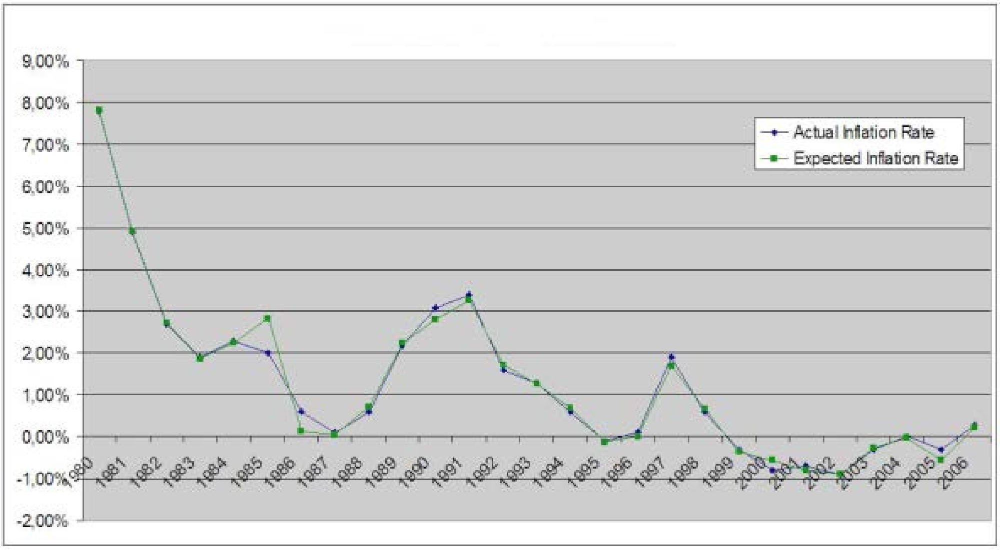

Figure 3: Annual inflation rates in Japan 1980-2006

Source: OECD Factbook 2007, http://caliban.sourceoecd.org/, accessed (20.09.2011).

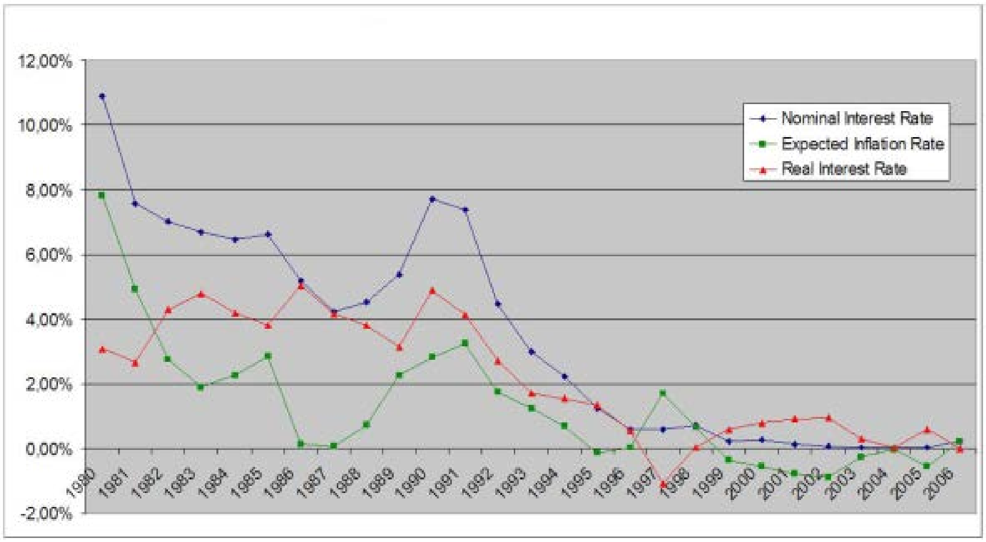

Figure 4: The Fisher effect in Japan

Source: Horn, p.13.

In Figure 3, it can be noticed that expected and actual inflation are very close and in the same trend. In figure 4, it is clear that the Fisher effect holds true for the case of Japan. Even though there are fluctuations the trend generally supports the strong relationship between inflation, either expected or actual inflation, and nominal interest rates.

