The Contribution of Inflation to the Level and the Variability of Nominal Interest Rates: Some Multi-Country Evidence

By Markus J. Granziol and Anna Holzgang

1. Introduction

The Fisher hypothesis, which states that the nominal interest rate changes point-for-point with expected inflation, leaving the ex ante real rate unaffected, has been investigated in a large number of theoretical and empirical studies. However, most empirical studies concentrate on a single country (typically the United States), and investigate the Fisher hypothesis in a time-series framework, e.g. by regressing the nominal interest rate on a constant and (a "proxy variable" for) the expected inflation rate and testing whether the slope coefficient deviates significantly from plus one. Although some studies extend the empirical analysis to several countries, they typically concentrate on the few major industrial nations without leaving the above-sketched time-series framework.

This paper contributes to the “Fisher literature” by proposing a cross-sectional framework for investigating the relationship between interest rates and inflation rates and for testing empirically the model’s main implications. In particular, the following propositions are derived and tested:

- Countries with a high (low) average inflation rate tend to have a high (low) average nominal interest rate.

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2 A recent example is Summers (1983, 1986). Some studies investigate the Fisher hypothesis in an instrumental variable or two-stage regression framework (see e.g. Granziol (1985)). In particular, the first step is usually a regression of the realized inflation rate on ex ante known variables which are assumed not to be correlated with the real rate. Such a first step regression corresponds directly to the construction of a proxy variable for expected inflation.

3 Examples are Schelbert/Granziol (1983) or Granziol (1985).

4 The studies on the equality of real rates across countries e.g. Mishkin (1984), Granziol/Schelbert (1983), Cumby/Mishkin (1984), Merrick/Saunders (1986), Gaab/Granziol/Horner (1986), of course also provide some information on the multi-country implications of the Fisher hypothesis. To be more specific, under real rate equivalence the sole reason for differences in the nominal interest rate level (or variability) across countries is differences in inflation rate expectations (or the variability of such expectations). As mentioned above, the available studies, however, typically concentrate on a very few countries and usually use a time-series two-country framework (see e.g. Merrick/Saunders (1986) or Gaab et al (1986)), while no direct cross-sectional regression approach is known to the authors. A disadvantage of the two-country framework is that it requires – as any time series investigation – high-quality data; inflation rate and interest rate data series should correspond exactly. Moreover, errors in the data may considerably affect the results. We suppose, however, that our procedure, which does not directly relate time-series but instead uses only the average and variance estimate from each time-series, is much more robust with respect to such data problems.
Countries with highly variable (expected) inflation rates also exhibit high nominal interest rate variability.

The paper is organized as follows: we shall first derive the theoretical and statistical model (section 2). The construction of the cross-sectional data and the empirical results are given in section 3. The main results are summarized in section 4.

2. Framework

2.1. The economic model

In this section we first derive a relationship between the average nominal interest rate and the average inflation rate and the average ex ante real rate. Thereafter, we shall investigate the relationship between the variance of the nominal interest rate and the variance of the expected inflation rate and the real rate.

According to Irving Fisher (1930), the nominal interest rate of a one-period bond can be expressed as the sum of two independent components: an expected real rate of return and an expected inflation rate. The independence of expected inflation and the real ex ante interest rate may be justified by the quantity theory, which suggests that expected real rates are determined by real factors, such as productivity of capital, investors' time preferences and tastes for risk, which are not related to pure monetary phenomena such as inflation.

Assuming that expectations are formed "rationally", the relationship between the nominal interest rate, the expected inflation rate and real interest rate can be stated formally as

\[ i_t = E(p_{t+1}|I_t) + r_t \quad t = \ldots, -1, 0, 1, \ldots \]  

where \( i_t \) signifies the one-period nominal interest rate set at time \( t \), \( p_{t+1} \) the inflation rate to be realized in the period \( t \) to \( t+1 \), \( r_t \) the ex ante real rate, \( I_t \) the set of information available to investors and \( E \) the mathematical expectation operator.

