

## **Price, Output and Productivity of Insurance: A Review of the Measurement Issues**

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## Introduction

In some services industries, the concept of real output is unclear. When it is difficult to measure the output of an industry, it is also difficult to measure its price change or its productivity. Insurance is one of those difficult-to-measure industries.

For goods, the concept of output is usually straightforward. What the industry produces is usually obvious (an automobile or a computer, for example). The unit in which output is measured is defined by the transaction, so one can count the number of products that leave the factory premises.

Of course, measuring the output of automobiles or computers involves much more than just counting the units, because in both cases quality change is nearly as important a contributor to output as changes in units produced, and in the case of computers perhaps more important. But conceptually, we count the output of the automobile (computer) industry in units that are “quality-adjusted” cars (computers), and that implies that one has the intellectual security of a place from which to start.

It might seem that “number of insurance policies” is the analog to “number of computers,” that “premium for a risk-adjusted insurance policy” is the analog to “price of a constant-performance computer,” and that the premium revenue of an insurance company corresponds to the sales (value of shipments) of a computer producer. However, unlike the computer, where we agree on the units and the measurement issues revolve around measuring the quality change, in insurance the units are themselves at issue--which is not to say that the quality change question is less an issue.

Speaking of services output generally, Zvi Griliches remarked: “The conceptual problem arises because...it is not exactly clear what is being transacted, what is the output, and what services correspond to the payments made to [service industry] providers” (Griliches, 1992, page 7). For insurance, Bradford and Logue (1998, page 30) make a similar remark: “In the case of property-casualty insurance, it is not clear what one means by ‘price’ or ‘quantity.’” Insurance differs from cars and computers because there is no agreed-on unit that provides a place to start. Accordingly, most of the literature on measuring insurance output amounts to debate over the output units: To oversimplify somewhat, the two alternative output units for insurance companies are (1) the insurance policy and (2) units of administrative services provided to the policyholders.

Two literatures address insurance output measurement questions, either directly or indirectly. First, insurance is the subject of a not insubstantial economic measurement literature--statistical agency materials, Conference on Research in Income and Wealth (CRIW) volumes, and economics and statistics journals. In this first literature, measurement questions are addressed and discussed directly and explicitly, which is a great advantage, particularly when the strengths and weaknesses of various alternatives are compared (a principle that is regrettably not observed as often as it should be). But the implications of alternative measurements and of alternative concepts for measuring insurance output are seldom tested by using them in some economic analysis, or by subjecting them to some hypothesis test.

Insights on measuring insurance output also emanate from economic research on insurance, because research requires price and output measures. The research literature has the opposite advantages and disadvantages as the measurement literature. Analytic implications are tested, which is a major advantage. However, the measurement implications are often not drawn directly: One has to infer the way price and output of insurance should be measured, either from what the researchers do with the data they use, or from their complaints about the data they need but do not have. There is no tradition of an

analytical appendix on the topic “What data should we have had to explore this problem?” One must infer such appendices from the content.

In April, 1998, the Brookings Program on Output and Productivity Measurement in Services convened a “Workshop on Measuring the Price and Output of Insurance.” This workshop assembled participants from both the analytic/research community and the measurement community. The latter included staff members from statistical agencies on both sides of the Atlantic, and from the Pacific region as well. Although the measurement of insurance has been discussed in other forums (for example, the papers in Voorburg Group, 1993) the all-day Brookings Workshop provided the most intensive and comprehensive discussion of measurement issues in the insurance sector that has ever taken place.<sup>1</sup>

This paper reviews the treatment of insurance output and prices in the economic measurement literature and in economic research on insurance, and draws as well on the papers presented at the workshop and the enlightening discussion from workshop’s participants. However, it is not intended as a summary of the workshop, nor should it be regarded as a summary of the consensus, for no consensus emerged. Rather, it is an essay on where the state of the measurement art on insurance output stands today, and I organize material from the Brookings workshop in a way that is intended to advance understanding of the issues. For example, the discussion of “models of insurance company behavior” (section I) was mainly implicit in the workshop discussion, but making this topic more explicit clarifies the subsequent discussion of insurance measurement issues.

An additional source on which I have drawn are the deliberations of a Bureau of Economic Analysis (BEA) study team that reviewed the treatment of insurance in national accounts in 1995-96. This team, known internally as the “Insurance and Pensions Modernization Work Team” (hereafter, BEA Work Team), ultimately split into majority and minority views on the treatment of insurance, voicing exactly the same two views that have been in the literature and that are reviewed in this essay. Partly because of this split, no publicly-available document was produced, but the materials developed by the team have been useful in preparing this review, particularly for the arguments favoring the national accounts view of insurance, which have not always been recorded in written or published form.<sup>2</sup>

Unless otherwise indicated, the topic of the paper is property-casualty and term life insurance. “Whole” life insurance, which has a substantial savings-investment component, is not emphasized, because true insurance is only a part of the contract. I also omit social insurance (in the U.S., Social Security, the unemployment compensation system, and so forth); social insurance is usually treated integrally with private insurance in the national accounts literature on insurance. However, as Lippman and McCall (1981) point out, institutions for managing risk are pervasive in a modern economy, they are not limited to private and social insurance schemes,<sup>3</sup> so extending the domain of the paper beyond the private insurance industry threatens its focus on a single class of issues.