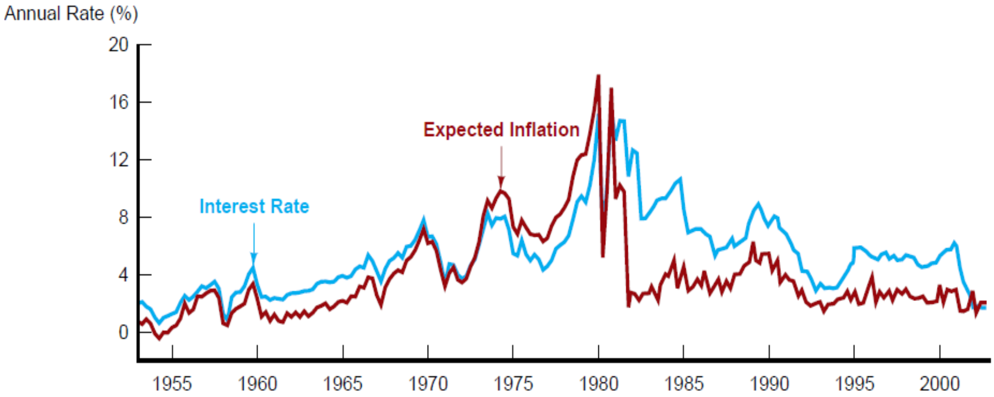

Figure 5: Movements of the inflation and interest rates in United States (1955-2000)

Source: Mishkin, p.152.

Here it can be understood the theoretical part that is explained above in a real life application. The data is taken in U.S. between years 1955 to 2000, and best represents how interest rates adapt to a change in inflation rates. The curve of inflation oscillates in a larger scale than the curve of the interest rates. Note that the curve of interest rates oscillates along with and according to the movement of the inflation.

As a conclusion to the figure 5, interest rates change with a change in inflation. This means that the data taken in these years that are being studied are in accordance with the theory, i.e. the Fisher effect.

In this part, it is provided an empirical test of the Fisher effect, where the existence of instabilities in the co integrating, or long run relationship is explicitly tested. The analysis is made in UK, for the period 1966-2007.

In the application, it will be taken to use data for the UK over the period 1966 - 2007. The data is taken from Organization for Economic Co-operation and Development (OECD, 2008). Specifically, series on long-term government bond yields/over 10-year/total, and the annual percentage change of the Gross Domestic Product (GDP) implicit price deflator (2003=100 is taken as base year, at market prices) are used, as proxies for the nominal long-term interest rate and the inflation rate, respectively. Ex-post real interest rate is computed as the difference between the interest rate and inflation series. The interest rate on long-term government bonds has been chosen because this is the most standard proxy for the long-term interest rate in empirical analyses of the Fisher effect. Further, using the GDP deflator is usually preferred to other alternatives, such as the Consumer Price Index

(CPI), since it is not based on a fixed basket of goods and services, so allowing changes in consumption patterns or the introduction of new goods and services to be reflected automatically in the inflation rate. Finally, the choice of the sample period is dictated by the availability of data on this proxy for the long-term real interest rate, which was not available before 1966. The time evolution of the three series is shown in

Figure 6.

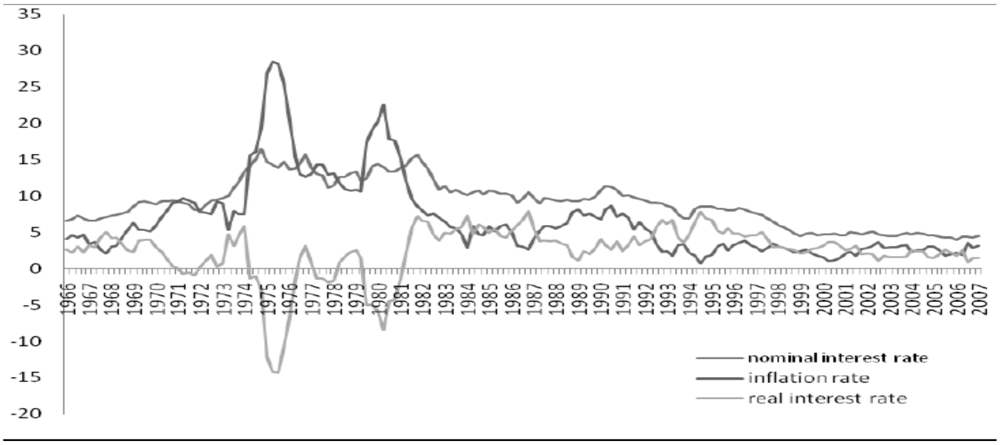

Figure 6: The rates of UK and inflation through the years 1996-2007

Source: Bajo-Rubio, et al., p.7.

