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FISHER EFFECT IN INDONESIA : (FOR PERIOD 2006-2010)

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Abstrak

Penelitian ini dilakukan untuk mengetahui apakah Fisher effect berlaku di Indonesia. Menggunakan data inflasi dan suku bunga untuk periode 2006 sampai 2010, ditemukan bahwa terdapat hubungan antara tingkat inflasi dan suku bunga untuk periode per tahun dan bukan periode per bulan. Dari hasil ini diketahui bahwa harapan inflasi yang ditentukan pengalaman inflasi beberapa periode sebelumnya menentukan pembentukan suku bunga nominal. Selain itu penelitian ini menemukan adanya suku bunga riil yang negatif saat inflasi tinggi. Hasil ini menunjukkan bahwa inflasi yang tinggi ternyata tidak sepenuhnya diantisipasi oleh pasar. Tidak ada hubungan antara inflasi dan suku bunga periode per bulan dan adanya suku bunga negatif menunjukkan bahwa harapan inflasi, yang mempengaruhi bunga nominal, dibentuk dari pengalaman inflasi yang panjang.

Key words: Fisher effect, inflation rate, interest rate

1. Introduction

The theory of *loanable fund* explain that the interest rate is generated in the market as result of the interaction of supply and demand of loanable fund. Madura (2008) describe the elements of supply and demand for loanable fund in following equations:

$$D_A = D_h + D_d + D_g + D_f \text{ and } S_A = S_h + S_d + S_g + S_f \quad (1)$$

Where: D_A and S_A = total demand and supply for loanable fund

D_h and S_h = household demand and supply for loanable fund

D_g and S_g = government demand and supply for loanable fund

D_f and S_f = foreign demand and supply for loanable fund

In equilibrium, $D_A = S_A$. If the aggregate demand of loanable fund rise but the supply unchanged, there will be shortage of loanable fund. Furthermore, the interest rate will increase until the demand back. The situation will be same when demand is risen but supply still constant. On the contrary, if the supply for loanable fund rise but demand still constant as well as demand for loanable fund drop but supply constant, the interest rate will drop that is caused by excess supply for loanable fund.

There are many determinants that affect the demand and supply for loanable fund as well as interest rate. The change of economic growth, government budget, and foreign flow of fund will affect demand of loanable fund. On the other hand the monetary policy will affect the supply of loanable fund. Finally the change of expected inflation also will change the interest rate.

The change in inflationary expectation can affect interest rate by affecting the spending of household as well as business. Decision of spending affects the demand and also supply of loanable fund. Because the inflation causes the increase of demand but decrease supply, it make interest rate rise. The explanation for interest rate and inflation relationship was proposed firstly by Irving Fisher. He stated that the inflation, that will cause the drop of purchasing power of money, is anticipated in nominal interest rate calculation. The relationship between interest rate and inflation rate is often called *fisher effect*.

Fisher effect and evidences

Irving Fisher states that the movement of interest rate can be explained by the movement of expected inflation. Fisher proposed that nominal interest rate involved two components; first is compensating for the reduced saver's purchasing power and the second additional premium for going present consumption. The reduction of purchasing power existed cause by inflation and for going present consumption happened because of illiquid. Fisher proposed the *nominal interest rate* (i) as the premium for present consumption or *real interest rate* (i_R) and anticipated rate of inflation ($E\pi$). The nominal interest rate can be shown in the following equation:

$$i = i_R + E\pi \quad (2)$$

From equation above, it can be known that interest rate that reflect supply and demand for loanable fund is real interest rate. Furthermore, because inflation actually always exists in world, the borrower also always anticipate it by add amount of their expectation of inflation in the interest rate.

From equation 2 we can rearrange the *real interest rate* in equation 3 as nominal interest rate minus anticipated inflation.

$$i_R = i - E\pi \quad (3)$$

It must be remembered that the real interest rate is composed based on expected inflation. If actual inflation different than anticipated, the realization of real interest rate will different than calculation. When actual inflation higher than anticipated, the actual real interest rate relatively low. On the other hand, when the inflation below the anticipated, the real interest rate relatively high.

Cooray (2002) states that the relationship of inflation rate and interest rate was firstly studied by Irving Fisher in 1930. Irving Fisher studied the relationship between nominal interest rates and the rate of inflation for the U.S and the U.K. Using annual data in the period of 1890–1927 for the US, and period of 1820–1924 for the U.K, Fisher found that inflation rate is related to the nominal interest rate. He stated that the nominal interest rate was influenced by expected inflation rate that relate to the actual inflation several period before. However, Fisher explained that expectations were not instantaneously reflected in interest rates. The relationship was found using distribution lag structure. For the US, the highest correlation, 0.86, between long-term interest rates and price changes was found when inflation was lagged over 20 years, while for the UK, a correlation coefficient of 0.98 was obtained when inflation was lagged over 28 years.

