NONPROPORTIONAL REINSURANCE AND THE INDEX CLAUSE

RONALD E. FERGUSON

Not since the Depression of the '30s has the country been so concerned about the state of the economy and, in particular, inflation. Everyone recognizes inflation to be the cruelest tax of all—a phenomenon that in its most virulent form can tear asunder the fabric of society. We are confronted with double digit inflation and double digit prime rates. In the words of President Ford, "Inflation is domestic enemy number one."

THE DIAGNOSIS

It is difficult to make a diagnosis of the problem; even the economists cannot seem to agree among themselves. Some would say the cause is deficit spending; some, in light of recent supply shortages and crop failures, hold to a cost-push theory; while still others blame wage-pull or demand-pull forces. Monetarists contend it is the supply of money and credit, while the "gold bugs" and "silver bugs" blame it on a currency that has no inherent value.

Of all the diagnoses offered, the one that makes the most sense to this author is that of Professor James S. Duesenberry, Chairman of the Department of Economics, Havard University.[1] He contents the etiology of this disease is complex and deeply embedded in our economic system. In the first part of his diagnosis he argues convincingly that our economy has a built-in bias toward inflation stemming from three major areas.

The first of the factors contributing to the inflation bias arises out of the need for changes in relative prices, engendered by shifts in supply and demand. Demographic changes, changes in tastes, changes in availability of raw materials and technological changes all translate into supply and demand changes and make changes in price relativities necessary. To achieve the appropriate relativities, some prices should go up while others go down. Professor Duesenberry argues, however, that in our economy for a variety of reasons these realignments are often accomplished only by price increases.

The second part of the bias problem involves linkages. It is easy to imag-

---

[1] J. S. Duesenberry, "Can We Control Inflation?" a lecture presented at the University of Michigan of September 20, 1973. Printed copies were distributed by the Graduate School of Business Administration.

ine examples of wage linkages. Personnel management and union operations have, in their quest for order and equity, established a complex set of wage linkages. For example, a police chief might be paid X% more than his captain, who will in turn be paid Y% more than the lieutenants, who will in turn be paid Z% more than the sergeants and so on down the line. Sometimes the linkages are even more complicated. In New York City, for example, the salary scale for firemen is directly related to the policemen's scale, and even the sanitationmen's salaries are keyed to police salaries. Such complex linkages make it difficult or impossible to respond to a supply and/or demand change without tilting the whole system.

The third element contributing to the bias is our commitment by law (Employment Act of 1946) and by deed to the concept of a full employment economy. A full employment policy coupled with welfare economics, deficit spending, and other biases mentioned above make it difficult or impossible for our present economy to go through the dislocation and wrenching that is needed to arrest inflation and regain an economic equilibrium point.

The second part of the Duesenberry diagnosis is the "dynamic" part of the problem, and involves what could be called the snowballing effect of a surge in demand. The results of a demand surge might be felt in several ways. A greater demand and utilization of capacity in one area will attract labor and capital from another area resulting in a higher cost of attracting labor and capital to both the first and second areas.

In addition, surges in demand are used (especially in oligopolistic industries) to push prices up to new levels. The new level becomes the norm, and a price retreat becomes unlikely. Remember the gas crisis? Similarly, a surge in demand may give a union a better bargaining position to exploit.

The stage may then be set for an inflation psychology with inflation spawning inflation. Expectations change and everybody wants "theirs": wage earners and pricemakers become aggressive in trying to protect their interests.

The situation is further complicated and compounded by the built-in biases mentioned above. The net result is a potential for mild recessions (or worse) with inflation, a tandem that until recently would have been considered improbable or even impossible. Professor Duesenberry explains, "The problem is that once we have built up a set of wage distortions and have changed expectations, a mild relaxation of demand pressures may not be sufficient to check the inflation. We'll just find ourselves on a new plateau

where we can only beat that inflation down to its former rate by some drastic sacrifice a big recession or major surgery with such instruments as price controls.[2]

Professor Duesenberry finished his lecture with the story of the executive who told his staff he wanted to learn all about economics. He didn't have time to read the several books they suggested, they then suggested one, but he didn't even have time for that. Finally the staff boiled the one book down to 50 pages, then 30, then finally down to a single sentence--a summary of the whole science of economics "There is no such thing as a free lunch."

THE PROGNOSIS

As for the prognosis, no one seems to have the answer and the problem continues to fester. In July 1974, the seasonally adjusted wholesale price index rose 3.7% over June, a staggering annual rate compounded monthly of 54.6%! As we approach "banana republic" inflation rates, everyone from the man on the street to the ivory tower economist has a suggested therapy. Interestingly enough, one of the "solutions" is directly related to the subject of this paper.