In discussing the main positions in the insurance output debate, and I have tried to be even-handed. I have, however, evolved a position myself, which inevitably colors what I write about other positions, so the reader ought to know what that is before beginning the text: I favor what I describe

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<sup>1</sup> The Workshop agenda and some of its papers may be accessed at: [add URL for Insurance workshop].

<sup>2</sup> Team members were: Wallace Bailey, David Kass, Ralph Kozlow, Kenneth Petrick, Mark Planting, John Sporing, Leon Taub, and Ernest Wilcox.

<sup>3</sup> Among the comparable arrangements they list are those to handle uncertainty about prices (futures contracts) and uncertainty over equipment failures (warranty agreements).

below as the “risk assuming” model of insurance company behavior, and not the “risk pooling” model that is incorporated into national accounts in the U.S. and other countries.

### I. Models of Insurance Company Behavior

At a perhaps too superficial level, the debate on insurance output has two positions. Advocates of the “premiums” position would represent the (current-value) output of the insurance industry by the total revenue from insurance premiums (plus ancillary activities of insurance companies, if any). This is also referred to as the “gross premiums” approach, to distinguish it from the “net premiums” approach (defined in the next paragraph). The output unit is the insurance policy.

Advocates of the second position contend that premiums *minus claims* is the proper measure of insurance output. Premiums minus claims equal the administrative expenses and profit of the insurance company. The insurance company is viewed as performing administrative services for policyholders, so the output unit is these administrative services, perhaps on a per policy or per policyholder basis.

In North American national accounts and economic measurement literature, the premiums minus claims position is usually called “net premiums.”<sup>4</sup> Any ancillary activities of insurance companies, typically their investment income, may or may not be incorporated in the net premiums measure of insurance output in national accounts--the U.S. National Income and Product Accounts (NIPA) and the 1993 System of National Accounts (Commission of the European Communities, et al. 1993) differ in this respect, as explained below.

However, the gross premiums-net premiums debate is only one manifestation of two different views of what insurance companies do. Each of these two views leads to one side of the gross premiums-net premiums debate and each also implies an integrated set of decisions on measuring the price and output of insurance.

Pooling risk. In the risk-pooling view of insurance, the policyholders create or pay into a pool for sharing risk. The insurance company is a facilitator and an administrator--it administers the pooling scheme, it collects the premiums and pays claims of the policyholders. The insurance company is essentially a cooperative, where the members of the cooperative pay a service fee to the insurance company for running the cooperative’s business functions. As Dohm and Eggleston (1998) nicely put it:

Pooling of risk defines the insurer as an intermediary between various policyholders, where the insurers’ function is to collect premiums and disperse them to claimants. The policyholders retain the risk in this model.

In the risk pooling model of insurance, the (current price) value of the service is the insurance company’s administrative expenses for operating the pool—premiums minus claims, or net premiums in national accounts language. The price of insurance is the service fee charged for administering the pool on behalf of the policyholders.

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<sup>4</sup> The term “net premiums” has different definitions in SNA93 (Commission of the European Communities, et al, 1993) and in the insurance industry (A.M. Best, 199x). These alternative definitions are displayed in Annex A. Because it is explosionally efficient to have a shorter version of “premiums minus claims” and because “net premiums” has that meaning in the North American measurement literature (see for example, Ruggles, 1983, Bureau of Economic Analysis, 1996a, 1996b, and Sherwood, 1998). I adopt the North American usage for this paper, even though it is not ideal, considering the alternative employments of the net premiums term elsewhere.

Assuming risk. In the alternative model of insurance company behavior, the insurance company assumes the risk. In this risk-assuming or risk-absorbing view of insurance, the policyholder buys the service of having assets or income protected against loss. As Bradford and Logue (1998, page 29) put it:

“An insurance company is a financial intermediary whose main line of business is the sale of a particular type of contingent contract, called an insurance policy.”

On this view of insurance, the service provided by the insurance company to policyholders is reduction of risk: Without insurance, an accident implies the loss of the car. With insurance, the household’s wealth is unaffected by whether or not an accident happens.

In the risk-assuming model, the service provided by the insurance company is the assumption of risk, so its (current price) output is measured by the number of policies times the quantity of risk assumed in each policy. The insurance premium is the price charged for assuming risk, so the price of insurance is the risk-adjusted premium.

Associating the gross premiums-net premiums debate with behavioral models of insurance is a relatively new approach to analyzing insurance measurement issues, although it has been a part of the oral discussion of insurance measurement in North America for some time. Nearly all of the issues discussed in the insurance output measurement literature and at the Brookings workshop can be portrayed as consequences of the two different behavioral models of the insurance business.

Thus, it is not so much that contributors to the economic measurement literature and the participants the Brookings workshop were debating the appropriate ways to implement *a model* of insurance behavior. Rather, they were debating, sometimes indirectly, *which model* of insurance company behavior—and policyholder behavior—is the relevant one. It is true that there are some side issues. For example, it was asserted in the workshop that the “premiums minus claims” rule for property insurance reduces the possibility that the output of auto repair shops is double-counted in national accounts. But such pragmatic arguments are ancillary to the main conceptual issue.