Blanchard (2009) compares the inflation rate and T-bill rate in US in period 1925 to 2006 shows that steady increase of inflation in 1960s to early 1980s was associated by increase of interest rate. The decreasing of inflation since the mid-1980s has been also associated by drop of interest rate.

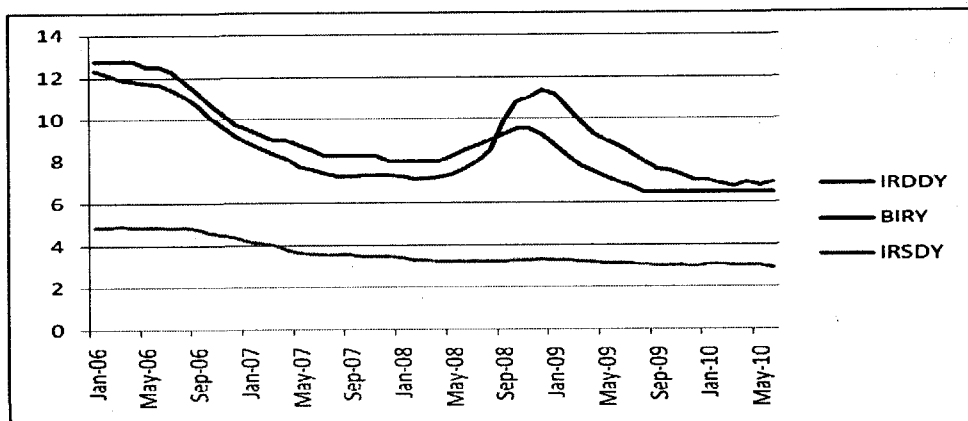
Cooray (2002) survey the literature studied to the Fisher effect. Cooray concluded that majority of early studies on the Fisher effect confirmed Fisher's findings for inflation and interest rate relationship. The studies for the US found a positive relationship between interest rates and inflation. On the other hand, results for other developed nations are not so clear-cut. Cooray also conclude that studies for the developing nations in the Latin American found significant evidence of a Fisher effect. However, the study for other developing countries did not observe evidences of Fisher effect relation.

Utami and Inanga (2002) from their study for international fisher effect in Indonesia (as home country) and US, Japan, UK, and Singapore as foreign countries, in period 2003 to 2008, find there is positive relation of inflation differential between home country to foreign countries to interest rate differential between them. The study concluded there was international fisher effect in that period in Indonesia. When inflation differential increase between countries, the interest rate differential between home to foreign countries also up.

The relationship among BI-rate, interest rate for demand deposit, and interest rate for saving deposit.

The montly BI-rate (BIR), monthly interest rate for 1 month demand deposit (IRDD), and montly interest rate for saving deposit (IRSD) in period January 2006 to June 2010 are shown in figure 1. The data in figure 1 is the rate of interest per year of BIR, IRDD, and IR-SD.

Figure 1
Interest rate for 1 month demand deposit, saving deposit, and BI-rate



Sources: Bank Indonesia

The IRDD moves relatively same as BIR. They down gradually from early first semester of 2006 until the early second semester of 2008 in the rate of nearly 13 to 7. Furthermore, They up sharply until the mid of 2009 to the rate of 9 and 11. After the mid of 2009, the BIR and IRDD down to the level nearly 7. Furthermore, the IRSD also droop gradually from 2006 to 2010 in the rate of nearly 5 to 3. The relation of among interest rates also can be shown in table 1 that shows the correlation among the BIR, IRDD, and IRSD.

Table 1

Correlations: IRDD, IRSD, BIR		
	IR-DD	IR-SD
IR-SD	0.714	
	0.000	
BI Rate	0.836	0.931
	0.000	0.000
Cell Contents: Pearson correlation		
P-Value		

The correlation between BIR and IRDD is 0.833 as well as BIR and IRSD is 0.930. The degree of the relation is also shown by the value of the P-value of correlation. The correlation between IRSD and IRDD, 0.74, also shows the high relation between them. From the figure 1 and table 1 above, it can be seen that BI-rate, demand deposit, and saving deposit relate each other. Because the interest rate for demand deposit and saving deposit correlate each other lower than their correlation to BI-rate, this study use BI-rate to represent all interest rate.