By virtue of the rational expectations assumption the unconditional expectation of the inflation rate equals the mean of the markets inflation rate expectations, i.e.

\[ E(E(p_{t+1}|I_t)) = E(p_{t+1}) . \]  

5 For the sake of simplicity, we ignore taxation problems, as discussed e.g. by Darby (1975), Feldstein (1976), Tanzi (1976), Dwyer (1981), Nielson (1981) and, recently, by Dewald (1986) and Hansson/Stuart (1986). The taxation of the purely nominal component of interest income means that nominal yields must rise by more than the expected rate of inflation if the after-tax real return is to be unaffected. The precise amount by which nominal yields must rise is, as shown by Dewald, difficult to determine theoretically. However, it appears likely to be less than the \( 1/(1 - t) \) basis points per basis point of expected inflation predicted by Darby (where \( t \) is the marginal tax rate of the marginal bondholder).
Taking (unconditional) expected values on both sides of eq. (1) thus leads to eq. (3), i.e.

\[ E(i_t) = E(p_{t+1}) + E(r_t). \]  

(3)

Therefore, the “level” of the nominal interest rate - defined here as the unconditional expected value of the nominal interest rate - equals the inflation rate “level” plus the ex ante real rate “level”. Note that if inflation, the real ex ante rate and the nominal interest rate are - as the empirical analysis will assume - covariance stationary stochastic processes, then the unconditional mean or expected value of each variable is by definition constant across time, and it can be estimated consistently by the respective sample average. Thus eq. (3) can also be interpreted as a relationship between the average nominal interest rate, the average inflation rate and the average ex ante real rate.

Taking the Fisherian view of the world which suggests that the expected inflation rate and the ex ante real rate are independent, the variance of the nominal interest rate can be stated simply as the sum of the variances of the ex ante real rate and the expected inflation rate, i.e.

\[ \text{VAR}(i_t) = \text{VAR}(E(p_{t+1}|I_t)) + \text{VAR}(r_t). \]  

(4)

By defining \( x_t \) as the percentage of the inflation variance which can be predicted on the basis of the available information, i.e.

\[ x_t = \frac{\text{VAR}(E(p_{t+1}|I_t))}{\text{VAR}(p_{t+1})}, \]  

(5)

eq. (4) can be restated conveniently as eq. (6):

\[ \text{VAR}(i_t) = \text{VAR}(p_{t+1})x_t + \text{VAR}(r_t). \]  

(6)

Both eq. (6) and eq. (4) state that nominal interest rate variance equals the inflation rate variance, to the degree that the inflation rate can be predicted, plus the real rate variance. Eqs. (3) and (6) are the main building blocks of the cross-sectional considerations discussed in the sub-section 2.2.

Before we proceed, we would like to emphasize that if we dropped the rather restrictive Fisherian assumption of independent ex ante real rates and expected inflation rates, then eq. (3) would still apply. The Fisherian view of the world sketched at the beginning of this section implies that the two variables on the right hand side of eq. (1) are independent - an implication which is, however, not needed in order to derive the relationship between the average inflation rate and the average nominal interest rate stated in eq. (3). On the other hand, if we would relax the Fisherian independence assumption, then eq. (4) und thus eq. (6) would have to be modified. In particular, the covariance between the ex ante real rate and the expected inflation rate would have to be added to the right hand
side of both equations, thus, so to speak, weakening the relationship between the nominal interest variance and the inflation rate variance.

2.2 The statistical model

It is convenient to simplify the notation in eqs. (3) and (6) by dropping the time index \( t \) – an appropriate step, since (as we indicated above) the empirical analysis will assume that all considered variables are covariance stationary processes (implying that the unconditional expectations and variances are constant across time) and that the fraction of the variance of the inflation rate, which is predictable, is also a constant:

\[
E(i) = E(p) + E(r) \quad (3b)
\]
\[
\text{VAR}(i) = \text{VAR}(p)x + \text{VAR}(r). \quad (6b)
\]

Eqs. (3b) and (6b) should hold for any country. We may thus in a multi-country and cross-sectional sense interpret the mean value of the nominal interest rate, the mean value of the real ex ante rate and the mean value of the inflation rate as well as the variance terms in eq. (6b) as jointly distributed “random variables” where each country provides a single observation of each variable and where for each country’s set of observations eqs. (3b) and (6b) should apply.