In the following two sections, I discuss in turn the arguments for and against the two behavioral views of insurance, examining separately where appropriate national accounts, productivity, CPI and PPI measurements. I leave for section IV a second set of issues--the treatment of insurance company investment income in output and price measures. Investment income could be added in principle to either of the risk-pooling or the risk-assuming model of insurance, so clarity will be served by considering investment income questions after discussing the basic ones.

## **II. The Risk-Assuming, Gross Premiums Position**

The view that an insurance company assumes risk may have entered the measurement literature (though not, to be sure, the insurance literature) with the work of Michael Denny (1980), and in Richard Ruggles’ (1983, but presented in 1979) review of issues in national accounts (see his “Appendix on Financial Intermediaries”). Ruggles states (p. 69): “What households are purchasing is protection against loss, and the cost of such protection... consists of the full premium and not the net premium.” Denny (page 151) is equally explicit: “The output of the insurance company is the quantity of risk shifted to the insurance company.” Both Ruggles and Denny were writing about and disagreeing with the national accounts net premiums measure of insurance. The Denny piece seems to have had relatively little impact,

possibly because it was only a short comment on another article. The Ruggles view is well known in national accounting circles, but has mostly been ignored or dismissed, rather than discussed seriously.<sup>5</sup>

Other contributors to the measurement literature who have endorsed the gross premiums alternative include Hornstein and Prescott (1992) and Popkin (1990). In the papers for the Brookings workshop, the premiums position was advocated in papers by Mark Sherwood (1999), whose focus was on industry productivity measurement, and by Arlene Dohm and Deanna Eggleston (1998), who described new Producer Price Indexes (PPI) for the insurance industry. Additionally, as discussed below, insurance industry researchers, including Bradford and Logue (1998) and Bernstein (1999), have generally adopted the gross premiums view of insurance price and output.

It is not necessary to explain at any great depth the rationale for the risk-assuming view of insurance. Logically, it follows from the observation that the insurance policy is what insurance companies sell, the premium is their revenue from it, and claims are a cost to the insurance business. Long ago, Clark Warburton remarked that a company's revenue source is a good indicator of its output, whether the company is an insurance company or a coal mine.

However, a number of confusions about the gross premiums position have arisen in the net premiums-gross premiums debate, largely in the national accounts context. The following sections discuss some of them.

**Calculation of value added under the two proposals.** For countries that calculate GDP by aggregating industry value added, value added becomes a crucial statistic. National accountants have sometimes stated that the gross premiums proposal for measuring insurance output will change value added and with it, GDP (this point came up at the Brookings workshop). This is a misconception: Value added in the insurance industry is the same under both output concepts, as Appendix A and the following shows.

Under the net premiums approach, gross output equals premiums minus claims. Value added is obtained by subtracting purchased inputs and services from net premiums (see the account in the Appendix). Thus:

$$(1a): \quad \text{value added (net premiums approach)} = [\text{premiums} - \text{claims}] - [\text{purchased inputs}].$$

Under the gross premiums approach, claims are a cost of the insurance company; they are treated like any other cost. This means that:

$$(1b): \quad \text{value added (gross premiums approach)} = [\text{premiums}] - [\text{claims} + \text{purchased inputs}].$$

For value added, the two alternative definitions of insurance output imply only that claims are subtracted from premiums at different points, either (1a) in the calculation of gross output itself, or (1b) as one element subtracted from gross output to get value added. The value added of insurance is invariant to the definition of insurance output.

Because insurance industry value added is the same under both proposals, the choice between gross premiums and net premiums as a measure of insurance industry output has no direct impact on the

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<sup>5</sup> Ruggles' paper was apparently not the subject of any internal document prepared for the discussions that led to the adoption of the 1993 SNA, nor have I seen any national accounts documents that either discuss it explicitly, or discuss the issues it raised for the measurement of insurance.

level of GDP. Sherwood (1999) makes the same point.

**Treatment of claims.** Because confusion exists, even among national accountants, it is worthwhile indicating at this point how the accounting treatment of insurance would differ under the present net premiums definition and the gross premiums alternative, although it is not my intention to work out all the implications for the SNA.

Under the present net premiums definition used in national accounts, consumers are treated as paying only the net premium for insurance; insurance claims are treated as income (in the U.S. NIPA, transfer payments in SNA93) to consumers, who may use this income to pay for, e.g. car repairs. Suppose that there were more car accidents, and that premiums rose in step with claims. The net premiums approach would show no increase in the purchase of insurance; but the rise in automobile accidents creates a flow of (transfer) income to consumers and an increase in household expenditure on car repair. Similarly, casualty insurance claims paid to non-financial industries for losses in a hurricane create a flow of miscellaneous receipts to those industries and extra investment expenditures by them to replace the assets lost in the storm.