In an article in *The New York Times* on April 3, 1974, Milton Friedman, the well-known classical economist from the University of Chicago, was quoted as suggesting escalator clauses might be the answer. Wages, interest rates, income tax, and accounting practices would all be adjusted to reflect the impact of rising prices. Few observers, however, agree that such an institutionalization of inflation would solve our inflation problem. In the *Wall Street Journal,* Walter Heller referred to Friedman's proposal as "economic streaking." Although it is generally conceded that such a scheme did help bring inflation under control in Brazil, it is argued that social and economic conditions were different enough in that country so as to make the experiment non-transferrable to other economies. In any case, Friedman's idea does not address the root cause of the problem, it is rather an accommodation to it, and it is likely the proposal will never gain much currency in this country. It is, however, an idea to which we will return as a possible solution to the inflation problems faced by one segment of the insurance industry.

---

[2] J. S. Duesenberry, op. cit.

THE PECULIAR PROBLEM OF THE EXCESS WRITER

Severe inflation is not a new problem for the liability insurance ratemaker. He was looking at double-digit inflation well before it became "fashionable." A recent Insurance Services Office (ISO) report indicated total limits general liability claims inflation was running between 13% and 23% per annum depending on the subline.[3] Auto claims inflation rates were over 8% per annum as early as the mid '60s when the Consumer Price Index (CPI) was going up at what now looks like a comfortable 2% to 3% annual rate. It seems that the collection of goods and services and loss of income that underlie an insurance claim have traditionally gone up faster than the overall market basket. Insurance, unlike other sectors, has suffered from a double barrelled inflation effect. The ordinary economic inflation discussed above and what might be called social inflation. By social inflation is meant the various noneconomic forces that have increased claim costs including lenient or compassionate (depending on your point of view) juries, increased claim propensities and erosion of the negligence concept.

To the credit of the industry these problems have been perceived and the industry has reacted on two fronts. Many carriers marshall a whole panoply of cost reducing efforts: experiments in early settlements, engineering services, rehabilition services and other risk management services. The second front is defensive rather than offensive and involves ratemaking endeavors. By and large it is safe to say that actuaries attempt to price the product to reflect the cost levels expected to ultimately obtain (giving full recognition to inflation). While it may be true (indeed must be true over the long run) that the primary ratemaker responds to total limits inflation, the carrier in an excess position must take extra precautions.

The problem the excess writer faces is the leveraged effect of inflation. If losses are insured over a fixed retention, say $50,000, all losses that exceeded the retention before inflation will, with inflation, treat the excess writer to a double dose of inflation. The excess writer will experience an increased cost on its part of the claim and also will bear the inflation on the retention, for on this type of loss, all the inflation is passed on to the excess area. The excess carrier experiences yet a more insidious inflation effect. Some losses that would not have pierced the retention without inflation now will, because of

---

[3] Report to the ISO Commercial Casualty Actuarial Subcommittee, August 2, 1974.

inflation, become excess losses. For example, with 10% inflation the $48,000 claim which formerly produced no excess loss, would now generate a $2,800 excess loss. Inflation increases the severity of losses that already exceeded the retention and increases the frequency of claims by actually creating new excess losses.

J. T. Lange demonstrated the problem in an interesting way. If a line (he used a least squares line) is fitted to both basic limits and total limits data (same population) the effect on the excess area can be estimated as follows:[4]

TABLE I

	Average Claim Cost		Average Annual Change in Claim Cost From Fitted Line
Total Limits	$1,100		$100
Basic Limits	1,000		80
Difference	$ 100		$ 20
Total Limits Trend	100 / 1,100	= 9%	
Basic Limits Trend	80 / 1,000	= 8%	
Increased Limits Trend	20 / 100	= 20%	

Mr. Lange said of this demonstration, "While this approach is not perfect, it can be easily applied to readily available data, is relatively simple to explain, and does demonstrate the magnitude of the problem." It should be noted that this approximating technique is currently used by ISO for increased limits ratemaking for some lines.

---

[4] J. T. Lange, "The Interpretation of Liability Increased Limits Statistics," *PCAS*, LVI (1969), p. 170.