More formally, we assume that each country’s \( E(i), E(r), E(p), \text{VAR}(i), \text{VAR}(r) \) and \( \text{VAR}(p)x \) are realizations of jointly normally distributed random variables designated by the respective (simplified) symbols \( EI, ER, EP, VI, VR \) and \( VPx \).

We restate eqs. (3b) and (6b) by substituting the respective random variables, i.e.

\[
EI = EP + ER \quad (3c)
\]
\[
VI = VPx + VR, \quad (6c)
\]

and, with reference to the Fisher hypothesis and the quantity theory, we assume that \( EP \) is not correlated with \( ER \) and that \( VPx \) is not related to \( VR \) respectively.

Eqs. (3c) and (6c) suggest that in a multi-country, cross-sectional sense the mean value of (the variance of) the nominal interest rate changes point-for-point with the mean value of the inflation rate (the expected inflation rate variance), leaving the mean value of the real rate (the real rate variance) unaffected.

Since the real ex ante rate is, however, not observable, eqs. (3c) and (6c) cannot be tested directly. Instead, we must restrict the analysis to nominal interest rates and inflation rates, where expected values and variance terms can be estimated, and implications from eqs. (3c) and (6c) can be tested in an empirical manner. Therefore, we shall consider the following two cross-sectional linear least squares regression functions:

\[
L(EI|1, EP) = a_0 + a_1 EP \quad (7)
\]
\[
L(VI|1, VPx) = b_0 + b_1 VPx \quad (8)
\]
where $L$ denotes the linear least squares regression operator, and $a_0$, $a_1$, $b_0$ and $b_1$ are the respective regression coefficients defined as

$$
a_0 = E(EI) - a_1 E(EP) \quad b_0 = E(VI) - b_1 E(VPx)
$$

$$
a_1 = \frac{COV(EI, EP)}{VAR(EP)} \quad b_1 = \frac{COV(VI, VPx)}{VAR(VPx)}
$$

where COV means covariance operator.

We also explicitly state the definition of the coefficients of determination ($R^2$) which refer to the regression eqs. (7) and (8):

$$
R^2_{eq. (7)} = (a_1)^2 \frac{VAR(EP)}{VAR(EI)}
$$

$$
R^2_{eq. (8)} = (b_1)^2 \frac{VAR(VPx)}{VAR(VI)}
$$

As can easily be verified, the assumption that $EP$ is not correlated with $ER$ implies $COV(EI, EP) = VAR(EP)$ and the assumption that $VR$ is not correlated with $VPx$ implies $COV(VI, VPx) = VAR(VPx)$. Thus the following one-for-one correspondence restrictions follow:

$$
a_1 = b_1 = 1
$$

Given data on $EI$, $EP$, $VPx$ and $VI$, these restrictions and thus eqs. (3c) and (6c) can be tested empirically.

Since the variables $ER$ and $VR$ reflect differences in ex ante real rates across countries which degenerate to constants if ex ante real rates are equalized across countries, our simple regression framework also allows us to investigate multi-country inequalities of ex ante real rates. To be more specific, using the $a_1 = b_1 = 1$ restrictions and the assumption that $EP$ and $ER$ as well as $VPx$ and $VR$ are not correlated, the above coefficients of determination can be stated as

$$
R^2_{eq. (7)} = \frac{VAR(EP)}{VAR(EI)} \frac{VAR(EP)}{VAR(ER) + VAR(EP)}
$$

$$
R^2_{eq. (8)} = \frac{VAR(VPx)}{VAR(VI)} \frac{VAR(VPx)}{VAR(VPx) + VAR(VR)}
$$

The $R^2_{eq. (7)}$ thus directly measures the proportion of (cross-sectional) variation in nominal interest rate levels due to variation in inflation rate levels. In the limiting case where inflation is the only reason for different nominal interest rate levels — as would be the case if ex ante real rates were equal across countries — the $R^2_{eq. (7)}$ reaches 1. A low $R^2_{eq. (7)}$, on the other hand, would indicate that $VAR(ER)$ is large (compared with $VAR(EP)$), meaning that ex ante real rate levels differ
considerably across countries and that such differences are an important factor for explaining cross-country differences in nominal interest rate levels.