Under the gross premiums approach, consumers would be depicted as paying more for insurance than they do with the present treatment (because gross premiums are substantially larger than premiums minus claims). Claims would no longer be household (transfer) income, they would instead be costs to the insurance company. Under the gross premiums approach, the consumer is portrayed as having a shiny car before the accident and after it, but the accident itself and the repair of it increases neither the consumer's income nor the household's expenditure. The loss of the property and the restitution of it by the insurance company are changes to be recorded in the insured's capital account, but not in the insured's income and expenditure.

If automobile accidents rise, consumers would pay more for insurance under the gross premiums approach (because premiums went up), and one would need to consider whether the increase in premiums is an increase in price or in the quantity of insurance. The insurance companies would pay more for car repair, but consumer income and consumer expenditures would be unchanged.

Additionally, changing the treatment of insurance will provoke parallel changes in inter-industry accounts. Under the gross premiums approach, other industries that consume insurance are depicted as paying more for insurance than under the present net premiums approach (this is parallel to the impact on personal consumption expenditures). But claims are costs to the insurance company, not revenue and expenses to the claiming industry. None of these changes affects the level of GDP, but they do shift the allocation of it among sectors.

Finally, the measured volume of car repair is, of course, unchanged by the alternative treatments of insurance. However, with the gross premiums approach, the insurance company is treated as purchasing car repairs that are paid out in the form of insurance claims, although some alternative accounting treatments that involve the insurance company and the capital accounts of insured industries are also possible.

**What Does Insurance Do to the Amount of Risk?** One argument that has been made against the gross premiums position is the assertion that it implies that the insurance company reduces the amount of risk in the economy, whereas the net premiums position does not carry the same implication. This seems a confusion.

When an insurance company absorbs risk, it does not reduce the quantity of riskiness in the economy. Insurance increases utility because individuals are not indifferent between losing a small amount with certainty (the premium) and losing a large amount with a probability that gives an equal expected value. This is one of the oldest results of utility theory. The nature of the gain from insurance thus depends on the nature of or form of insurance consumers' utility functions defined over risky states. This problem was the subject of Erwin Diewert's (1996) paper for the Brookings workshop, and of George Akerlof's comments.

A parallel has often been drawn between insurance and gambling. Both obviously involve behavior toward risk, but insurance consumers are usually thought of as avoiding risk, gamblers as cultivating it. The topic also emerges in the national accounts debate on insurance, because the net earnings of casinos are usually entered into national accounts and other economic statistics, not the gross amount wagered.

Akerlof noted in the workshop that insurance and gambling should probably not be considered together. He suggested that gambling had entertainment value, that even though gamblers wanted to win, they were not (normally) playing on the expectation that they would win. If casinos provide entertainment, then this is a rationale for including their margins in national accounts. This issue is not, however, a completely settled one, but I will not pursue it to any greater extent here because it is tangential to the main subject of the paper.

### **III. The Risk-Pooling, Premiums Minus Claims Position**

The premiums minus claims, or net premiums, approach to insurance output is endorsed in the 1993 System of National Accounts (Commission of the European Communities, 1993, hereafter: SNA93), in the Balance of Payments (BOP) Manual (IMF, 1994), and in the European "Harmonized Indexes of Consumer Prices" (HICP—see Eurostat, 1997). As Robert Parker (1998) documents in his paper for the Brookings workshop, net premiums also describes the treatment of insurance in the U.S. National Income and Product Accounts (NIPA)—not only the output of the insurance industry, but also consumption of insurance as a final product (by consumers, for example), and exports and imports of insurance. It has also been incorporated into the European standard for collecting industry statistics on insurance (see Walton, 1993 and Eurostat, 1997), a standard that guides compilation of industry statistics in all the countries of the European Communities.<sup>6</sup> The report of the Oslo meeting of the Voorburg Group (1993) suggests concurrence on premiums minus claims as the recommended measure of insurance output for industry statistics internationally.

Thus, premiums minus claims (net premiums) is overwhelmingly the way that insurance is portrayed in economic statistics, worldwide. Notable exceptions are the new U.S. Producer Price Index (PPI) price indexes for the insurance industry.

The list of authors supporting the net premiums definition is long. Most are individuals who are associated with national accounts. In presentations to the Brookings workshop, Peter Hill (1998) and

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<sup>6</sup> However, as noted already the term "net premiums" sometimes does not mean premiums minus claims. The SNA93 definition of "net premiums" depends on its special definition of insurance "premiums," but amounts roughly to claims adjusted for changes in reserves. The U.S. insurance industry definition of net premiums, as given by the A.M. Best company, approximates "losses" (which is the industry term for claims paid), though it uses the ordinary meaning of premiums (not the SNA definition). These definitions are contained in Annex A.

John Astin explain the preference for the net premiums approach in, respectively, the 1993 System of National Accounts (SNA93) and the European Harmonized Indexes of Consumer Prices (HICP). Mary Weiss, in her discussion of Mark Sherwood's Brookings workshop paper, also supported the net premiums view, with some qualifications. Others include John Walton (1993), Richard Collins (1993), and Hirshhorn and Geehan (1977, 1980).

