

THE EFFECT OF INFLATION ON
LOSSES AND PREMIUMS FOR
PROPERTY-LIABILITY INSURERS

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Discussion by Rafal J. Balcarek

I have found the paper well written, technically sound, and very logical. On the other hand, the various conclusions appear to be at variance with what is commonly accepted as truth in the property and casualty insurance industry. The reader is left with a strong impression that inflation exerts a benign, if not actually beneficial effect on the industry. The usual approach in such a controversial case is for the reviewer to state that the model is too simplistic and proceed to complicate it to the nth degree so that no conclusion could ever be drawn. This reviewer does not like complicated models, consequently, he will refrain from using this approach.

Upon a close analysis, it is obvious that most of the unusual conclusions depend on the applicability of the "Fisher effect" to real life. It may, therefore, be useful to concentrate on this subject.

As far as I know, Stephen D'Arcy was the first to introduce the "Fisher effect" to the Casualty Actuarial Society. This happened in the May 1979 Call Paper Program. Irving Fisher was a classical economist who in 1896 presented the theory that interest rates are related to inflation, the higher the expected rate of inflation, the higher will be the interest rate. His formula shows that an investor will demand an interest rate high enough to compensate for expected inflation and risk plus a provision for a real rate of return. Fisher was of the opinion that the real interest

rate was positive and was constant over time.

While the theory is simple and logical, in real life we have some complications. Classical economics assumes that in the marketplace no seller or buyer is large enough to affect the price. In real life, the market for loanable funds is heavily influenced by the Federal Reserve System and the Federal Treasury, both on the supply and demand side. Economists frequently dismiss this complication by asserting that this is only a short term situation, and that in the long run, the "Fisher effect" will prevail. Question now arises how long is the short run? Other complications follow when we try to express inflation in numerical terms. Last, but not least, we have a large spectrum of widely different interest rates, some of the yields being taxable, others tax-free. At least Fisher did not have to worry about the tax situation because there were no Federal income taxes in 1896.

There were a number of studies which have discussed, disputed, and calculated the "Fisher effect." Most of these studies were made some time ago and do not incorporate recent statistics. D'Arcy, in his paper, accepted as appropriate the findings by William Gibson who related government security yields and inflation expectations (as measured by a consensus of leading experts in government, business, and investment community) for the period 1959-70. Gibson absolutely confirmed the "Fisher effect." This does not mean that he related security yields to actual inflation rates. Let us therefore supplement his study by relating the average yields on 3-month U.S. Treasury bills to change in inflation as measured by average annual changes in Consumer Price Index for the period 1959-1980. The choice of the short-term government securities was dictated by two considerations: (1) Relative safety of principal, (2) Absence of investment risk. With long term securities, the investor cannot obtain

the latest yield without selling the security at a loss if interest rates are rising.

	<u>Average Increase In CPI</u> (1)	<u>Average Yield On 3 Monthly Treasury Bills</u> (2)	<u>Real Rate of Interest Before Tax Col. (2)-(1)</u> (3)	<u>Average Yield on 3 Month Treasury Bills After Tax*</u> (4)	<u>Real Rate of Interest After Tax Col. (4)-(1)</u> (5)
1959	0.9	3.4	2.5	1.8	0.9
1960	1.6	2.9	1.3	1.5	-0.1
1961	1.0	2.4	1.4	1.2	0.2
1962	1.1	2.8	1.7	1.5	0.4
1963	1.2	3.2	2.0	1.0	-0.2
1964	1.3	3.6	2.3	1.9	0.6
1965	1.7	4.0	2.3	2.1	0.4
1966	2.9	4.9	2.0	2.5	-0.4
1967	2.9	4.3	1.4	2.2	-0.7
1968	4.2	5.3	1.1	2.8	-1.4
1969	5.4	6.7	1.3	3.5	-1.9
1970	5.9	6.5	0.6	3.4	-2.4
1971	4.3	4.3	0.0	2.2	-2.1
1972	3.3	4.1	0.8	2.1	-1.2
1973	6.2	7.0	0.8	3.6	-2.6
1974	11.0	7.9	-3.1	4.1	-6.9
1975	9.0	5.8	-3.2	3.0	-6.0
1976	5.8	5.0	-0.8	2.6	-3.2
1977	6.5	5.0	-1.2	2.6	-3.9
1978	7.7	7.2	-0.5	3.7	-4.0
1979	11.3	10.2	-1.1	5.5	-5.8
1980	13.5	11.8	-1.7	6.4	-7.1

