The specific tests for the inflation-induced wealth-transfer hypothesis are described and presented. Section IV discusses the empirical findings. The last section summarizes the results and discusses the direction of future research.

II. Present Status of the Wealth-Transfer Debate

Kessel's analysis had two serious weaknesses. The first was the failure to distinguish between unexpected rates of inflation and realized rates of inflation. Given that market participants have a subjective probability distribution over all possible inflation rates, expected inflation can be defined as the mean of this ex ante distribution while unexpected inflation represents the difference between the realized inflation rate and the expected inflation rate. Inflation-induced wealth-transfer can occur only when either positive unexpected rates of inflation or negative unexpected rates of inflation exist. Under the wealth-redistribution hypothesis, net debtors [creditors] gain at the expense of net creditors [debtors] when unexpected inflation is positive [negative]. Kessel investigated whether inflation ought to be profitable for net debtors and unprofitable for net creditors. He treated realized rates of inflation as if they were entirely unexpected. Indeed, most of the subsequent empirical studies of the Fisher-Keynes hypothesis also failed to correct this problem (see Bach and Ando [2], Alchian and Kessel [1], Bradford [4], Bach and Stephenson [3], Hess and Bicksler [9], and Hong [10]).

The second weakness of the Kessel study was its failure to distinguish between realized rates of return to firm owners and abnormal rates of return; wherein abnormal rates of return are those rates found after controlling for the effect of systematic risk on realized returns. Inflation-induced wealth-transfer as measured by realized rates of return may be spurious if net debtor firms are deemed riskier by the market than net creditor firms. Unless the systematic risk of their common stocks are taken into account to adjust their realized rates of return, the wealth transfer indicated by unadjusted realized rates of return would instead be the natural result of investor recognition of higher risk levels. Bach and Stephenson [3] were the first to recognize this problem and incorporate systematic risk into their investigation. After adjusting common stock returns for systematic risk, they found no significant difference between abnormal returns of net debtors and those of net creditors.

Hess and Bicksler [9], in their unpublished manuscript, investigated the identical set of industrial firms used in the original Kessel study. They reported that abnormal returns of net debtors were not different from those of net creditors. Both Bach and Stephenson [3] and Hess and Bicksler [9], however, failed to distinguish unexpected rates of inflation from realized rates of inflation.

The more recent study by Mandelker and Rhee [14] used both the framework of the capital asset pricing model for measuring abnormal returns to owners and Fama's [5] treasury bill model wherein short-term interest rates are treated as predictors of inflation to meet the identified shortcomings of the Kessel analysis. They found no evidence of a wealth-transfer between net

debtors and net creditors due to expected inflation. More importantly, they also found no evidence of such a transfer due to unexpected inflation. Findings consistent with the conclusion that no empirical support exists for the Fisher-Keynes hypothesis were likewise reported by French, Ruback, and Schwert [8].

With respect to recent empirical evidence against the Fisher-Keynes hypothesis, an interesting question remains for financial firms such as insurers: Would these insurers behave the same way as industrial firms given that their asset and financial structures are subject to regulatory restrictions? It is not obvious on an *a priori* basis whether the wealth-redistribution hypothesis would be rejected for financial firms operating under these regulatory restrictions. This study examines a set of insurers to explore the Fisher-Keynes hypothesis in this unique environment.

III. Data and Methodology

The sample for this study is composed of stock insurers. Because of the significant number of corporate reorganizations and the frequent changes in ownership, primarily due to the growth of holding companies, the number of insurers included in the sample is somewhat limited. Those insurers selected were chosen largely on the basis of their continued, identifiable existence over the study period. However, few insurers included in the study remained totally unchanged throughout the study period. Depending upon the availability of monthly stock prices and paid dividend records, the number of insurers included in the sample fluctuates year to year, ranging from 34 to 40. Of the 40 insurers in the sample 18 are life insurers, 16 are property-liability insurers, and six are insurers that effectively write both types of business.

The data sources are the *Bank and Quotation Record* for monthly stock prices, *Moody's Dividend Records* for dividend data, and *Best's Insurance Reports* (1959-1980) for balance sheet information. The time period for the study was restricted to the years, 1964-1980.