Similarly, the $R^2_{eq.(8)}$ measures the proportion of (cross-sectional) variation in $V\chi$ due to variation in $VP\chi$. Hence, the more the expected inflation rate variability relative to ex ante real rate variability matters for explaining cross-sectional variation of nominal interest rate variances, the higher the $R^2_{eq.(8)}$ is. Again, in the limiting case of equal ex ante real rates across countries, all countries exhibit the same ex ante real rate variance implying that $VAR(VR)$ is zero, and thus an $R^2_{eq.(8)}$ equal to 1.

It might be interesting to note that the derived regression model of the average inflation rates and the average nominal interest rates depends less on the Fisherian view of the world discussed in section 2.1 than the derived regression relationship between the inflation rate variance and interest rate variance. In particular, we might interpret the mean ex ante real rate as approximately reflecting the long-run equilibrium real rate in the respective country, and the mean inflation rate might be considered as the corresponding long-run inflation rate. Assuming that $ER$ and $EP$ in eq. (3 c) are uncorrected could then be justified within a more general economic framework than the Fisherian model. By way of contrast, in order to derive the regression relationship between the variance of the nominal interest rate and the variance of the expected inflation rate the assumption that ex ante real rates and expected inflation rates are strictly independent was already used to derive eq. (6) and thus eq. (6 c). Moreover, unless one accepts the Fisherian view of the world, it is difficult to imagine a framework suggesting that $VP\chi$ and $VR$ are not correlated.

3. Empirical analysis

3.1 Strategy of estimating the cross-sectional data

We assume that in each of the countries under consideration the observed inflation rates and nominal interest rates are realizations of covariance stationary stochastic processes. Covariance stationarity implies that the unconditional statistical expectation and variance of $i_t$ and $p_t$ are constant across time. Thus for each country $E(i), E(p), VAR(i)$ and $VAR(p)$ can be estimated from available historical time-series. Moreover, the above stated stationarity assumption also implies that $E(i), E(p), VAR(i)$ and $VAR(p)$ can be estimated using data sampled from time periods which do not overlap exactly or from time series which contain missing observations – as is the case for some of the interest rate series.

In contrast to the interest rate data, the available consumer price indices do not contain missing observations; simple time-series procedures can thus be used for estimating the x’s. To be more specific, regarding the x’s we shall proceed as follows: for each country’s inflation process an ARIMA-process is identified
and estimated using the Box-Jenkins method. The coefficient of determination, which measures the proportion of the estimated inflation rate variance explained by the model, is then used as an estimate of the respective \( x \)-value.\(^6\)^7

3.2 The source of the time-series data and the cross-sectional data estimates

The empirical analysis uses quarterly data of twenty-four countries; the country sample includes all major industrial countries plus a number of important developing countries where data were available. The data concentrate on the period starting with the first quarter of 1972 and ending with the last quarter of 1986. The original interest rate and consumer price index data are taken from IFS-statistics (line 60 b and 64). The interest rate data are quarterly averages of call money rates (used as proxy variables for three-month rates). The decision to use call money rates was motivated by data availability considerations and the observation that call money markets are generally highly liquid and less subject to direct government intervention than treasury bill markets (outside the US and Canada). All inflation and interest rate data were transformed into continuously compounded rates defined per annum.\(^8\) The average values of the inflation rates and nominal interest rates in all countries under consideration, the respective variance estimates and the \( x \)-estimates, as well as the list of the countries included in the sample and the respective data sample periods are given in Table 1.

\(^6\) One might object that in order to predict future inflation, the (rational) market participant uses more information than just past inflation rates and is thus able to predict more inflation variation than is possible just on the basis of past inflation rates. Following this line of argument, estimating the \( x \)'s by the coefficient of determination of univariate time series models produces downward biased \( x \)-estimates. On the other hand, estimation of the time-series model uses sample information, i.e. the time-series model which "fits" best is chosen. If the time-series is short or if the underlying process is not strictly covariance stationary, the coefficient of determination tends to overestimate the variance proportion which is ex ante predictable on the basis of the most recent inflation rates.