### A. National Accounts Rationale

National accounts universally employ the net premiums approach. The premiums minus claims convention for insurance output entered the U.S. National Income and Product Accounts (NIPA) about 1947 and was employed in the 1968 version of the United Nations System of National Accounts (SNA68).<sup>7</sup>

As Peter Hill (1998) points out in his paper for the Brookings workshop, the 1968 version of the SNA used net premiums as its entire measure of insurance industry output. In this, it concurred with present and past U.S. practice. However, as Hill also reports, dissatisfaction with the measure of insurance industry output arose because in many countries insurance output so defined is negative: insurance companies in some periods, and sometimes for many years, pay out more in claims than the premiums they receive.

Profit in an inefficient or unfortunate enterprise or industry might be negative. It is even possible that value added could be negative—that is, a company or an industry might take in less than it pays out to others for the cost of purchase materials and services—although negative value added could hardly persist for very long. Output, however, can never be negative, even for short periods. Negative output, however, makes no economic sense.

Thus, as Hill explains, the 1993 version of the SNA modified insurance industry output by adding insurance company investment income to the previous output definition of premiums minus claims. This change, proposed by Andre Vanoli (1988), was motivated more than anything else by the need to exterminate the negative measured output that resulted from the SNA68 definition. Indeed, deliberations that led up to SNA93 contained no serious discussion of the gross premiums alternative to the SNA net premium characterization of insurance output (Hill, 1998, and personal communication from Anne Harrison of OECD).

As Hill also pointed out in the Brookings workshop discussion, the “net premium” position on insurance holds that *gross* output of insurance is measured by premiums minus claims; it is not a position that net output (another name for value added) is measured by net premiums. Net premiums equal premiums minus claims; value added equals premiums minus claims minus insurance industry purchases from other industries (energy, paper and office supplies, for example). Thus, the gross premium-net premium distinction for insurance output is not equivalent to the usual national accounts “gross output-net output” distinction (i.e., output-value added). Some confusion on this point appeared during the discussion at the workshop, and undoubtedly clouded the discussion of the real issues.

Confusion about value added under the two insurance output proposals also arose during the

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<sup>7</sup> The treatment of finance and insurance played a role in a 1947 meeting between Richard Stone and U.S. national accounts experts that eventually led to the NIPA and UN systems going their separate ways (conversation with the late Edward Denison). However, the two systems have historically contained remarkably similar measures of finance and of insurance.

workshop, and probably exists as well in the literature on the measurement of insurance output. Whether insurance output is measured by gross premiums, or net premiums, value added is the same under both proposals. This point was made earlier, but bears repeating for its importance. (See the account in Annex A.).

If the output concept makes no difference with respect to national accounts' major concern, the measurement of value added and of GDP, why has so much controversy surrounded proposals to change the insurance output concept in national accounts? The following sections summarize the arguments in support of the net premiums position in the national accounts literature.

**1. Validity of the risk-pooling concept.** Some national accountants and economic statisticians believe that the risk-pooling model of an insurance company depicts empirically the way the insurance business is conducted. Peter Hill explained the views of national accountants:

“How do they view the [insurance] transactions...? When we talk about premiums, for the non-life insurance or accident insurance, they view it as two components. One is a payment for the service of insurance—this is essentially the net approach. The second is viewed as a transfer—this is the risk pooling element. The household is viewed as paying a transfer into some common pool, these transfers are not regarded as themselves goods or services” (edited transcript of remarks at the Brookings workshop, April, 1998).<sup>8</sup>

This SNA view of the insurance business is buttressed by a passage in SNA93 which notes that claims are paid out of premiums: “This emphasizes the fact that the essential function of non-life insurance is to redistribute resources” (SNA93, ¶8.87, page 200). Insurance claims paid are treated as transfers to the claimants (see SNA93, ¶8.88, page 200).

The BEA Working Group described the SNA (and NIPA) treatment of insurance as consistent with the view that insurance companies are engaged in the provision of risk pooling services for the policyholders. It also contended that mutual insurance companies and retrospectively rated plans operate explicitly like risk-pooling arrangements, which it offered as a justification for the net premiums treatment of insurance output.

Collins (1993, pages 213 and 215) states: “Insurers are engaged in the pooling of risk... [Their] revenue consists of two components—a service charge for the insurance services and a transfer component to pay claims.”

Other examples come from Eurostat regulations for the HICP and for industry statistics. The explanatory material for the European regulation on the treatment of insurance in the HICP states: “What the consumer purchases with an insurance policy is the service by the insurance company of redistributing the risk” (Eurostat, HCPI 98/182, ¶6). The Eurostat Insurance statistics manual (Eurostat, 1997, page 1) states: “Two elements characterise the activities of insurance enterprises. At first they pool the risks of the insured. Secondly they collect funds through the insurance premiums they receive and invest these

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<sup>8</sup> Subsequently in the same presentation Hill also remarked: “I don’t think that those who were responsible for the final version of the SNA would be prepared to go to the stake defending the principles or methodologies which are used [for insurance]. But as in so many other areas, this is an area in which doubtless improvements can be made.”

funds on the financial markets.”<sup>9</sup> Paragraph 5.2.4 (page 117) of this manual explains that the output definition for insurance industry statistics is the same as for national accounts.