Overall, the results of the study support the existence of a partial Fisher effect for the UK economy in the long run. Especially, for one point increase in inflation rate, one third of it would have been passed through to a higher nominal interest rate, with the remaining two third of it being reflected in a lower real interest rate.

This part will test if the Fisher hypothesis holds by analyzing a sample of 26 countries. The study will test if the long-run relationship between nominal interest rates and inflation rates is a one-to-one, taking into consideration the short run dynamics of interest rates (Berument an Mehdi Jelassi 2002).

This study is the most extensive study testing the Fisher hypothesis as far as the number of the countries that are incorporated is concerned. Engsted (1994) and Koustas and Sertelis (1999) are the most comprehensive studies as far as the numbers of countries are concerned. These studies consider 13 and 11 OECD countries respectively, for the testing of the Fisher hypothesis.

The basic equation that has been used to test the Fisher hypothesis is:

$it = \alpha + \beta\pi et$ (6)

Where it is the nominal interest rate at a given moment in time t, α is the real interest rate, and πet is the expected inflation for the period t. Here, β is the coefficient of inflation expected to be one as there is a one-to-one relationship between interest rates and the expected inflation, the strong form of the Fisher hypothesis. However, β is positive but not equal to one in its weak form. Tobin (1965) suggests that if money and capital are the only forms of wealth, when the opportunity cost of holding money increases due to higher inflation, money holding decreases and capital stock increases.

The list of the countries is shown in the Table 2. The interest rate taken into account is either the T-bill rate or the lending rate.

Table 2: List of 26 countries

Country	Interest rate used	Sample period
	Developed countries	
Belgium	Treasury bill rate	1957:04 1998:05
Canada	Treasury bill rate	1957:08 1998:05
Denmark	Treasury bill rate	1981:06 1988:12
Finland	Lending rate	1978:03 1998:04
France	Treasury bill rate	1966:03 1998:05
Germany	Treasury bill rate	1975:10 1998:05
Italy	Treasury bill rate	1977:07 1998:04
Japan	Lending rate	1957:05 1998:05
Korea	Lending rate	1981:01 1998:03
Switzerland	Treasury bill rate	1980:05 1998:05
UK	Treasury bill rate	1964:07 1998:05
USA	Treasury bill rate	1964:04 1998:05
	Developing countries	
Brazil	Treasury bill rate	1995:05 1998:03
Chile	Lending rate	1978:01 1998:05
Costa Rica	Lending rate	1982:05 1998:05
Egypt	Lending rate	1976:03 1998:04
Greece	Lending rate	1957:05 1998:05
India	Lending rate	1979:04 1998:01
Kuwait	Treasury bill rate	1979:08 1996:07
Mexico	Treasury bill rate	1978:04 1998:05
Morocco	Treasury bill rate	1978:08 1991:12
Philippines	Treasury bill rate	1982:01 1998:04
Turkey	Treasury bill rate	1985:12 1995:08
Uruguay	Lending rate	1980:04 1998:05
Venezuela	Lending rate	1984:07 1998:04
Zambia	Treasury bill rate	1985:02 1998:01

Source: Berument and Jelassi, p.3.

In this work, attention was focused on testing the strong version of the Fisher hypothesis: Does the nominal interest rate rise point-for-point with the expected inflation? This study finds supporting evidence for the strong version of the Fisher hypothesis in 16 out of 26 countries. The strong version of the Fisher hypothesis is also widely known as a one-to-one relationship. It is also likely that the Fisher hypothesis holds more for the developed countries than the developing ones in the sample. The strong version of the Fisher hypothesis could not be rejected for 9 out of 12 developed countries and for 7 out of 14 developing countries.

Albanian Application

In this part it will be studied whether the Fisher effect holds true for the economy in Albania. The years taken in consideration will be post 1990, because before the 1990's the economic system of Albania has been a controlled centralized economical system. This means that theories of free market economies do not hold.

The period of the study is 15 years [1995-2009], because of the data being more reliable in these years. There is unbalanced inflation in the late 1996 and completely 1997 because of the political and social disorders that happened at the time in Albania. Nonetheless, loan interest rate has also shifted upwards in order to follow the abnormality of inflation, leaving thus the Fisher theory intact. The following years after turmoil had finished, i.e. after 1997, normal economic activity took place and the data generally supports the Fisher effect. This will be explained in detail in the following figure 7 and table 3.

As an indicator for the interest rate it is taken a one to three year loan released from the banks. This is a consistent indicator of the loan because it is a middle term loan, therefore does not change considerably when there are temporary shocks in economic activity.