Classification of Net Debtors and Net Creditors

All assets and liabilities are classified into two categories, monetary and real. The market value of a monetary asset or liability is independent of changes in the price level while that of a real asset or liability is not.[2]

At the end of 1980 consolidated assets of U.S. life insurers totaled $479 billion while those of property-liability insurers amounted to $190 billion.[3] The composition of the asset portfolios of life insurers is substantially differ-

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[2] The classification of monetary and non-monetary (or real) items has been extensively discussed in the Statements of the Accounting Principles Board (APB) No. 3 (1969), the Financial Accounting Standards Board (FASB) Statement No. 8 (1976), and the FASB Statement No. 33 (1979).

[3] See *1981 Life Insurance Fact Book* (Washington, DC: American Council of Life Insurance, 1982) and *1982-1983 Insurance Facts* (New York: Insurance Information Institute, 1982).

ent from that of property-liability insurers. As of 1980 the assets of life insurers were dominated by corporate debt and mortgages which accounted for 37.5 percent and 27.4 percent of total assets, respectively. The remainder of their assets were composed of common stocks (9.9 percent), policy loans (8.6 percent), government securities (6.9 percent), real estate (3.1 percent), and others (6.6 percent). In contrast, property-liability insurers maintained the bulk of their funds in investments that could be sold readily, bonds and stocks. Their investment portfolios were composed mainly of bonds (75.8 percent), common stocks (18.7 percent), and preferred stocks (5.0 percent). In essence, life insurers have a more divergent and longer maturity asset structure than property-liability insurers. For insurers a substantial portion of total assets is classified as monetary assets, the major exceptions being common stocks and real estate. Both common stocks and real estate are treated as real assets because they are valued at the year-end market values in accordance with the guidelines of the National Association of Insurance Commissioners. Corporate and government bonds, whose amortized values are reported as part of admitted assets, are classified as monetary assets for the following reasons: (a) the amortized values do not necessarily coincide with the market prices of bonds and (b) these bonds are held by insurers primarily for long-term fixed income rather than held as a short-term investment. Preferred stocks included in the asset portfolio are treated as monetary because most of them are carried at cost rather than market value. The present value of the tax shield provided by depreciation of real estate/office buildings can be safely ignored in measuring the total amount of monetary assets because the proportion of these fixed assets is extremely small relative to total assets.

For life insurers monetary liabilities include policy reserves, policy dividend accumulations, surplus funds, and other long-term debt obligations. For property-liability insurers monetary liabilities include loss and unearned premium reserves (liabilities that are very similar in nature to commercial bank reserves for loan losses), and other long-term debt obligations. Preferred stocks issued by insurers, if any, are included in monetary liabilities because they are regarded as fixed obligations for the firm.

With monetary assets and liabilities so classified, the relative net monetary position (RNMP) is defined as follows:

$$RNMP = \frac{MA - ML}{TA} , \tag{1}$$

where MA = monetary assets, ML = monetary liabilities, and TA = total assets. An insurer with a positive RNMP is termed a net creditor while an insurer with a negative RNMP is termed a net debtor.

For each insurer, RNMP's are estimated yearly beginning in 1959. Moving five year mean RNMP's, then, are calculated for each insurer. Using these five year mean RNMP's, the sample insurers are classified each year into two groups: net debtors with negative RNMP's, and net creditors with positive RNMP's. Since, on average, seven of the insurers are net debtors and 31 net

creditors, the authors decided to divide net creditors further into two, equal sub-groups. This division avoids extreme imbalance of the net debtor/net creditor portfolio composition due to the number of insurers included in each group. The two sub-groups were net creditors (L) or insurers with relatively low RNMP's and net creditors (H) or insurers with relatively high RNMP's. An interesting trend observed is that net debtors are predominantly life insurers while net creditors (H) are dominated by property-liability insurers.

Table 1 presents summary statistics for the three groups of insurers; net debtors, net creditors (L), and net creditors (H). The number of insurers classified into each group and the five year, cross-sectional mean RNMP's are reported for each group across various time periods. The results show that the RNMP values are relatively stable throughout the study period. The mean RNMP of net debtors is −0.05 while the comparable values for two groups of net creditors are 0.07 and 0.30, respectively.