Of the sources cited above, only the BEA Working Group considered explicitly the gross premium alternative for insurance output. Alternative concepts for insurance output were also discussed in the meetings of the Voorburg group, an international statistical agency meeting on measuring services, in meetings at Williamsburg in October, 1992, and Oslo, in September, 1993 (the final report of the Williamsburg meeting, paragraph 2, make reference the fact that two alternatives exist). No alternative model of insurance was mentioned in Eurostat HICP materials and papers on insurance. The HICP decision on insurance was made partly, as John Astin indicated in the workshop, because of a desire to integrate the HICP with national accounts wherever possible.

**Discussion.** The empirical validity of the risk-pooling model of insurance may not be the crucial issue for national accountants (the following section suggests why it might not be). If it is, however, then empirical tests of the risk-pooling model should be crucial for determining the way to measure insurance output. That is, one could ask: Is there evidence that demanders and suppliers behave according to the risk-pooling insurance output model in the SNA? Or is the alternative, risk-absorbing, model more consistent with empirical information?

One need not think of hypothesis testing only in terms of econometrics. In the SNA “risk pooling” model of insurance company behavior, insurance company output is the fee for administering the risk pool. One cannot find, however, an insurance contract that is written in this way—there seems to be no price charged for a service so defined. Put another way, there seems to be no unit or units in which this SNA administration service is observed. This is a strong empirical strike against the model that is embodied in the SNA (though not against the idea that policyholder services are portions of insurance output).

Indeed this problem is acknowledged in some SNA materials, but only as a difficulty in implementation, not as a test of the validity of the net premiums concept of insurance:

“In the case of non-life insurance, it has always been necessary to carry into the accounts of the consuming sectors or industries a conceptual distinction between the insurance service and indemnities (transfers), a distinction which is not perceived by the consumer of the service” (Walton, 1993, page 206).

On the other hand, the “risk absorbing” model of insurance behavior implies that the unit is the insurance policy. The price is the risk-adjusted insurance premium, which is the Bradford and Logue (1998) view, as well as the Sherwood (1999) view, and the view embodied in the PPI (Dohm and Eggleston, 1998). As a general rule in measurement, we start with the unit in which the transaction takes place, and in this, the insurance policy seems as natural a unit from which to begin as does a pen or a computer.

Other empirical evidence is provided by asking whether insurance companies that are in a formal sense organized as policyholder cooperatives (called mutual insurance companies in the U.S. and the U.K.) behave differently from other insurance companies in the same lines of business. Born *et al.*,

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<sup>9</sup> On the other hand, a subsequent paragraph on the same page states: “The main economic function is to transfer risks to specialised enterprises which assure risks to a certain amount through the collection of premiums.” That sentence could be interpreted as supporting the risk-assuming view of insurance, but clearly this was not the intention of the authors of the document.

(1998) investigated the economic behavior of U.S. insurance companies that were organized as “mutual companies” (nominally owned by the policyholders) and U.S. “stock” insurance companies (nominally owned by shareholders). A third class of property-casualty insurance companies also exists in the U.S.—nominally stock companies that are owned by nominally mutual insurance companies. They found no significant behavioral differences:

“We do not find a discernable pattern whereby one organizational form outperforms the other, though the three types of firms are statistically different. .... We found a notable lack of difference between stock and mutual companies. For example, neither form of organization has consistently higher underwriting profitability than the other. Our most persistent and powerful result is that stock and mutual-owned stock companies are much quicker to exit unprofitable markets and expand operations in profitable markets”(Born *et al.*, 1998, pages 189 and 191).

However, the Born, *et al.*(1998) results only show that a single model of insurance company behavior covers both types of company organization, they do not show which model of insurance is the correct one. Mutual insurance companies may operate explicitly as managers of the risk-pool, as the BEA Working Group suggested; if so, the Born, *et al.*(1998) empirical results say that nominally stockholder-owned insurance companies function the same way. Alternatively, the Born, *et al.*(1998) empirical results may be suggesting that insurance companies that are organized as policyholder-owned mutual companies, or which began that way 100 or more years ago, function today as risk-absorbing companies, just as do stockholder-owned insurance companies. But however one interprets their results for the insurance measurement controversy, Born *et al.*(1998) indicate that there are no real differences in insurance company behavior.

Perhaps competition forces investor-owned insurance companies to mimic mutual companies, and behave as agents for their policyholders. This was suggested by Brian Newson at the Brookings workshop, and is consistent with economic models of agency behavior. Or perhaps it is the other way around: Competition forces cooperatives to behave as profit-making enterprises, a result that is also well-known in economics. My automobile insurance company (which carries the word “mutual” in its title) periodically sends me a small refund check when it has favorable claims experience. I interpret that as trying to hold on to me as a customer, but perhaps its motives differ from my perception.

My insurance company never tries to charge me an additional premium when it suffers an unfavorable claims experience, although it may use an unfavorable claims experience to justify an increase in rates for the subsequent period. Again, that is probably behavior that is forced upon it by competitive conditions. It knows that if it tried to bill me after the fact for the company’s losses I would not pay because I could renew my insurance with another company. If I were in some real sense the owner of the company, I should be liable for losses. The fact that policyholders are never liable for losses of a mutual insurance company suggests that competition from stock companies prevents mutual companies from behaving as policyholders’ agents in loss situations, even if, as asserted, they do so in profitable situations.