The relationship between inflation rate and interest rate

The relationship among inflation rate and interest rate will be discussed in this section. The inflation rate per month (π_{tm}) in figure 2 is the different between aggregate price level in current month (P_t) and previous month (P_{t-1}). The value of inflation rate can be written as:

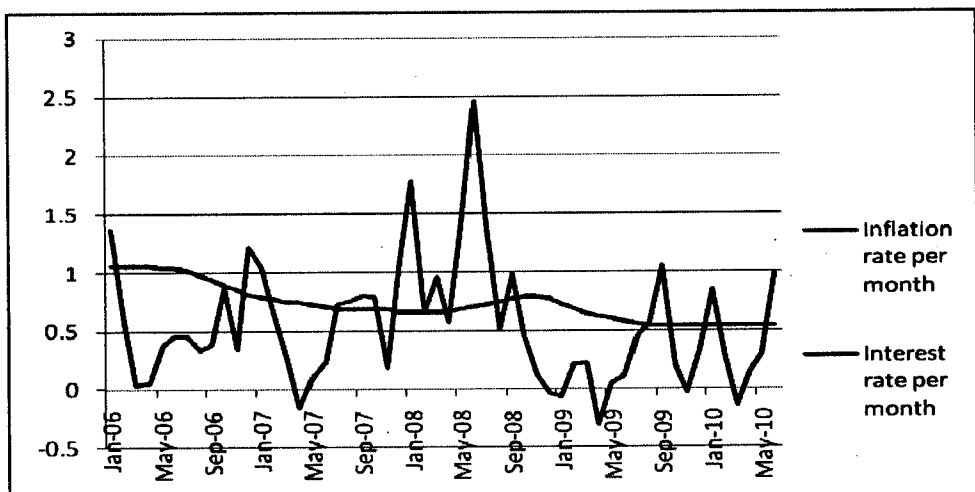
$$\pi_{tm} = \frac{P_t - P_{t-1}}{P_{t-1}} \times 100 \quad (4)$$

The interest rate per month (IR_{tm}) is formed by divided BI-rate per year (BIR) to 12. The value of interest rate per month can be written in the following equation:

$$IR_{tm} = \frac{BIR}{12} \quad (5)$$

Using montly data, the relationship between IR_{tm} and π_{tm} cannot be shown by figure 2. The π_{tm} move in high amplitude bud the IR_{tm} move more stable. The highest of π_{tm} reach nearly 2.5 percent per month in June 2008 but IR_{tm} still low. On the contrary, when π_{tm} down nearly zero in early period of 2006 as well as the last period of 2008 and early period of 2009, the IR_{tm} higher than June 2008.

Figure 2
Monthly inflation rate and interest rate per month



Sources: Bank Indonesia, BPS

Table 2

Correlations: Inflation rate, Interest rate

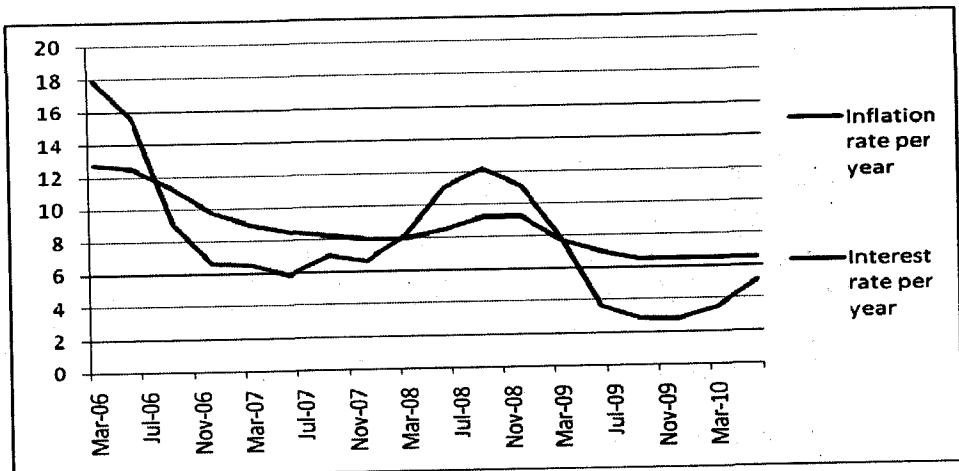
Pearson correlation of Inflation rate and Interest rate = 0.029
P-Value = 0.834

The relation of IR_{tm} to π_{tm} can be seen in table 2. There are no significant correlation between IR_{tm} to π_{tm} . The correlation nearly zero, 0.029, show there is not significant relationship between them.