The leveraged effect of inflation does vary greatly by retention. This phenomenon was studied by Mr. L. H. Roberts, who prepared a lengthy technical report, although a summary did appear in the trade press. Mr. Roberts started with actual loss distributions to which he fitted a sequence of connected second and third degree polynomials and used a Pareto type curve for the last (top) group. Various inflation rates were assumed and run against the loss model. A sample of the results is set forth below:

TABLE II

OVERALL INFLATION RATE 8.6% PER ANNUM[5]

(1) Retention	(2) Effect on Losses (limited to retention)	(3) Effect on Excess Losses
$10,000	7.27%	17.95%
15,000	7.67	18.94
20,000	7.83	21.21
25,000	7.97	23.02
50,000	8.35	29.59

As the retention increases, Column (2) will approach 8.6% and Column (3) will increase without bound.

It may be that the excess writer faces yet another peril arising out of inflation. It is commonly believed, or at least assumed, that inflation is uniform and does not vary by size of claim. Whether small claims inflate at an annual rate that differs from that affecting large claims has not been explored and remains a matter of conjecture. It is likely, however, that large claims would inflate at a higher rate due to their mix of indemnity and medical/rehabilitation. Large claims may have a higher proportion of medical/rehabilitation costs and thus be more sensitive to inflation.

The leveraged effect of inflation is without a doubt one of the most serious problems faced by any carrier writing longtail business over fixed retentions or significant deductibles.

---

[5] L. H. Roberts, *Best's Review* Property/Liability Edition, "The Impact of Inflation on Reinsurance Costs," March, 1973, p. 16.

THE SOLUTION

There are a number of possible solutions to the leveraged inflation problems of the excess writer:

1. If excess prices are to be a function of increased limits tables, the ratemaking underlying the tables must properly take into account the leveraged effect of inflation.

2. It is not difficult to devise a loss rating scheme where the projected claims inflation can be fully taken into account. (See for example, formula 2 in Appendix II). It is however, in these uncertain economic times questionable whether inflation can be predicted with sufficient accuracy to make such schemes work.

3. Experience rating schemes (either adjustable commission or premium arrangements) may have enough latitude to absorb the increased costs resulting from inflation.

4. Coverage does not have to attach on the traditional losses occurring basis. There has been talk recently of "claims made" coverage – it would be theoretically possible, although perhaps not too practical, to have coverage attach on a "claims settled" basis.

Done properly, each of these approaches could be aceptable, but it does mean that increased limits tables and rates developed from a loss rating approach would have to be revised at least annually.

The great and relentless pressure on excess rates can be seen in the following example. For purposes of this example, a loss distribution was invented (losses below $30,000 are not shown since they are not germane to the point) and the following assumptions employed:

1. Losses take four years to settle

2. There is no loss development other than that caused by inflation

3. Gross losses inflate by 10% per annum

4. The initial total limits (or subject) premium is $10,000,000

TABLE III

Number of Losses	1974 Initial Gross Losses $29,999 and Over	1974 Accidents Settled At 1978 Values	1975 Accidents Settled At 1979 Values	1976 Accidents Settled At 1980 Values
10	$ 30,000	$ 43,923	$ 48,315	$ 53,147
5	40,000	58,564	64,420	70,862
3	50,000	73,205	80,526	88,578
2	60,000	87,846	96,631	106,294
1	80,000	117,128	128,841	141,725
1	100,000	146,410	161,051	177,156
Losses Excess of $50,000	$100,000	$351,665	$446,832	$582,983

		Excess Rate Before Expense And Profit		
		Total Limits Premium		
1974	$10,000,000	3.52%		
1975	11,000,000		4.06%	
1976	12,100,000			4.82%

Even if rated properly and nothing else changes (the legal climate, underwriting, accident frequencies and product mix are all stable, and the primary carrier properly reflects inflation in his total limits ratemaking), the excess rate cannot hold up under the attack of inflation. The excess carrier must, even if the exposure was properly priced in the first year, constantly reassess his pricing and seek rate increases every year. In this example, the subject premium and the excess premium increased 10% each year, but in addition, the excess writer needs a 15% increase for the second year and a 19% increase for the third year. If inflation can be predicted with reasonable accuracy, and if both the ceding company and the primary carrier understand the forces eroding the adequacy of the excess rate, there is no reason why the excess coverage cannot be written over a fixed retention. Both parties would simply have to become accustomed to the need for frequent rate increases.

INDEX CLAUSE

There is a way to achieve stability in the excess rate, even in the face of inflation. The only way stability can be achieved is for the ceding company and the excess carrier to share the effects of inflation. This can be accomplished by adjusting the retention over time in phase with changing economic conditions.