Ultimately, then, there are two pieces of relevant evidence. First is the fact that no insurance contracts are written with a price equal to an administration fee.

Second, there seems to be little evidence that insurance companies think they are administering a pool on behalf of the policyholders (though, of course, they might be wrong). For example, one participant at the Brookings workshop remarked that when he sat on the board of directors for a major U.S. insurance company, nothing he ever heard there suggested that the company thought it was acting on

behalf of the policyholders, rather than of the stockholders. I asked an executive at a major U.K. insurance company whether U.K. mutual companies behaved more like policyholder cooperatives than American ones; he chuckled and told me a story about some financial manipulation involving a mutual company.

These questions are certainly worth exploring at greater length with empirical studies, but what comes out of existing studies and anecdotes does not provide much support for the policyholders' cooperative view of insurance companies.

Even though the risk-pooling and risk-absorbing models are very useful for thinking about insurance output, one can probably make too much of them in the context of the SNA decision-making. At the Brookings workshop, Peter Hill remarked (edited transcript):

“I wouldn't say, in my view, there is a recognition amongst national accountants of the intrinsic difficulties of issues that are being dealt with [at the workshop]....It's my recollection that in the '93 SNA discussions, there was very little discussion at all of the specific issue being addressed [at the workshop], which is how to obtain satisfactory price and volume measures for insurance output. I suspect that from a national accounts point of view, the immediate reaction would be to be more concerned about the growth of the output than the price. But, of course, these are essentially different sides of the same coin.”<sup>10</sup>

He went on to suggest that the matter deserves further study:

“It's extremely important to have meetings, seminars, of precisely this kind we are having today, if there is to be significant improvement....I think that the [SNA] system might be improved, but only as a result of discussions of this kind.”

**2. Other SNA conceptual points.** Some proponents of the net premiums approach for national accounts emphasize less the risk-pooling view of the insurance company and put more emphasis on the SNA conceptual view of certain financial portions of insurance transactions.

Insurance is, as Bradford and Logue (1998) point out in the passage quoted above, a type of contingent contract. SNA93 contains language on the national accounts treatment of contingent contracts:

“The entitlement to contingent benefits...cannot be treated as if it were itself some kind of asset that could be valued and recorded in the accounts. Hence, items such as [casualty-property] premiums... are treated in the accounts as transfers” (SNA93, ¶8.28, page188).<sup>11</sup>

The SNA defines a transfer payment as a “transaction in which one institutional unit provides a good, service, or asset to another unit without receiving from the latter any good, service or asset in return...” (SNA93, ¶8.27, page 188). The payment of an insurance claim is regarded in isolation as a payment to the policyholder without any compensating services. The BEA Working Group notes that the

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<sup>10</sup> Hill's recollection of the SNA group's discussions agrees with that of Anne Harrison of OECD, another prominent contributor to SNA93 (personal communication to the author).

<sup>11</sup> The next paragraph (¶8.29) explains that life insurance premiums are not treated as transfers, but life insurance in the SNA means what is called whole life insurance in the U.S. Another section of the SNA notes that the administrative expenses part of the non-life insurance premium is not a transfer, but is a payment by the policyholders for services that are produced by the insurance company and consumed by the policyholder.

BPA manual also advocates treating insurance claims payments to policy holders as transfer payments, on the grounds that “the policy holder is receiving an economic benefit...without giving up anything in return.”

**Discussion.** It is sometimes not clear whether references to insurance in the SNA passages on contingent contracts and on transfer payments are simply collateral consequences of the SNA definition of insurance, or whether they are separate conceptual points from which the SNA insurance definition derives. If the latter, then they are conceptual points that must be dealt with separately, and it is a valid point in the debate that only the net premiums approach to insurance is consistent with the SNA view of contingent contracts and of transfers.

But if the former case prevails, the SNA’s language on contingent contracts and transfers and on insurance are not independent points at all. If so, invoking contingent contracts and transfers definitions in the gross premiums-net premiums debate is a kind of “double counting.” Whichever is the case, for the sake of the discussion I consider the SNA passages quoted above on their own merits, that is, as separate points that are relevant to the insurance debate and not just corollaries to the SNA position on insurance.

The statement that contingent contracts cannot be valued seems too sweeping, or perhaps it does not quite mean what it seems to mean. An insurance company can certainly sell its insurance customer base to another insurance company. For example, before the recent bankruptcy of the Australian HIH insurance company, it sold off major parts of its outstanding insurance contracts in an attempt to raise cash to forestall the bankruptcy. In that sense, an insurance contingent contract can be and is valued and exchanged as an asset. The statement that contingent contracts cannot be valued appears incorrect, even in the case of insurance contracts.

With respect to the argument on transfers, two apparent confusions may exist. First, there is little reason to treat the payment of an insurance claim in isolation from the entire insurance contract. The purchaser of the insurance policy pays a premium to the insurance company in return for a payment that is contingent upon, e.g., suffering a loss to his capital asset. It is not true that, as the BEA Working Group quotes the BPA manual, “the policy holder is receiving an economic benefit...without giving up anything in return,” or that the insurance company has made a payment to the insured “without receiving from the latter any good, service, or asset in return.” The whole transaction has to be considered, not just the payment of an insurance claim as if there were no previous payment that created the contingent entitlement to the claim.