Inflation taken in consideration is the real inflation, due to lack or missing information about the expected inflation with reference to the years in which the study takes place. With this being said is implicitly understood that, consistent with the explanation in the theoretical part, the ex-post Fisher equation is being studied in our case.

Table 3: Database for regression analysis

Year	Actual Inflation	Loan Interest Rate	Real Estimated Interest Rate
1995	6.0	21	15.0
1996	17.4	28.8	11.4
1997	42.1	43	0.9
1998	8.7	25	16.3
1999	-1.0	25.8	26.8
2000	4.2	24	19.8
2001	3.5	11.9	8.4
2002	1.7	16	14.3
2003	3.3	10.5	7.2
2004	2.2	13.7	11.5
2005	2.0	12.2	10.1

2006	2.5	12.9	10.4
2007	3.1	11.7	8.7
2008	2.2	11.8	9.6
2009	3.7	12.5	8.7

Source: www.instat.gov.al, accessed on (20.09.2011).

INSTAT (Albanian Statistical Institute) publications, the annual change of Consumer Price Index (CPI) with 2007 as the base year.

These figures represent the actual inflation and the source of the information is INSTAT.

This is the ex post real interest rate calculated from the author: $r = i - \pi$

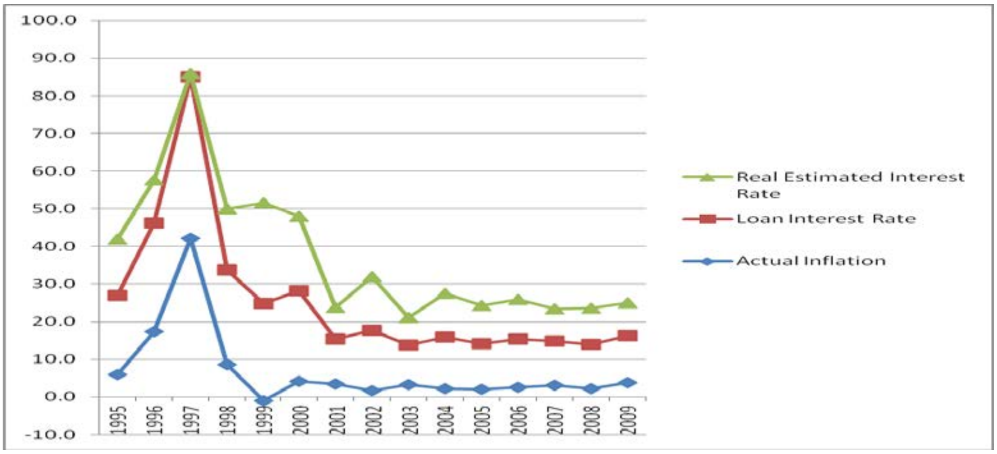

Figure 7: The graph of the curbs of inflation, nominal interest rate

Source: generated from INSTAT by author.

Following the graph as in figure 7, as well as the data in table 3, several conclusions can be drawn. According to the theory of Fisher, the ex-post application, nominal interest rate will increase due to an increase in actual inflation. This can be seen in Albanian case in the period being studied.

As seen in the graph, the Fisher effect theory generally holds true for Albanian economy through the years 1995-2009. The data has been processed with excel program. It has been analyzed the regression between inflation and interest rate.

Inflation is the independent value while interest rate is taken as dependent. According to the theory of Fisher there exists an almost equal change in interest rates whenever the expected inflation rate changes.

The outcome of the study as taken in excel is shown annex.

The Regression equation is:

$Y = \alpha + \beta X + e$ (7)

Where:

Y - is the depended variable, which is being predicted or explained, in this case the interest rates.

α - is the expected intercept parameter, equals the value of Y when the value of X=0.

β - is the expected slope, how much Y changes for each one-unit change in X.

X- is the independent or explanatory variable, in this case inflation.

e – is the error term; the error in predicting the value of Y, given the value of X (it is not displayed in most regression equations).

Conclusions that can be drowned from the regression analysis and ANOVA (table for analysis of variance) statistics.

The equation of regression between interest rates being the dependent variable and inflation rates being the independent variable is as follows:

$i = 13.9093639 + 0.71\pi$

Where i represents interest rates which are trying to be predicted or explained by π which represents inflation. The intercept would represent the value of interest rates if inflation was equal to 0, or there would be neither inflation nor deflation, as seen above in this paper in section 2.4.2, the case of Japan in page 11. In this case if there was neither inflation nor deflation and inflation was 0, the interest rate would be expected to be almost 14 %.