The part of the contract that spells out the terms of the adjustable retention is usually called the "Index Clause," although it is sometimes referred to as a "Stability Clause." The contractual language is neither long nor complicated. It may state that it is the intent of the parties that the company's retention and the excess carrier's limit of liability retain their relative monetary value (by means of the index clause). It could be, and often is, stated in a different way, but, of course, the end result is the same. Another example it is intended to equitably share the effect of inflation or deflation between the ceding and assuming carrier (by means of the index clause). Yes, the index clause is a two-edged sword, but, for the reasons mentioned in the first section, the deflation edge is probably only of academic interest.

Operation

The contract will then go on to explain the mechanics or operation of the clause. Exhibit I of Appendix I is a complete index clause agreement. In this agreement, the mechanics of the indexation are described in a general way. Examples of the operation of the index are, however, included to illustrate the intent. Exhibit II of Appendix I is a contract used in the London market and actually spells out the mechanics in considerable detail.

In the case of a single claim (payment) the operation is very simple: the retention is merely adjusted in direct proportion to the change in the selected index between the time coverage was priced (i.e., inception of a reinsurance treaty) and the date of claim settlement. If, for example, the index went up 20% (say from 100 to 120 or from 150 to 180), the retention would be increased by 20%.

For example, suppose a retention of $50,000 was selected and priced when a certain type of gross claim was expected to cost $65,000. If such a claim occurred and was settled not for $65,000 but $78,000 by reason of inflation, the excess carrier without an index clause would have a claim severity 87% greater than expected, while the ceding carrier's loss would have stopped at $50,000 for a 0% effect. With the index clause, the retention would

go to $60,000 (50,000 x 1.20) and both carriers would have experienced a 20% claims inflation. In other words, the two carriers would have ratably shared the effects of inflation.

Returning to the rating problem and assumptions discussed earlier (Table III) with a $50,000 retention, it was demonstrated that:

TABLE IV

	Losses Excess of $50,000	Excess Rate Before Expenses
No Inflation	$100,000	1.00%
10% Per Annum Inflation		
1974 Accidents (settled 1978)	$351,665	3.52%
1975 Accidents (settled 1979)	$446,832	4.06%
1976 Accidents (settled 1980)	$582,983	4.82%

Assuming the index selected went up 10% per annum (just as the losses), the retention with respect to cases settled in 1978 would be $73,205, $80,526 in 1979, and $88,578 in 1980. Under these circumstances, the expected excess loss cost and rate would be:

TABLE V

	Excess of Indexed Rentention	Excess Rate Before Expenses
1974 Accident Year	$146,410	1.46%
1975 Accident Year	161,050	1.46
1976 Accident Year	177,157	1.46

Thus, it can be seen that, other things being equal, the index clause can create a stable excess rate by sharing inflation between the two carriers. Both

carriers under the index clause are liable for the same percentage of the total limits losses they would have had without inflation. In other words, the retention and limit have been adjusted so as to maintain relative monetary values consistent with those that obtained when the business was originally underwritten and priced.

If more than one claim is subject to the same retention, the intent and concept remain the same although the execution is more complicated. As an example, consider the case of some excess business underwritten in 1974 with a retention of $50,000 and with claims inflation and the selected index increasing at 10% per annum. Suppose an automobile accident occurred resulting in three claims settled as follows:

TABLE VI

	Settled	Amount	Index (1974 = 1.00)
Claimant A	1975	$ 10,000	1.10
Claimant B	1976	15,000	1.21
Claimant C	1980	150,000	1.77
Total		$175,000	

To determine the properly indexed retention involves a two-dimensional weighting of the retention adjustment – for time and money. The easiest way to accomplish this is to deflate all values to "time O" or the inception of the contract and determine the relationships between retention and the deflated settlements. In other words, how would the total loss have been allocated absent inflation? These relationships are then used to allocate the actual settled values.