Estimation of Expected and Unexpected Rates of Inflation

To measure the expected and unexpected rates of inflation, Fama's [5] treasury bill model is used. Although other approaches (such as using Livingston's direct observations of expected inflation or uni- and/or multivariate ARIMA models) are available, Fama's approach is adopted because (a) it has been widely accepted by other financial economists (see Jaffe and Mandelker [11], Fama and Schwert [6], Schwert [17], and Mandelker and Rhee [14]) and (b) its results are consistent with market efficiency (see Nelson and Schwert [15]).

Table 2 presents summary results for monthly rates of inflation. The price control period, August 1971-December 1974, was excluded to avoid the potential distortion in the realized rates of inflation. During the study period, the average monthly realized rate of inflation is 0.48 percent. Using Fama's treasury bill model, an average expected rate of inflation of 0.48 percent is calculated yielding an average unexpected rate of inflation for the whole period of only −0.00005 percent. However, this unexpected rate of inflation becomes larger when the sub-periods characterized by positive and negative unexpected inflation are examined. Of the total 163 months, 90 months have negative unexpected inflation with a mean unexpected rate of inflation of −0.14 percent; 73 months have positive unexpected inflation with a mean of 0.18 percent.

Test of the Wealth-Transfer Hypothesis

Table 3 summarizes the predicted direction of any wealth-transfers taking place between net debtors and net creditors when faced with uncertain inflation. According to these predictions net debtors gain when unexpected inflation is positive and lose when unexpected inflation is negative. Precisely the opposite is true for net creditors. The extent of the gains or losses is measured by the abnormal returns after adjusting for systematic risk.

Table 1

Summary Statistics for Relative Net Monetary Positions

Period	Net Debtor		Net Creditor (L)		Net Creditor (II)		Whole Sample	
	Number of Insurers	Average RNMP	Number of Insurers	Average RNMP	Number of Insurers	Average RNMP	Number of Insurers	Average RNMP
1959-63	7	-0.05	13	0.07	14	0.35	34	0.16
1960-64	6	-0.06	14	0.06	15	0.33	35	0.16
1961-65	6	-0.06	15	0.07	15	0.35	36	0.17
1962-66	6	-0.05	15	0.07	15	0.35	36	0.17
1963-67	8	-0.04	15	0.08	15	0.35	38	0.16
1964-68	7	-0.05	15	0.06	16	0.33	38	0.16
1965-69	7	-0.04	16	0.08	16	0.33	39	0.16
1966-70	7	-0.04	16	0.07	16	0.33	39	0.16
1967-71	8	-0.03	15	0.08	16	0.32	39	0.15
1968-72	8	-0.05	16	0.06	16	0.30	40	0.13
1969-73	7	-0.06	16	0.04	17	0.26	40	0.12
1970-74	6	-0.07	16	0.04	18	0.26	40	0.12
1971-75	9	-0.05	15	0.06	16	0.26	40	0.11
1972-76	6	-0.05	16	0.06	17	0.25	39	0.12
1973-77	4	-0.10	17	0.06	13	0.25	39	0.13
1974-78	6	-0.08	16	0.08	17	0.27	39	0.14
1975-79	7	-0.06	15	0.09	16	0.26	38	0.14
Average	7	-0.05	15	0.07	16	0.30	38	0.14

Table 2

Summary Statistics for Monthly Rates of Inflation
(1964–1980: Price Control Period Not Included)

Classification	Whole Period (163 Months)	Periods of Negative Unexpected Inflation (90 Months)	Periods of Positive Unexpected Inflation (73 Months)
Monthly Realized Inflation	.4808% (.3256)	.3263% (.2690)	.6712% (.2872)
Monthly Expected Inflation	.4808% (.2527)	.4693% (.2643)	.4949% (.2385)
Monthly Unexpected Inflation	-.00005% (.2054)	-.1430% (.1181)	.1762% (.1436)

Notes: 1. Figures in parentheses represent standard deviations.
2. Because of rounding errors, the values for the monthly unexpected inflation are not the same as the difference between the monthly realized inflation and the monthly expected inflation.