* 46% tax rate for 1979 & 1980;
48% tax rate for prior years

The Pearson correlation coefficients between the various variables are as follows:

$$r_{12} = .93$$

$$r_{13} = -.87$$

$$r_{14} = .93$$

$$r_{15} = -.98$$

All the coefficients are significant on 95% level.

The changes in CPI correlate positively with average yields on 3 month Treasury Bills on a before and an after tax basis. This means that the higher the rate of actual inflation, the higher will be the actual rate of interest which is in accordance with the "Fisher effect." However, a rise of one percent in CPI is accompanied only by a rise in yield of 0.60 percentage point before tax and 0.33 percentage point after tax. As a result, high rates of inflation are negatively correlated with real yields, both before and after tax. At some level of inflation, the real rate of interest becomes negative. This result is at variance with Fisher's theory and Gibson's findings. It would appear that there are two reasons for this variance:

- (1) The expectations in regard to future inflation rates are optimistic as they are fed by statistics and pronouncements of an army of government economists and politicians who tend to explain high levels of inflation as a passing phenomenon which is about to be corrected.
- (2) During the time of high inflation, the Federal Reserve System may be motivated to keep a lid on the interest rates on Government securities in order to reduce the cost of government borrowings.

Of course, these are only short term complications but the reviewer would like to point out that the "short-term" in case of yields before tax has lasted for seven years and for after tax yields a little longer.

In addition to the "Fisher effect", there is another complication. The investment portfolio of an average insurer consists of a wide range of classes of investments and maturities. Consequently, the insurer is unable to invest his assets at the latest yields which increases the lag between the actual investment yields and the rate of inflation. This is illustrated in the table following which relates the

increases in CPI with investment yields before and after tax of stock property and casualty insurers.

Stock P & C Companies

	<u>Average Increase in CPI</u>	<u>Investment Income Before Tax as % of Mean Assets*</u>	<u>Investment Income After Tax as % of Mean Assets*</u>
1959	0.9	2.55	2.13
1960	1.6	2.66	2.22
1961	1.0	2.57	2.15
1962	1.1	2.62	2.19
1963	1.2	2.69	2.25
1964	1.3	2.69	2.25
1965	1.7	2.78	2.32
1966	2.9	2.87	2.40
1967	2.9	3.03	2.53
1968	4.2	3.06	2.56
1969	5.4	3.27	2.73
1970	5.9	3.57	2.98
1971	4.3	3.88	3.24
1972	3.3	3.84	3.21
1973	6.2	4.13	3.45
1974	11.0	4.72	3.94
1975	9.0	4.83	4.03
1976	5.8	4.73	3.95
1977	6.5	5.07	4.23
1978	7.7	5.27	4.40
1979	11.3	5.97	4.98
1980	13.5	6.00 (Est.)	5.01

* Best's Aggregates & Averages

**Estimated tax rate of 16.5%

The regression analysis shows that for each increase of 1% in CPI, the investment yield tends to increase by only 0.29 percentage point before tax and 0.24 percentage point after tax.

I have no problem with the author's conclusion that we should take into account the total return instead of underwriting gain when appraising the prospective profit-

ability of a line of business. The only reservation is that we calculate the real return which is probably somewhat less than the return reported by the accountants. This is due to the fact that inflation seriously overstates the reported return by eroding our assets and translating the erosion into investment income to be taxed by the government. Most of the assets of property and casualty insurance industry are scraps of paper denoting a fixed amount of depreciating dollars which makes the industry very vulnerable to this process.

The conclusion of the reviewer is that in real life the economy, including the insurance industry, does not react instantaneously to changing levels of inflation. The process of adjustment is fairly long and it is never really finished. During the period of adjustment, the results may be markedly different from those projected by the use of assumptions based on classical economic theories.

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