TABLE VII

	Actual Value	Deflated Value
Claim A	$ 10,000	$ 10,000 ÷ 1.10 = $ 9,091
Claim B	15,000	15,000 ÷ 1.21 = 12,397
Claim C	150,000	150,000 ÷ 1.77 = 84,746
	$175,000	$106,234

Original retention as a percent of deflated losses 50,000/106,234= .4707

Excess recovery (deflated basis) 56,234/106,234=.5293

Thus, the $175,000 should be allocated as follows:

$$\text{Retention} = \$50{,}000 \times \frac{175{,}000}{106{,}234} = \$175{,}000 \times \frac{50{,}000}{106{,}234} = \$175{,}000 \times .4707 = \$82{,}372$$

$$\text{Recovery} = \$56{,}234 \times \frac{175{,}000}{106{,}234} = \$175{,}000 \times \frac{56{,}234}{106{,}234} = \$175{,}000 \times .5293 = \$92{,}628$$

A single claim with multiple payments presents similar problems and would usually be treated the same as a multiple claim incident (above). Strictly speaking, there should be a distinction made between a partial payment that represents a partial settlement as opposed to one that is merely an advance payment. In the former case, that part of the claim is closed and can be indexed at the time of payment. The advance payment, on the other hand, has little or no effect (an arguable point) on the inflation forces operating on the claim as a whole and is indexed at the settlement date. In other words, all advance payments are collected and the actual final payment, treated as one final payment.

Obviously, multiple claims or multiple payment situations can get quite complex from an index clause point of view. One immediate problem is that it is not possible to make a final apportionment of the loss until all elements are known. It is, of course, possible to make provisional apportionments along the way. If the claim involves a string of payments similar to an annuity, it might be possible to commute the payments for index clause/retention computation purposes. There will, nevertheless, be complicated situations where the parties might have to develop a mutually agreeable and equitable application of the index clause.

Variations

A few interesting variations (although not widely used in the United States) on the operation of the index clause are the so-calle franchise, cut-off, and exemption. All of these serve to limit in some way the operation of the index. The first, the franchise deductible or severe inflation index, simply makes the index clause inoperative unless inflation is more than X% per year, or has accumulated to more than Y% since the contract's inception. Used properly (X and Y fairly low), this variation may have some value reducing the nuisance and expense of the index clause in times of low inflation.

The second idea, the cut-off, is simply an agreement to cap the adjustment of the retention. The contract may specify that inflation of no more than X% per annum or Y% since inception will be considered in computing the retention adjustment. The cut-off is difficult to price and tends to vitiate the whole index clause concept but may, in certain situations, (for very small ceding companies) serve a valid purpose.

A third variation is to allow for an exemption or deviation from the indexation. If it can be demonstrated that the settlement was unusual and at least in part not related to inflation, the indicated retention might be deviated, but probably not below the retention indexed to the year of occurrence.

All these innovations, and more are undoubtedly on the way, served useful purposes at first, but use has in some cases given way to abuse. One recent development is the announcement by a London broker that a facility has been arranged "whereby reinsurance can be offered to reduce loss to ceding companies due to the application of an index or stability clause in excess of loss reinsurance treaties."[6] This sort of gap coverage will perhaps appeal to some, though it lacks logic. After all, from a ruin theory, or even common sense, point of view, it would appear the retention should change (quite apart from the excess writer's problem) as the value of money changes, and it would hardly seem justifiable to insure the difference between the old or original retention and the indexed retention.

A final comment on the mechanics of index clauses involves layers. Many excess coverages and nearly all reinsurance arrangements involve more than one layer. The logical rules concerning indexation and layers appear to be:

---

[6] Article appearing in June 1974 edition of *Reinsurance*, p. 72.

1. If the attachment point (i.e., retention) of the preceding layer is indexed, but the length of the layer is not indexed, it is possible to leave subsequent layers unchanged. This, of course, means the layer between the first (indexed) attachment point and the next (unindexed) point will shorten and perhaps even be eliminated eventually.
2. The first attachment point might be indexed with the length of the first layer remaining constant. In other words, the constant first layer would float over the indexed retention. In this case at least the second attachment point would have to be adjusted.
3. If the attachment point and the length of the layer below are both indexed, the attachment point of the next layer must be indexed. If it isn't indexed, there will be an overlap in coverage.

Pricing

Obviously, a contract with an index ought to carry a price that is different from a contract without an index (assuming the latter was priced properly as respects anticipated inflation). An interesting problem is then presented: How much should the unindexed rate be discounted in contemplation of the index?

One can take either an empirical or theoretical approach to determine the value of an index clause. The approaches and discounts discussed below begin with the premise that the proper rate (i.e., proper in the sense that the rate is valid for the future rating period) is now being charged. To the extent the present rate structure is deficient the discount would, of course, require modification.

The empirical approach would simply involve performing a loss rating analysis on two bases: pitching gross losses to anticipated levels by trending from the midpoint of the accident year to the midpoint of the exposure period, and in one case, using the fixed retention and in the other, adjusting the retention based on an estimated elapsed time between occurrence and settlement. The difference between the two rates is the indicated discount. The resulting number is, of course, subject to whatever shortcomings exist in the loss rating techniques and in the data itself, and it must be tempered accordingly.