To empirically test this "wealth-transfer hypothesis," the following model is used:[4]

$$R_{p,t} - R_{f,t} = \hat{\alpha}_p + \hat{\beta}_p \; [R_{m,t} - R_{f,t}], \tag{2}$$

where $R_{p,t}$ = return on portfolio p in month t,

$R_{f,t}$ = return on the risk-free asset in month t,

$R_{m,t}$ = return on the market portfolio in month t,

$\hat{\alpha}_p$ = abnormal return for portfolio p (estimated OLS intercept),

and

$\hat{\beta}_p$ = systematic risk for portfolio p (estimated OLS slope).

Portfolios are rebalanced each year from 1964 to 1980 based upon the mean RNMP's from the preceding five year period. For the year in question, then, monthly rates of return on each portfolio are estimated by the cross-sectional arithmetic average of the realized returns on securities included in the portfolio. As a proxy for the risk-free rates of return, the realized monthly yields on 30-day treasury bills are used while the value-weighted index (with dividends reinvested) of NYSE firms compiled by the Center for Research in

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[4] Most recent applications of this model or its variations can be found in various papers that appeared in a special issue of *Journal of Financial Economics*, 12 (June 1983).

Security Prices (CRSP) is used to measure monthly rates of return on the market portfolio. For each portfolio, abnormal returns, as measured by $\hat{\alpha}_p$, are examined for both statistical significance and sign.

Table 3

The Prediction of Wealth-Transfer

Classification	Periods of Negative Unexpected Inflation	Periods of Positive Unexpected Inflation
Net Debtors	Abnormal Return < 0	Abnormal Return > 0
Net Creditors	Abnormal Return > 0	Abnormal Return < 0

IV. Empirical Results

Excess Rates of Return

Table 4 presents the regression results and related summary statistics. Consider first the summary statistics for the average excess rate of return, the difference between the realized rate of return on each portfolio and the risk-free rate of return. Table 4 shows that during the 163 month study period, the average excess rate of return on the market portfolio is 0.57 percent per month while that on the whole sample of insurers is 0.64 percent. The comparable excess returns are 0.52 percent, 0.31 percent, and 1.04 percent for net debtors, net creditors (L), and net creditors (H), respectively. It is puzzling to observe that the estimated betas do not explain the differences among these excess rates of return. For example, the beta for the net debtor portfolio is 0.87 while the betas for the portfolios of net creditors (L) and (H) are 0.90 and 0.78, respectively.[5]

Examination of the market portfolio's excess rates of return across the two sub-periods, periods of negative unexpected inflation and positive unexpected inflation, yields another puzzling result. When the unexpected rate of inflation is negative, the market portfolio's excess rate of return is 0.97 percent per month. This percent is far greater than the 0.07 percent observed when the

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[5] As a check, the excess rates of return and estimated betas of the three portfolios were examined for the two sub-periods, 1964-1971 and 1975-1980. It was found that the puzzling results were largely caused by the observations for the first sub-period. Nevertheless, as will be discussed later, the overall empirical results on the wealth-transfer hypothesis for the two sub-periods are not substantially different from the reported findings for the whole period.

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Table 4

Performance Measures and Related Statistics

Classification	Period	$\hat{\alpha}_p$	$\hat{\beta}_p$	$\overline{R_p - R_f}$	R^2
Net Debtor	Whole Period	.02% (.05)	.87 (9.12)**	.52% [.06]	.34
	Periods of Negative Unexpected Inflation	-.51% (.93)	.86 (6.52)**	.33% [.06]	.33
	Periods of Positive Unexpected Inflation	.68% (1.15)	.91 (6.56)**	.74% [.06]	.38
Net Creditor (L)	Whole Period	-.20% (.61)	.90 (11.14)**	.31% [.06]	.44
	Periods of Negative Unexpected Inflation	-.52% (1.11)	.80 (7.07)**	.26% [.05]	.36
	Periods of Positive Unexpected Inflation	.29% (.59)	1.03 (8.99)**	.36% [.06]	.53
Net Creditor (H)	Whole Period	.60% (2.00)*	.78 (10.98)**	1.04% [.05]	.43
	Periods of Negative Unexpected Inflation	.30% (.79)	.60 (6.42)**	.88% [.04]	.32
	Periods of Positive Unexpected Inflation	1.16% (2.61)**	1.01 (9.69)**	1.23% [.06]	.57
Whole Sample	Whole Period	.16% (.55)	.85 (11.99)**	.64% [.05]	.47
	Periods of Negative Unexpected Inflation	-.18% (.46)	.73 (7.55)**	.52% [.05]	.39
	Periods of Positive Unexpected Inflation	.71% (1.65)	1.01 (9.86)**	.79% [.06]	.58
Market Portfolio	Whole Period	---	---	.57% [.04]	---
	Periods of Negative Unexpected Inflation	---	---	.97% [.04]	---
	Periods of Positive Unexpected Inflation	---	---	.07% [.04]	---