\(^7\) In order to investigate whether the use of ARMA-models for constructing the \( x \)-estimates affects the results of the cross-sectional regressions, we also experimented with other methods for estimating the \( x \)'s. For example, we also used the coefficients of determination of simple ordinary least squares regressions of the inflation rates on eight lagged values plus the constant 1. However, the results of the cross-sectional regression analysis were very similar to those obtained by using the "ARIMA-\( x \)-estimates".

\(^8\) The IFS interest rate data \( z(t) \) were transformed to continuously compounded rates per annum according to \( 4 \ln(1 + z(t)/400) \). The IFS consumer prices \( P(t) \) were transformed to inflation rate data according to \( 4(\ln P(t) - \ln P(t-1)) \).
3.3 Regression Results

We estimated the cross-sectional regressions (7) and (8) using the data of all the countries considered and for two subgroups: industrial countries and developing countries as defined by IFS-statistics. We divided our country sample into two subgroups for the following reasons: Developing countries typically exhibit much higher and more variable inflation rates than industrial nations. On the other hand, money and treasury bill markets are less developed and tend to be more subject of direct government interventions in non-industrial countries implying that observed interest rates are lower and less variable than the “true” equilibrium rates would be. Moreover, the real ex ante rates of industrial and non-industrial countries may strongly differ, which may also result in unstable regression coefficients across the two sub-samples. The estimated regression coefficients, some test statistics and the F-statistics referring to the Chow-test applied in order to investigate the stability of the regression coefficients across the two sub-samples are given in Table 2.

Interestingly enough, none of the three \( a_1 \)-estimates given in Table 1 differs by more than twice the estimated standard error from the +1 value predicted by the model, and using only the data referring to the industrial countries results in an \( a_1 \)-estimate of almost exactly +1. Thus the evidence is supportive for our model. Moreover, the high \( R^2 \)'s clearly indicate that the average inflation rates (rather than the average ex ante real rate) are the major cause of different average nominal interest rates across the countries under consideration. To be more specific, according to the \( R^2 \)'s two thirds of the cross-sectional variation of average interest rates is due to different average inflation rate. Finally, the F-statistic referring to the Chow-test does not indicate parameter instability (at the 5 % level the critical level of the F-statistic is 3.49) suggesting the same relationship between the mean nominal interest rate and the mean inflation rate in developing and industrial nations. Hence we conclude that regarding average nominal interest rates and average inflation rates the cross-sectional results strongly support the Fisher hypothesis.

On the other hand, the \( b_1 \)-estimates are significantly lower than +1. The results do thus not support the hypothesis of a one-for-one correspondence between the variance of the nominal interest rate and the variance of the expected inflation rate. In fact, the \( b_1 \)-estimates and the \( R^2 \)'s close to zero suggest no systematic relationship between our measure of nominal interest rate variability and expected inflation rate variability at all. Since the Chow-test does not indicate parameter instability, this result applies also to both sub-samples.

Direct inspection of the graphical exposition of the data confirms that the regression results discussed above compactly summarize the shape of the respective data clouds: In Figure 1, showing the average inflation rates plotted against the respective average nominal interest rates, the data points concentrate nicely around the regression line, which exhibits a slope coefficient close to +1,
while – as can be seen from Figure 2 – the expected inflation rate variances plotted against the nominal interest rate variances show no tendency to concentrate.  

The difference between the results pertaining to the mean values and the variances is somewhat puzzling and suggests that either the model is misspecified and/or that statistical problems strongly affect the results.  

Regarding the specification of the theoretical model we already mentioned that the regression relationship between the nominal interest rate variance and the expected inflation rate variance strongly relies on the Fisherian assumption that the real ex ante rate is independent of the expected inflation rate, while the regression relationship between the average inflation rate and the average nominal interest rate could also be justified in a more general framework. Thus one might conclude that the results suggest rejection of the Fisherian independence hypothesis.

From the statistical point of view the major difficulty is to obtain reliable estimates of the respective variances. Estimation errors tend to be much larger in the context of second moment estimates than errors in the estimates of the respective unconditional expectations. Thus the correlation between our variance estimates may be much lower than the correlation between the “true” variances.