The theoretical approach is handy, but it is built on a set of assumptions (it can be argued that the empirical approach is also built on a set of assumptions the principal one being that the past will be replicated with (trending) adjustments in the future). The formula derived in Appendix II is not difficult to use, once the assumptions are developed.

$$\text{Discount} \doteqdot 1 - \frac{1}{1 + [(1 + i)^t - 1] \cdot R/\overline{X}}$$

Where i = Gross inflation rate
t = Average number of years to settle a loss
R = Retention
$\overline{X}$ = Expected average loss in excess of the indexed retention.

Assuming the data have some credibility, the empirical approach is probably the method of choice, although there is value in going through the formula approach. Developing the formula result highlights the assumptions the sensitive areas. The value of an index clause varies by retention level, inflation rate, life (longevity) of a claim, and the frequency and severity of excess losses.

Prudence would seem to militate against allowing the full indicated discount. Since the data are seldom fully credible, and since numerous assumptions must be used, and since the primary industry may not be responding fully to total limits inflation, the discounts probably should be discounted.

Reserves

An excess contract with an index clause has loss reserving ramifications for both the ceding and assuming carriers. While it is true in a narrow and technical sense that the index clause is oriented toward settlement, it would be imprudent not to take the indexed retention into account during the life of the claim. For example, suppose a primary carrier reserved all its claims on a basis geared toward settlement and both carriers set up reserves without consideration of the indexed retention. It seems clear that such a procedure would overstate the liability of the assuming carrier with a corresponding understatement of the ceding carrier's liability.

In order to reflect the proper allocation of the loss, the carriers could agree to register (book) claims on an indexed basis. Periodically there should be a reevaluation of the claim and an adjustment of the retention. Another approach would be to process individual claims without regard for the indexed retention and calculate or estimate a bulk reserve adjustment (normally negative for the assuming carrier and positive for the ceding carrier) at statement dates.

Either the indexed case or the formula approach should help to develop a more accurate reserve structure. Perhaps the most important single point is to have adequate communication between the carriers on the handling of reserves.

Economic Barometers

There are myriads of indices from which to select — none of them perfect. Ideally the index should move directly in phase with all of the forces that affect the claims inflation of the particular line of insurance. The index values must be available on a regular and timely basis. The index must have continuity and the confidence of both parties.

No single economic barometer meets all of these tests, but some come closer than others. As respects test number 1, we might be very willing to settle for an index that explains or accounts for 70% or 80% of the line's inflation.

Availability (timing) can be a problem. If the index clause wording is not carefully planned it could happen that it is time to settle a loss and the applicable index value is not yet published. A lag factor can be built into the index clause as was done in Exhibit I of Appendix I, or losses could be settled provisionally and adjusted when the index value is known — a cumbersome and expensive procedure.

There are four possible sources for the index:

1. Internal — If dealing with a very large primary company, their severity data may be credible and usable.
2. External Private — Industrywide or nearly industrywide statistics as published by organizations such as ISO are theoretically the best source, but continuity is a problem. Companies come and go from the data base; sometimes whole states come and go!
3. Government Statistics — Dozens and dozens of indices are published by branches of the U. S. Government. The CPI is the best known, but probably least suitable. It has a narrow scope and lags behind other indicators. The Wholesale Price Index and manufacturing wage data are probably better indicators.
4. In some circumstances, it may be possible (necessary!) to synthesize an index using selected government and/or private indices. Masterson has done a considerable amount of work in this area.[7]

---

[7] N. E. Masterson, "Economic Factors in Liability and Property Insurance," *PCAS*, LV (1968), p. 61.

SUMMARY

There is ample evidence to suggest that inflation, perhaps even severe inflation, will be a serious problem for the excess writer in the foreseeable future. A fixed retention excess contract with inflation, will result in a disproportionate distribution of the effects of inflation, thereby eroding the excess carrier's position.

The excess carrier's rating problem can be solved by exercising vigilance and responsive imaginative pricing schemes. If a stable excess rate is sought, the only answer is to share equitably the effects of inflation by means of an index clause or something like it.

The index clause can be a powerful and useful tool, but it is important to also understand what it cannot do. The index clause is not a panacea. If the excess position is deteriorating for reasons other than (or in addition to) inflation, the index clause is not the total answer. The index will not counterbalance changed underwriting standards, product mix changes, changing claim philosophies, and the like. The index clause does not even solve the problem of inflation; it merely solves the problem of allocating the effects of inflation.