Notes: 1. Figures in parentheses represent t-values.
        2. Figures in brackets represent standard deviations.
        3. *:   Significant at α = 5%.
        4. **: Significant at α = 1%.

unexpected rate of inflation is positive.[6] For the insurance industry as a whole, the difference between the excess rates of return for the two sub-periods is not as pronounced. Unlike the case for the market portfolio, it appears that the insurance industry performs better during periods of positive unexpected inflation than during periods of negative unexpected inflation. This finding is also true for the portfolios of the three industry sub-groups.

Abnormal Rates of Return

A review of the abnormal return measure, $\hat{\alpha}_p$, for the three portfolios, yields another surprising result. As reported in the third panel of Table 4, the portfolio of net creditors (H) appears to have outperformed the market during the whole period as well as during the periods of positive unexpected inflation. However, this superior performance does not hold when unexpected inflation is negative. This result is not consistent with the expected results under the Fisher-Keynes wealth-transfer hypothesis. In contrast, the portfolios of net debtors and of net creditors (L) do not show any significant abnormal returns.[7] Although the signs of the $\hat{\alpha}_p$'s for the net debtor portfolio are consistent with the wealth-transfer hypothesis, they are not statistically significant. Given these mixed results, further examination of the sensitivity of empirical results is needed before any meaningful conclusion can be drawn.

Sensitivity of Empirical Results

At least three alternative methods for testing the sensitivity of the empirical results are possible. First, the portfolio composition may be changed so that only extreme debtors and extreme creditors are included in the two respective portfolios. Second, each insurer's RNMP for a single year (rather than a five year mean value) may be used to form the portfolios and measure each portfolio's realized rates of return for the following year. Third, some months with relatively small unexpected rates of inflation, both positive and negative, can be dropped from the regression to emphasize the impact of unexpected inflation.

Of the three alternatives, the last two are viable with the present data set. The first approach cannot be implemented because the sample includes too

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[6] Given the large difference between the market portfolio's excess rates of return during the periods of negative unexpected inflation and of positive unexpected inflation, the market portfolio's performance during the two sub-periods, before and after the price controls, were examined. Trends similar to those observed for the whole period were found for the two sub-periods. During the first sub-period, 1964-1971, the average excess rates of returns are 0.57 percent and −0.45 percent when unexpected inflation is negative and positive, respectively. During the second sub-period, 1975-1980, the average excess rates of returns are 1.90 percent and 0.40 percent depending upon whether unexpected inflation is negative and positive.

[7] These findings for net creditors (H), as well as for net debtors and net creditors (L), did not change when their performances were evaluated for the two sub-periods, before and after the period of price controls, 1964-1971 and 1975-1980, respectively.

few net debtors to yield credible results when the extreme debtor/creditor portfolios are formed.

The regression results obtained from the second approach wherein the one year lagged RNMP value is used to form the portfolios are similar to those reported in Table 4: the portfolio of net creditors (H) shows positive abnormal returns during the periods of positive unexpected inflation and the whole period while the other two portfolios of net debtors and net creditors (L) do not.[8]

Table 5 summarizes regression results obtained from the third approach. During periods of negative unexpected inflation, those months with unexpected rates less than −0.084 percent are dropped from the regression while during periods of positive unexpected inflation, those months with unexpected rates less than 0.010 percent are suppressed. These cut-off values are one-half of a standard deviation below the mean values in each sub-period. As a result of this selection process, the number of observations for the whole period is reduced to 99 from 163. The number of observations for the periods of negative unexpected inflation is 56 and that for the periods of positive unexpected inflation is 43. The last column shows the results when the five year mean of RNMP is used to form the portfolios.