Slope in this case is 0.71; this would be understood as a level of correlation between variables. It extensively explains at what extent is inflation influencing interest rates. This result may be influenced at some level by abnormal inflation rates occurring in years 1996-97. In that time correlation between the two variables is surprisingly strong giving further support to the theory of Fisher, with hyperinflation taking place caused by political and social turmoil.

As for the statistical significance, t-statistics is going to be studied. t- statistics = 8.39, that is bigger than 5, it means that the b coefficient is statistically significant, furthermore, means that the independent variable or X, i.e. inflation, should be kept in the regression equation, since it has a statistically significant relationship with the dependent variable or interest rates.

Finally explanatory meanings of the statistics found will be tested. In this part how much of a variable inside the equation, i.e. the dependent variable or interest rates, can be explained by a change in the other variable i.e. independent variable or inflation. This is given statistically by R2 also known as determination coefficient. In this formula, R2 is equal to 0.681762648 >0.5. In this case only 68% of the change in interest rates can be explained by a change in inflation.

This concept can be easier to understand in this way; for every point increase in inflation, interest rates would increase by a multiplier of 0.68. What can be seen is that interest rates move slower but in the same direction as inflation. If there is a change in inflation, then according to the figures in Albania during this period of time, a change somewhat smaller in interest rates would be expected.

The value of F statistics used in ANOVA, also known as F ratio is important in regression analysis. Specifically, F statistics is used to test the hypothesis that the variation in the independent variables (the X's) explains a significant proportion of the variation in the dependent variable (Y). Thus, F statistics can be used to test the null hypothesis that all the regression coefficients are equal to zero against the alternative hypothesis that they are not all equal to zero. Null hypothesis is going to be accepted if F-statistics < F-table. In this case $\alpha=0.05$. There are 15 observations so $n = 15$. The F distribution for each level of statistical significance is defined in terms of 2 degree of freedom (df). These are $k - 1$ for the numerator and $n - k$ for the denominator. So when finding F-table value $k - 1 = 2-1 = 1$ must be taken for numerator and $n - k = 15 - 2 = 13$ for the denominator. The critical value of F from the table for 5 percent level of significance is F-table = 4.6672.

This value is smaller than F-statistics calculated from the equation. The rule was that null hypothesis were to be accepted if F-statistics < F-table. Since the calculated value of the F statistics of 27.85 exceeds the critical value of 4.67 for the F distribution with 1 and 13 df, it is rejected at the 5 percent level of significance the null hypothesis that there is no statistically significant relationship between the independent variable and the dependent variable (i.e. alternative hypothesis is accepted at the 5 percent level of significance that not all coefficients are equal to zero).

Conclusion

In this paper the relation between interest rates and inflation is tested. There are many countries in which the Fisher hypothesis finds support. In most of the cases there is strong evidence that there exists a positive relationship between inflation and interest rates. Direction is from inflation, which is the independent variable, to interest rates, being the dependent variable. In real life this means that the business and the traders as well as households tend to increase or decrease the interest rates in order to follow the changes in inflation, actual or expected likewise. If the business expects inflation to rise, this must mean that the yield of rented money in loans will decrease in real terms. So the money in rents and loans would lose its purchasing power, forcing the profit down. In response to this businesses would require a higher interest on loans in order to keep the profit level unchanged.

Albanian case also supports the Fisher effect theory. In this paper, Albanian economy in a fifteen year [1995-2009] period has been studied. Results show evidence proving the Fisher effect in those years as inflation causes at some extent the interest rates to move in the same direction. Nevertheless, there is not seen a one-to-one relationship as stated by the theory. After performing the regression analysis the relationship holds true. Even though a change in inflation generates a minor change in interest rates, the change in interest rates cannot be explained by the change in inflation but for only 68% of it.

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.825689196							
R Square	0.681762648							
Adjusted R Square	0.657282852							
Standard Error	5.358627486							
Observations	15							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	799.7100224	799.7100224	27.85001312	0.000149619			
Residual	13	373.293551	28.71488854					
Total	14	1173.003573						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	13.9093639	1.656751148	8.395566177	1.31321E-06	10.33017066	17.48856	10.33017	17.48856
X Variable 1	0.710292529	0.134593642	5.277311163	0.000149619	0.419520644	1.001064	0.419521	1.001064

Note: Regression analysis for the Albanian data between inflation and interest rate in years 1995-2009. Source INSTAT www.instat.gov.al, accessed (20.09.2011) and personal elaboration of the data.

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