Finally one could also argue that quarter-to-quarter movements of short-term interest rates such as the applied money market rates primarily reflect other variables than the expected inflation rate, while the average inflation rate still determines the average interest rate. Monetary policy actions or changes in the business cycle as perceived by the market may be more important for such short-term interest rate movements than changes in the expected inflation rate, which could explain the low correlation between the interest rate variances and expected inflation rate variances. Thus the results may not be as puzzling as it appears at first glance.

4. Conclusions

This study investigated the contribution of inflation to the level and the variability of nominal interest rates in a multi-country cross-sectional framework. The applied theoretical model is based on the Fisher hypothesis combined with rational expectations. The main empirical results are as follows: We find strong evidence of a cross-sectional one-for-one correspondence between the level of the nominal interest rate (measured in each country by the average value of the nominal interest rate during an extended historical time period) and the level of the inflation rate (measured in each country by the average inflation rate observed during the same or a similar time period). Moreover, the results clearly suggest that different average inflation rates (rather than different average ex ante

9 The same conclusion can be drawn from the plot (which for space reasons is not included in the paper) of the nominal interest rate variance against the simple inflation rate variance.
real rates) are the main reason for differences in the average nominal interest rates. By way of contrast, we are unable to find evidence of any relationship between the variability of nominal interest rates and the variability of inflation rates. In fact, our measure of the (rationally) expected inflation rate variance is virtually useless for explaining cross-sectional differences in nominal interest rate variances.

References


## Table 2: Regression Results

<table>
<thead>
<tr>
<th></th>
<th>$L(EI / 1, EP) = a_0 + a_1 EP$</th>
<th></th>
<th>$L(VI / 1, VPx) = b_0 + b_1 VPx$</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>$\hat{a}_0$</td>
<td>$\hat{a}_1$</td>
<td>$R^2$</td>
</tr>
<tr>
<td>All Countries</td>
<td>0.026188 (0.0117)</td>
<td>0.78677 (0.1199)</td>
<td>0.6620</td>
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<td>Industrial Countries</td>
<td>0.0125 (0.0146)</td>
<td>0.9760 (0.1652)</td>
<td>0.6994</td>
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<td>Developing Countries</td>
<td>0.0334 (0.0242)</td>
<td>0.6693 (0.2094)</td>
<td>0.6715</td>
</tr>
</tbody>
</table>

Standard errors in parentheses;  
Industrial countries: USA, United Kingdom, Belgium, Denmark, France, West-Germany, Italy, Netherlands, Norway, Sweden, Switzerland, Canada, Japan, Finland, Ireland, Spain, Australia  
Developing Countries: Portugal, South Africa, India, Indonesia, Malaysia, Pakistan, Thailand.
<table>
<thead>
<tr>
<th>Country 1)</th>
<th>Sample period 2)</th>
<th>( E(i) ) 10^2</th>
<th>( E(p) ) 10^2</th>
<th>( \text{Var}(i) ) 10^3</th>
<th>( \text{Var}(p) ) 10^3</th>
<th>( \xi )</th>
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</thead>
<tbody>
<tr>
<td>USA</td>
<td>72.01 - 86.04</td>
<td>8.9126</td>
<td>6.6122</td>
<td>1.165</td>
<td>1.396</td>
<td>0.744</td>
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<td>Italy**</td>
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<td>Spain</td>
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<td>14.1596</td>
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</tr>
<tr>
<td>Australia</td>
<td>72.04 - 86.04*</td>
<td>9.5698</td>
<td>9.4996</td>
<td>1.142</td>
<td>1.962</td>
<td>0.162</td>
</tr>
<tr>
<td>South Africa</td>
<td>72.01 - 86.04</td>
<td>9.6356</td>
<td>12.0729</td>
<td>2.634</td>
<td>1.710</td>
<td>0.328</td>
</tr>
<tr>
<td>India</td>
<td>72.01 - 86.03</td>
<td>8.8478</td>
<td>8.3687</td>
<td>0.594</td>
<td>12.051</td>
<td>0.676</td>
</tr>
<tr>
<td>Indonesia</td>
<td>78.01 - 85.04</td>
<td>13.3771</td>
<td>14.2141</td>
<td>1.807</td>
<td>15.095</td>
<td>0.150</td>
</tr>
<tr>
<td>Malaysia**</td>
<td>72.01 - 85.02</td>
<td>5.1165</td>
<td>5.2877</td>
<td>0.542</td>
<td>2.906</td>
<td>0.373</td>
</tr>
<tr>
<td>Pakistan</td>
<td>72.01 - 85.03</td>
<td>8.8102</td>
<td>9.9515</td>
<td>0.259</td>
<td>11.637</td>
<td>0.243</td>
</tr>
<tr>
<td>Thailand</td>
<td>77.01 - 86.03</td>
<td>12.7114</td>
<td>7.8666</td>
<td>0.756</td>
<td>5.975</td>
<td>0.446</td>
</tr>
</tbody>
</table>