Although not a panacea, the index clause does deal effectively with what is probably the number one problem on the nonproportional carrier. If both the primary and nonproportional writers are operating consistently and soundly, the index clause can produce a stable rate and a stable relationship.

Appendix I
Exhibit I

ENDORSEMENT NO. 2

Attached to and made a part of
AGREEMENT NO. 123

As respects losses resulting from accidents taking place on and after January 1, 1974, IT IS MUTUALLY AGREED that the amount(s) of the Company Retention, and the amount(s) of the First Excess Covers set forth in Agreement Number 123 (as amended by prior Endorsements thereto), is provisional and shall be subject to adjustment at the end of each calendar quarter in accordance with the provisions of the attached "Index Clause" and the attached EXAMPLES OF THE APPLICATION OF THE INDEX CLAUSE

IN WITNESS WHEREOF, the parties hereto have caused this Endorsement to be executed in duplicate this 1st day of January, 1974.

RELIABLE REINSURANCE COMPANY

By _____

A + INSURANCE COMPANY

By _____

INDEX CLAUSE

Attached to and made a part of
Agreement No. 123

The amount(s) of the Company Retention and the amount(s) of the First Excess Covers shall all be correspondingly adjusted as respects accident occurring on and after January 1, 1974 so as to equitably share the effect of deflation or inflation between the Company and the Reinsurer. The retention and above-mentioned cover(s) shall be adjusted based on changes in the Index of Countrywide total limits of Automobile Bodily Injury Liability average paid claim cost data for all types of Automobiles as compiled by the Insurance Services Office. Such data are compiled on a quarterly basis and the average paid claims costs for the twelve month period ending December 31, 1972 shall be deemed the index base existing at January 1, 1974.

Accordingly, the amount of the Company Retention and above mentioned limit(s) shall be decreased or increased on a quarterly basis in proportion to the variation between the Index figure for the twelve month period ending December 31, 1972 and the applicable Index figure set out in the following schedule.

January 1 thru March 31 of calendar year	12 month period ending four calendar quarters prior to previous December 31
April 1 thru June 30 of a calendar year	12 month period ending four calendar quarters prior to previous March 31
July 1 thru September 30 of a calendar year	12 month period ending four calendar quarters prior to previous June 30
October 1 thru December of a calendar year	12 month period ending four calendar quarters prior to previous September 30

EXAMPLES OF THE APPLICATION OF THE INDEX CLAUSE

Attached to and made a part of ENDORSEMENT NO. 2
AGREEMENT 123

A. Index Clause effective January 1, 1974

Twelve Months Ending	Countrywide Average BI Paid Claim Cost	Index
12/31/72	$1,880 (Estimated	1.000
12/31/73	1,975 (Estimated)	1.051
6/30/74	2,025 (Estimated)	1.077

B. Single Settlement Date First Excess Cover-$65,000 per person excess of $35,000 per person and Second Excess Cover-$900,000 per person excess of $100,000 per person.

An accident occurs on March 1, 1974 and is settled on February 1, 1975 for $200,000. Based on the information in paragraph A, the company's retention of $35,000 on January 1, 1974 is adjusted to $35,000 x 1.051 or $36,785, and the second excess attachment point of $100,000 is adjusted to $100,000 x 1.051 or $105,100. For this claim the Reinsurer would reimburse the company $163,215 ($200,000 - $36,785). The Reinsurer's payments would be allocated between the First Excess Cover ($68,315) and the Second Excess Cover ($94,900) for a total of $163,215.

C. Multiple Settlement Dates First Excess Cover $65,000 per occurrence excess of $35,000 per occurrence and Second Excess Cover $900,000 per occurrence excess of $100,000 per occurrence.

If an accident occurs on March 1, 1974 and results in settlement with two Automobile Bodily Injury claimants, the calculations would be as follows:

$200,000 paid to claimant E on February 1, 1975

$200,000 paid to claimant F on July 3, 1975

Claim E	$\frac{\$200,000}{1.051}$	=	\$190,295
Claim F	$\frac{\$200,000}{1.077}$	=	185,701
	Sub-Total		\$375,996
	Less original retention of		\$ 35,000
			\$340,996
	Less original First Excess Cover of		\$ 65,000
			\$275,996

Final Apportionment of Claims

Retention	$\frac{\$ 35,000}{375,996}$	×	\$400,000	=	\$ 37,234
First Excess Recovery	$\frac{\$ 65,000}{375,996}$	×	\$400,000	=	69,150
Second Excess Recovery	$\frac{275,996}{375,996}$	×	\$400,000	=	293,616
			Total Claims		\$400,000

Appendix I
Exhibit II

INDEX CLAUSE

1. It is the intention of this Agreement that the retention of the Company and Reinsurer's maximum limit of liability shall retain their relative monetary values as they exist at . . . . . .