For these regressions, it may be observed that the t-values of $\hat{\alpha}_p$'s for the portfolio of net creditors (H) are substantially reduced. This reduction in t-values may be attributed to the smaller number of observations used in regressions. Nevertheless, the magnitude of the abnormal return measures for the portfolio of net creditors (H) is far greater than those for the other two portfolios of net debtors and net creditors (L).[9]

A Closer Look at the Insurance Industry

In order to examine the insurance industry more closely, three portfolios are formed depending upon the major business lines of the sample insurers. These portfolios are composed of the 18 life insurers, the 16 property-liability insurers, and the six insurers writing both types of policies, respectively.

Table 6 presents summary results for the three portfolios. The regression results are strikingly similar to those reported in Table 4. This is not surprising, however, because the net debtor portfolio is composed primarily of life insurers while the extreme net creditor portfolio is dominated by property-liability insurers. Contrary to conventional wisdom, property-liability insurers outperformed the market during the whole period as well as during the periods of positive unexpected inflation while life insurers do not show any significant abnormal returns during either period. In short, these results

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[8] The regression results are not reported here because of their similarity to those reported in Table 4. Summary results can be provided to readers upon request.

[9] The portfolio returns estimated using the one-year lagged RNMP values are also used for the regressions over the two sub-periods. Regression results are again very similar to those reported in Table 5, which implies that the overall results are robust, regardless of which method of RNMP calculation is used.

Table 5

Regression Results Utilizing Months With
Substantial Unexpected Rates of Inflation

Classification	Period	The Number of Observations	$\hat{\alpha}_p$	$\hat{\beta}_p$	R^2
Net Debtors	Whole Period	99	.07% (.13)	.86 (7.34)**	.36
	Periods of Negative Unexpected Inflation	56	.02% (.03)	.75 (4.58)**	.28
	Periods of Positive Unexpected Inflation	43	.27% (.39)	1.02 (6.14)**	.48
Net Creditors (L)	Whole Period	99	-.28% (.62)	.91 (8.83)**	.45
	Periods of Negative Unexpected Inflation	56	-.30% (.45)	.79 (5.41)**	.35
	Periods of Positive Unexpected Inflation	43	-.10% (.16)	1.10 (7.66)**	.59
Net Creditors (H)	Whole Period	99	.52% (1.31)	.73 (8.06)**	.40
	Periods of Negative Unexpected Inflation	56	.39% (.77)	.58 (5.11)**	.33
	Periods of Positive Unexpected Inflation	43	.87% (1.46)	.97 (6.70)**	.52
Whole Sample	Whole Period	99	.09% (.24)	.82 (9.19)**	.47
	Periods of Negative Unexpected Inflation	56	.03% (.05)	.69 (5.66)**	.37
	Periods of Positive Unexpected Inflation	43	.35% (.66)	1.03 (7.97)**	.61

Notes: 1. Figures in parentheses represent t-values.
2. **: Significant at $\alpha = 1\%$.

appear to be industry sector specific. At present, the laws of all 50 states generally prevent a single corporate entity from engaging in both "businesses." Various legal subterfuges are used to circumvent these laws (in large measure these laws are the primary contributors to the numerous corporate reorganizations and holding company formations observed during the study period); nevertheless, two different industries or industry sectors exist. This fact is important because the characteristics and constraints of the financial management of these two types of insurers are not the same. In the area of pricing, property-liability insurers are significantly more constrained in their ability to set and adjust rates than are life insurers. On the other hand, liquidity needs, asset maturity structures, and regulatory restrictions tend to constrain the investment choices of life insurers more than those of property-liability

Table 6

Regression Results for Three Portfolios Formed by Business Lines

Classification	Period	$\hat{\alpha}_p$	$\hat{\beta}_p$	$\overline{R_p - R_f}$	R^2
Life Insurers	Whole Period	-.12% (.35)	.90 (10.66)**	.39% [.06]	.41
	Periods of Negative Unexpected Inflation	-.48% (.99)	.86 (7.24)**	.35% [.06]	.37
	Periods of Positive Unexpected Inflation	.37% (.71)	.98 (7.97)**	.44% [.06]	.47
Insurers in Both Business Lines	Whole Period	-.13% (.33)	1.03 (11.10)**	.46% [.06]	.43
	Periods of Negative Unexpected Inflation	-.68% (1.35)	.87 (7.04)**	.16% [.06]	.36
	Periods of Positive Unexpected Inflation	.74% (1.25)	1.25 (9.17)**	.83% [.07]	.54
Property-Liability Insurers	Whole Period	.65% (2.20)*	.72 (10.23)**	1.06% [.05]	.39
	Periods of Negative Unexpected Inflation	.37% (.99)	.56 (6.03)**	.91% [.04]	.29
	Periods of Positive Unexpected Inflation	1.16% (2.62)**	.93 (8.86)**	1.23% [.05]	.53