1) \( E(i) \) = average nominal interest rate; \( E(p) \) = average inflation rate; \( \text{Var}(i) \) = estimated variance of the nominal interest rate; \( \text{Var}(p) \) = estimated variance of the inflation rate; \( \xi \) = estimated proportion of inflation rate variance that can be predicted.

2) The symbol "*" indicates missing observations. In particular, money market rate data were not available for Switzerland during the 79.04-81.01 period, for Ireland during the 76.01-76.03 period and the 78.01 quarter, for Portugal during the 85.03 quarter and for Australia during the 80-01-80.04 period. Time series on inflation rate referring to the 72.01-86.04 period do not contain missing observations and were available for all countries except those marked with the symbol "**"; for them the sample period is 72.01-86.03.
Figure 1
Plot of Average Inflation Rates against Average Nominal Interest Rates

\[ E(i) \times 10^2 \]

\[ E(p) \times 10^2 \]

--- estimated regression line

Figure 2
Plot of Estimated Expected Inflation Rate Variance against Estimated Nominal Interest Rate Variance

\[ \text{Var}(i) \times 10^3 \]

\[ \text{Var}(p) \times 10^3 \]

--- estimated regression line
Summary

*The Contribution of Inflation to the Level and the Variability of Nominal Interest Rates: Some Multi-Country Evidence*

This study investigates the contribution of inflation to the level and the variability of nominal interest rates in a multi-country cross-sectional framework. Using quarterly inflation rate and interest rate data of 24 countries during the 1972–1986 period, we find strong evidence of a cross-sectional one-for-one correspondence between the level of the nominal interest rate (measured in each country by the average value of the nominal interest rate) and the level of the inflation rate (measured in each country by the respective average inflation rate). Moreover, the empirical results are consistent with the view that different nominal interest rate levels primarily reflect different inflation rate levels in the respective countries. However, we are unable to detect a corresponding cross-sectional relationship between the variance of the nominal interest rate and the variance of the estimated expected inflation rate.

Zusammenfassung

*Der Beitrag der Inflation zum Niveau und zur Varianz der Nominalzinssätze: Eine Mehrländer-Querschnittsstudie*


Résumé

*Incidence de l'inflation sur le niveau et la variation des taux d'intérêts nominaux: une démonstration multinationale*

L'étude porte sur l'influence exercée par l'inflation sur le niveau et la variation des taux d'intérêts nominaux dans un contexte multinationale à travers différents secteurs. A partir des taux trimestriels d'inflation et d'intérêts de 24 pays pour la période 1972–86, nous obtenons la preuve certaine d'une correspondance 1 à 1 par secteur entre le niveau du taux d'intérêt nominal (pris dans chaque pays à partir de la moyenne du taux d'intérêt nominal) et le niveau du taux d'inflation (pris dans chaque pays à partir des taux moyens respectifs d'inflation). En outre, les résultats empiriques confirment l'idée que différents niveaux de taux d'intérêts nominaux sont avant tout le reflet des différents niveaux de taux d'inflation dans les différents pays. Nous ne sommes cependant pas en mesure de trouver une relation correspondante par secteur entre la variation du taux d'intérêt nominal et celle du taux estimé d'inflation attendue.