Although Although it is no correlation between inflation and interest rate when use the data of IR_{tm} and π_{tm} per month, figure 3 show other fact. Using same period, January 2006 to June 2010, the figure show positive relation between inflation rate per year and interest rate per year. The inflation rate in figure 3 is quarterly data of differences of price level in current year (t), P_{tY} , to price level in one year before (t-1), P_{t-1Y} , divided by P_{t-1Y} . Furthermore, the interest rate is the quarterly interest rate per year (IR). The inflation rate per year (π_{tY}) can be calculated in following equation.

$$\pi_{tY} = \frac{P_{tY} - P_{t-1Y}}{P_{t-1Y}} 100 \quad (7)$$

Figure 3
Quarterly interest rate and inflation rate per year



Sources: Bank Indonesia, BPS

In figure 3, it can be seen the relation between IR and π_{TY} . The quarterly inflation rate for one year (π_{TY}) move together with interest rate. When price level in March 2006 is 18 percent higher than price level in March 2005, the IR is high, 12 and 13 percent a year. After march 2006, The π_{TY} sharply down to nearly 6 percent, however IR decrease more slowly than inflation. When π_{TY} sharply up from 8 percent in March 2008 to 12 percent in November 2008 as well as sharply down to 4 percent in July 2008, the IR also down but in lower rate of decreasing.

Table 3

Correlations: Inflation rate and Interest rate

Pearson correlation of Inflation rate and Interest rate = 0.871
P-Value = 0.000

The relationship between IR and π_{TY} also explain by highest degree of coefficient correlation between them, 0.871. The value of P-value, 0.000, give the evidence that the interest rate per year have significant relationship to inflation rate per year.

The case of negative real interest rate

In figure 4 shows that IR above π_{TY} when inflation rate is low but below it when inflation rate is high. On the other hand, in the figure 4 and also the table 3, it can be seen that IR will go up when π_{TY} up and down when π_{TY} decrease. However, the IR up and down always below the π_{TY} fluctuation.

The situation above makes real interest rate per year (IRR) sometime in negative value. Figure 5 shows the movement of π_{TY} and IRR. The IRR is stable in average 2 until 4 percent when inflation stable in 3 until 6 percent. When π_{TY} up to the level nearly 10 percent, the IRR down to the zero level.

Figure 5: BI rate minus inflation rate

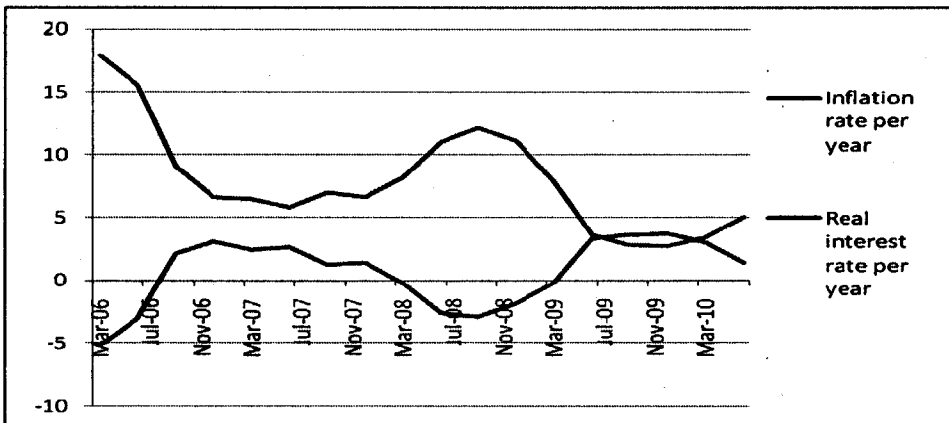


Table 4

Correlations: Inflation, real

Pearson correlation of Inflation rate and IRR = -0.938
P-Value = 0.000

The correlation coefficient between π_{1Y} and IRR is shown in table 4. There are significant negative value of correlation coefficient, -0.938, between them.

Conclusion

This study finds the relationship of nominal interest rate and inflation rate in Indonesia for period 2006 to 2010. Although the relation between interest rate per month to inflation rate per month is not found, the high relationship between interest rate per year and inflation rate per year is obtained. Based on Fisher hypothesis, this evidence shows that expectation of inflation that influence nominal interest rate is composed based on the series of inflation in previous period but is not formed based on only the inflation a month before. This study confirm Fisher hypothesis that nominal interest rate is influenced by expected inflation.

This study also find that the negative relationship between inflation rate and real interest rate. The correlation, -0.938, is higher than the correlation between inflation rate and nominal interest rate, 0.871. The evidences show that although the long term inflation rate are anticipated in calculation of nominal interest rate, it is still not fully anticipated all movement of inflation rate, especially unanticipated high level of inflation rate. The negative real interest rate shows the evidence of unanticipated high level of inflation rate. The anticipated real interest rate that reflect supply and demand for loanable fund will same as actual real interest rate when actual inflation rate same as anticipated.

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