Notes: 1. Figures in parentheses represent t-values.
        2. Figures in brackets represent standard deviations.
        3. *:   Significant at α = 5%.
        4. **: Significant at α = 1%.

insurers. With primarily long-term contractual liabilities, life insurers are significantly ''locked into'' long-term mortgage loans and policy loans while property-liability insurers, with their greater liquidity needs, maintain asset portfolios with shorter maturity structures. This characteristic permits property-liability insurers to adjust their portfolio composition among bonds, stocks, and preferred stocks more easily. During periods of rising interest rates, this shorter maturity structure appears to be an important factor explaining the better performance for property-liability insurers.

In interpreting the observed results, however, a potential source of distortion (i.e., the maturity structure of monetary liabilities) must be recognized. It is well known that the loss reserve portion of property-liability insurer liabilities is an estimated value. For property-liability insurers the estimate is frequently very imprecise. It represents the insurer's financial obligation for existing claims that have yet to be settled. Of the various types of property-liability coverages, some tend to produce claims that are settled quickly while others tend to produce claims that take many years to reach a final settlement. In short, the loss reserve liability has a maturity structure. Periods of positive unexpected inflation are especially troublesome for insurers with a high proportion of ''long-lived'' loss reserves; their loss reserves may be

significantly undervalued during such periods. This "undervaluation" may result in the misclassification of the insurer; if loss reserves are properly valued the insurer may be classed a net debtor. If a significant number of insurers classed as net creditors during period of positive unexpected inflation were thus reclassified, the anomolous results reported herein might disappear.

It is not an easy task to measure the potential distortion caused by the current accounting practices allowed for property-liability insurers. This distortion is another important subject to be analyzed by future research along with the general impact of the maturity structure of liabilities on the classification by net monetary position of insurers.

In summary, regulatory effects seem to have a significant effect on the observed anomaly in the insurance industry relative to the Fisher-Keynes hypothesis. Unlike industrial firms, insurers with extreme net creditor status (or property-liability insurers) perform better during the periods of positive unexpected inflation than other insurers. This finding is, of course, contrary to the wealth-transfer hypothesis' prediction. All other insurers show no statistically significant effects from either positive or negative unexpected inflation. While the sensitivity analyses provides little additional, statistical support for these anomolous result, it does not provide any counter indications. In short, the statistical evidence for a wealth transfer due to unexpected inflation is absent for most insurers and, where it exists, this evidence is contrary to that predicted by the wealth-transfer hypothesis.

V. Conclusions

With the exception of the study by Kessel [12], empirical examination of the Fisher-Keynes wealth-transfer hypothesis have in the past been performed exclusively on manufacturing firms. This paper provides a broader empirical base by examining the wealth-transfer hypothesis for one industry within the financial services sector, the insurance industry. Not only are these insurers different in many obvious, operational ways from manufacturing firms, but they are also subject to a host of wide-ranging regulatory restrictions. In conducting this analysis, the two serious deficiencies in the two original studies are corrected. Specifically, abnormal rates of return, rather than realized rates of return, are utilized as the appropriate measure of the hypothesized transfer, and unexpected rates of inflation, rather than realized rates of inflation, are utilized as the appropriate engine behind the transfer.

The most important finding is that insurers with extreme net creditor status perform better during periods of positive unexpected inflation than other firms. Since most of these insurers are property-liability insurers, this result runs counter to the conventional wisdom which holds that these insurers suffer financially during periods of positive unexpected inflation. For all other periods and all other insurers, no evidence of a wealth transfer is found. While contrary to Kessel's original findings, this absence of a wealth transfer is consistent with most of the more recent research on the wealth-transfer hypothesis.

