

U.S Producer Price Index for Property and Casualty Insurance

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I. Industry Output

The primary output of the property and casualty insurance industry is the assumption of risk (transfer of risk from the policyholder) and financial intermediation. In this industry, financial intermediation is the investing of someone else's money with the goal of partially offsetting the size of the premium payment.

The policy underwritten by the insurer represents the unique output. The policy lists the coverages for which restitution would be made to the policyholder to cover claims. The amount of risk being transferred to the insurer is clearly stated in terms of covered benefits (and benefits not covered) and it obligates the insurer to pay claims for all such occurrences. So, the output is the transfer of the risk of financial loss from the policyholder to the insurance company.

The output can be further defined by the specific types of property and casualty insurance coverage. The major service lines follow:

- Private passenger auto insurance
- Homeowner's insurance
- Commercial auto insurance
- Commercial multiple peril insurance
- Worker's compensation insurance
- Medical malpractice insurance
- Product liability insurance
- Inland marine insurance
- Surety insurance
- Fidelity insurance

II. Item Selection

The first step in the selection process was to sample the companies by line of insurance. Next, actual policies were chosen by probability proportionate-to-size sampling based on certain price determining characteristics of the policies. Once an actual policy is selected, its price determining characteristics are identified to permit repricing of the same unique item. The following policy characteristics are common in most property and casualty insurance lines:

1. Type of property/casualty description - This provides the characteristics of the insured property.
2. Type of coverage - This includes physical damage coverage and liability coverage.
3. Dollar limit of coverage - This is the maximum amount of money the insurer is legally obligated to pay in the event of a claim.
4. Coinsurance clause - The percent of the value of the property to be reimbursed by the insurer.
5. Deductible - The insured bears the first part of any loss covered by the policy up to a specified amount.

6. Length of policy period – This is the time frame for which the policy is in effect.
7. Perils covered – These are the specific risks that the insurer assumes.
8. Location of the insured property – Risks vary by geographic location.
9. Past loss experience – Premiums generally are lower if the insured has a past record of making fewer claims.
10. Valuation of insured property – This can be either the actual cash value of the property, which adjusts for depreciation, or the replacement cost.
11. Valuation of risk exposure – This is a valuation for liability coverage.

III. Pricing Methodology

The operational definition of assumption of risk plus financial intermediation is premium plus rate of return on investment. Investment income is crucially important to the industry and greatly affects their pricing decisions and its inclusion should yield a smoother statistic that would facilitate the regulatory decision-making process. Companies may well reduce premiums when the rate of return increased in response to competitive pressures, as well as raise premiums when the rate of return is lower.

Thus, the price can be expressed as

$$\text{Price} = \text{Premium} (1 + r)$$

where r is the annual return on the invested portion of the premium for the particular line of insurance that is being priced. This rate is stated as a percentage of all premiums paid.

There are mutual companies whose policyholders are also the stockholders of the company. These companies typically pay out a dividend rebate to the policyholders on an annual basis. In such cases, the dividend would be subtracted from the premium to obtain a net transaction price. This price can be expressed as

$$\text{Price} = \text{Premium} (1 + r) - \text{Dividend}$$

To track premium movement in the property and casualty industry, companies provide estimated premiums for “frozen” policies. This is an actual policy selected by probability where the premium determining characteristics are held constant while the policy is repriced on a monthly basis. The insurance company estimates the current premium for this “frozen” policy by using current charges applied to the policy characteristics of the actual policy. This premium remains unchanged until the policy is priced again the following year.

The major difference in repricing a frozen policy versus repricing an actual policy is that the insured may modify the policy over time. For example, an auto policyholder could add a teenage driver in year two of the policy, increase the liability, or reduce the deductible. Such a change in the repriced item violates the Laspeyres assumption of fixed quality. By freezing the policy characteristics, the fixed quality assumption is realized.

In order to hold inflation-sensitive characteristics constant, periodic adjustments are made to account for inflation. For homeowners insurance, the dollar limit of coverage is adjusted annually to account for construction price inflation. The assumption is that the policyholder is insuring to secure a constant flow of services from the insured property. If there is price inflation affecting the cost of repair or replacement of the damaged property, the coverage limit should be escalated to reflect this increase. This adjustment is made annually on the anniversary date of the policy. This reflects what actually occurs – where the company makes these coverage adjustments at the time of policy renewal. As the index is tracking several thousand policies selected on a probability basis, there is a spread of policy anniversary dates throughout the year. This yields a smoother behaving index than making this adjustment for all repriced items at one time.

The source to be used for the escalation is dependent upon the insurance company. If the company cannot make a recommendation as to how the inflation-sensitive policy characteristics should be adjusted, PPI decides the appropriate index to use. For example, the E. H. Boeckh Building Cost Index is used to escalate the coverage limit for homeowners insurance. A different procedure will be used for Workers Compensation Insurance. The workforce in the group is held constant (same number of people in the same jobs), but the wage rates are adjusted to account for general wage inflation. In this case, the Bureau of Labor Statistics' Employment Cost Index is used.

The investment rate of return is calculated by all insurance companies as a percentage of the premium. An annual report is prepared by all companies which includes this calculation. The report provides the investment rate of return by insurance line calculated as a percent of premium. As with the inflation-sensitive policy characteristics, the rate of return is updated annually for each priced item on the policy anniversary date.

IV. Issues in Maintaining Constant Quality

The fundamental issue in pricing insurance services over time is the ability to identify and adjust for changes in risk. For changes in explicitly endogenous risk factors such as changes in coverage or deductibles, companies have suitable cost data to allow for meaningful cost based quality adjustment. However, for changes in exogenous risk factors that go beyond the scope of policy negotiations, such as an increased incidence of theft or a severe hurricane season, company specific data would not be sufficient to definitively quantify risk. Only outside data sources will be able to identify short-term vs. long-term changes in risk.

Such an outside data source is used in the quality adjustment of private passenger auto insurance where risk changes occur even though the age of the insured auto remains the same. To keep the age constant, the model year of the auto is updated once a year to the next model year. For example, a 1996 Honda Accord is changed to a 1997 model. However, changing the model year can also move the auto into a different risk category known as a symbol group. Insurance companies are unable to assess this risk change on their own, but a valuation can be obtained from Insurance Services Office (ISO). This organization pools risk information industry-wide, producing data which is broader in scope than any that one company could gather on its own. The ISO assigns autos to symbol groups based on their risk characteristics. For PPI purposes, the ISO provides the value of risk change for every auto included in the index. The ISO monitors the symbol group that is assigned to an auto and the particular risk associated with that symbol group. When an auto moves into a different symbol group, ISO assigns a value to the risk change that occurs. This value is then used to explicitly quality

adjust the premium used in the PPI. Therefore, the risk changes are not reflected in the index as price changes.

Another issue is the new item bias that can be present in both repricing methodologies. However, this bias may be especially problematic when pricing a frozen policy. Over time, this policy may no longer be representative. Mandated coverages may change or new insurance products may be introduced. Although bias may not be as prevalent when following an actual policy, it can occur if the general population has changed their preferences for the type of insurance product that they purchase or if the policy represents a smaller portion of the company's business.

The PPI program has developed a "directed substitution" procedure to reduce new item bias. This procedure captures evolutionary changes to a current product or service that did not exist when the sample was selected. Periodically, each company will be contacted in order to review the insurance products included in the sample. The existence of these evolutionary changes in the industry will be identified and disaggregation will be performed to determine if a substitution should be made from the current product to an evolutionary product or to add the new feature to the description of the current product. Producer cost based quality adjustment will then be attempted to adjust for these changes.