2. At the date of settlement of any claim by the Company any change in relative monetary values shall be ascertained from the latest figures issued in respect of the Index specified below.

3. The retention of the Company and the maximum limit of Reinsurer's liability shall be modified in proportion to any variation in the Index as between the . . . . . and the date of settlement of the claim by the Company.

4. The date of settlement of a claim shall, unless otherwise agreed, be the date of settlement by the Company or the date upon which the amount of an award is finally determined by the Courts.

5. In the case of a claim being settled by the Company in more than one payment:

   a. Any interim payment, other than specified in (b) below shall be added to the final payment and the Index applied as above described.

   b. In the case of claims involving continuing payment which cannot be commuted, the Company and the Reinsurer shall consult together with regard to an equitable application of this clause.

6. In the case of an event/accident/occurrence (as defined in Article . . . . . of this Agreement) consisting of more than one claim, each claim shall be dealt with separately in accordance with the terms of Section 2 of this clause. The factor produced by dividing the total of the amounts actually settled by the Company in respect of all claims by the total of their indexed values shall then be applied to the retention of the Company and to Reinsurers' maximum limit of liability and the loss apportioned accordingly.

7. The Index to be applied shall be . . . . . .

APPENDIX II

INDEX CLAUSE DISCOUNT

n = Number of reinsurance losses

G_j = Gross Loss (settled or outstanding, as the case may be) in observation period ($G > R$)

X = Average excess loss trended and indexed =

$$\frac{\sum_{j=1}^{n} [G_j (1+i)^u - R (1+i)^t]}{n}$$

R = Retention (i.e., current or proposed fixed retention)

E = Subject premium base in observation period
[$E (1+i)^u$ could be replaced, indeed it would be preferable, by premiums on level]

LDF = Loss Development Factor

t = Number of years from occurrence to settlement

u = Number of years from occurrence to midpoint of new exposure period

i = Inflation Rate

P_{WI} = Price with indexed retention

P_{NI} = Price — no index

D = Discount

$\triangle$ = Excess cost on claims that exceed retention as a result of inflation

$$P_{WI} = \frac{\sum_{j=1}^{n} [G_j (1+i)^u - R (1+i)^t]}{E (1+i)^u} \cdot LDF = \frac{n\overline{X} \cdot LDF}{E (1+i)^u} \tag{1}$$

$$P_{NI} = \frac{\sum_{j=1}^{n} [G_j (1+i)^u - R] + \triangle}{E (1+i)^u} \cdot LDF$$

$$P_{NI} = \frac{\sum_{j=1}^{n} [G_j (1+i)^u - R (1+i)^t + R (1+i)^t - R] + \triangle}{E (1+i)^u} \cdot LDF \tag{2}$$

$$P_{NI} = \frac{n\bar{X} + nR [(1+i)^t - 1] + \triangle}{E (1+i)^u} \cdot LDF$$

$$\frac{P_{WI}}{P_{NI}} = \frac{n\bar{X}}{n\bar{X} + nR [(1+i)^t - 1] + \triangle} =$$

$$\frac{1}{1 + \frac{R}{\bar{X}} [(1+i)^t - 1] + \frac{\triangle}{n\bar{X}}}$$

$$D = 1 - \frac{P_{WI}}{P_{NI}}$$

$$D \doteq 1 - \frac{1}{1 + [(1+i)^t - 1] \cdot \frac{R}{\bar{X}}}$$

As a practical matter, the discount formula might be used with some modification since it is usually difficult to determine $\triangle$ with much accuracy. Leaving $\triangle$ out of the discount formula makes the discount somewhat more conservative from excess carrier's point of view. Another way to get a perspective on the difference or discount is to relate formulas (1) and (2) as follows:

$$P_{NI} = P_{WI} + \frac{nR [(1+i)^t - 1] + \triangle}{E (1+i)^u} \cdot LDF$$

Therefore, the difference in price is a function of inflation on the retention for each of the old excess claims (i.e., those that without inflation already exceeded the retention) and the new excess claims that come through the retention as a result of inflation.