Obviously, further research is needed. Many factors are not adequately captured or controlled by the methodology employed. The regulatory effects and the maturity structure of both assets and the liabilities are two important factors making this industry different from manufacturing industries. Examination of other industries within the financial services sector of the economy is also warranted. In particular, commercial banks and thrift institutions which, likewise, are subject to significant regulatory restrictions may provide fertile ground for additional study.

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A Graphical Treatment of the Coinsurance Clause

Yoong-Sin Lee

I. Introduction

The coinsurance clause is one of the most difficult clauses to understand in the insurance business. For an insurance coverage where the insurer's liability for a loss may be less than the face amount of the policy, theoretically a need exists for coinsurance or some other equivalent arrangement such as graded premium rates. Without coinsurance, a premium rate that is applied uniformly to the amount insured would be inadequate for the insurer and inequibable for the insureds when the latter are allowed to select the amount insured. Coinsurance is widely practiced in property insurance and yet there is much confusion about the concept. This confusion has been attributed to the lack of proper explanation of the subject. Thus says Head, ''The author believes that much of the current confusion and ignorance about coinsurance and about the problem of insurance to value to which coinsurance is one solution is due to the absence of a firm anatytical foundation for the largely superficial treatment of these subjects in current insurance literature.'' (See [2], p. 2.) Later, when Head explains the central concept of the need of coinsurance, he uses, however, mathematical formulas with summation of terms involving probabilities and also integral algebra. Is the concept of coinsurance really so difficult that it has to be explained with esoteric mathematics beyond the ken of most of the not so numerate insureds, insurance agents and brokers, and insurance students? Is it not possible to explain the idea more simply so that a large section of the population concerned with it is able to understand the concept?

This paper presents a graphical device for explaining the underlying concept of coinsurance, its theoretical necsssity, and some of its salient proper-

Yoong-Sin Lee is a Senior Lecturer in the Department of Economics and Statistics at the National University of Singapore. He earned a Ph.D. at the University of Toronto and is a Fellow of the Casualty Actuarial Society.

A graphical method is introduced to explain the need for coinsurance, how it works, and its salient properties. Finer points of the principles of coinsurance are demonstrated by pictures without use of mathematical formulas.

ties. It is hoped that this graphical method of explanation can be easily understood even by "the layman" with little knowledge of mathematics. Yet the method is entirely rigorous and theoretically sound. In fact, whatever the graphs depict can be coverted into a formula version by rigorous mathematical process. The graphs just serve to make the ideas appear simple.
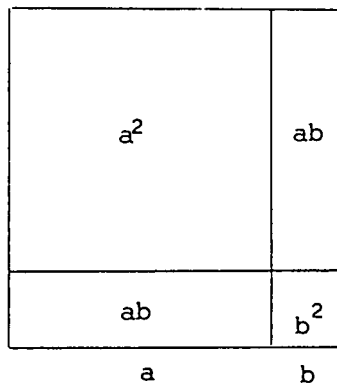
II. The Power of Graphical Representation

Graphs have been used in quantitative disciplines to help explain many quantitative ideas. Graphical explanations for formulas or numerical facts have great appeal to students of quantitative subjects because the pictures help them visualize otherwise abstract subject matter. A geometrical version of, for example, an algebraic relationship often makes an abstract idea concrete and thereby leads to greater understanding. As an example consider the well known formula for the square of the sum of two numbers:

$$(a + b)^2 = a^2 + 2ab + b^2.$$

This formula can be obtained algebraically by "multiplying out" the sum in the brackets. But Figure 1 presents a geometrical version. In this picture the result on the right of the equation above is visualized immediately. To many people the pictorial version is much more direct and convincing than the manipulation of symbols in algebra. Economists make extensive use of geometric figures to explain their ideas. In microeconomics the pictorial method is so integrated in the subject that pictures form an integral part of most expositions. See, for example, Samuelson[4]. Indeed, modern comprehensive treatment of microeconomics at an elementary or intermediate level without pictures is almost unthinkable. To many students of economics, such ideas as the relationship between supply and demand, or the optimum output of a firm, are made comprehensible only through geometric devices.

Fig. 1

$$(a+b)^2 = a^2 + 2ab + b^2$$