Second, and more seriously, advocates of the net premiums approach have apparently misconstrued the implications of the alternative, gross premiums, approach. The gross premiums approach does not imply that payment of an insurance claim must therefore be treated as a payment for a service, contrary to what some have apparently thought. Having property insurance means that the owner of a shiny new car will have a shiny new car before an accident, after an accident, or if an accident never takes place. One can treat the insurance company as purchasing car repairs or treat the car repair in some other way. Whether one advocates gross premiums or net premiums as the output concept for the insurance company, the payment of a claim should not be treated as the provision of a service by the insurance company to the insured. The service is insurance, not the claim. Claims paid should not be treated as income to the consumer or the business that suffers a loss. Whether one wants to call the claim a transfer to the insured’s capital account is a secondary matter, or one of language, but not of substance.

It is quite clear, however, that changing the concept of insurance output in the SNA would require

collateral changes elsewhere in the SNA. National accountants have argued forcefully in other forums (though not at the Brookings workshop) that the appropriate concept of insurance output must take a back seat to other matters that are regarded as more central to national accounts. Some of these positions on insurance seem close to saying: We can't change the treatment of insurance output because it would force changes elsewhere. It is true that moving away from the present net premium definition of insurance output has impacts elsewhere in the national accounts. However, that is not the issue. The issue is the appropriate way to measure the output of the insurance business.

**3. Consistency with other parts of the accounts.** Consistency is important in national accounts, so it is not surprising that it features prominently in the argument in behalf of the net premiums output concept for insurance. Thus, the majority members of the BEA Working Team(1996a) concluded that the *primary* advantage of using net premiums as the measure of insurance output is consistency with other parts of the accounts.

Several examples of consistency arguments may be cited. The BEA Working Group contended that if insurance companies absorb risk, they do it with a financial instrument (insurance policies are financial instruments, within the SNA meaning of finance). Sales of financial instruments are always treated as exchanges of assets in national accounts, not as purchases of services. Second, risk-taking activities of insurance companies are sometimes asserted to be similar to stock or commodity options, or hedging plans, financial derivatives, loan payment guarantees, and gambling. In none of these does the SNA take the revenue as the measure of output. Casinos, for example, have as output their net margins, not the total amount wagered. As another example, some national accountants have contended that the net premiums approach for insurance creates consistency between the treatment of insurance output and the treatment of banking output in the SNA.

**Discussion.** Consistency can be a treacherous or ambiguous argument. Consistency with other parts of national accounts is not convincing when the other parts are themselves controversial. It is true that the treatment of insurance and banking in national accounts have always been linked, and it is apparently also true that no one has ever been a critic of one of these two national accounts conventions and a supporter of the other. But in principle, these are separate questions, there is no reason to consider them as linked logically. Precisely because banking output in national accounts has long been controversial (Triplett, 1992), the consistency argument between insurance output and banking output will not persuade those critics of insurance who also criticize the national accounts treatment of banking.

Moreover, all consistency arguments are essentially analogies. Thus, they are open to the criticism that the analogy is not exact. In general, analogies are useful as illustrations, less so as matters of logic.

Many consistency contentions concern finance. If an insurance policy is *defined* as a financial instrument subject to SNA rules for financial instruments, and if the present financial instruments definition creates difficulties for alternative definitions of insurance output, then one obvious "solution" is to redefine SNA financial instruments to exclude insurance policies. As noted above, some contentions on alternative treatments of insurance amount to statements that changing the concept of insurance output in the SNA would require collateral changes elsewhere in the SNA. This is not a persuasive argument in favor of the net premiums approach to insurance output.

**4. Capital account issues.** In the Brookings workshop, one participant objected that the gross premiums approach might work satisfactorily in the case of car repair (for households, that is), but it

would pose difficulties if the insurance claim covered an investment good, rather than an item of consumer expenditure. The example was the destruction of a house, by fire or storm. A new house is investment under all present national accounting systems.

It was not entirely clear why some participants deemed investment goods a problem. With the gross premiums approach, one would presumably still record the new house as investment, but it would be investment that was made by the insurance company, not by the households (other accounting conventions might also be worked out).

The BEA Working Group recognized this problem. It proposed a capital account component of insurance representing the amount of risk transferred (measured by the claims), and a current account component, representing the services provided by the insurance companies (i.e., premiums minus claims). Only the second component would represent the output from current production of the insurance industry.

**Discussion.** Barry Bosworth noted in the discussion of this point that the U.S. has no “other changes in assets” account. The appropriate treatment of hurricane damage to the housing stock in the investment accounts and in the other changes in asset accounts is omitted from the present discussion, and probably needs additional thought. But investment goods do not seem to present a fundamental objection to the use of the gross premiums approach in national accounts. And in any case, this problem of how to show the loss of a destroyed productive asset is present in both approaches to insurance output.

**5. Parallels with retail and wholesale gross margin definitions of output.** The outputs of certain industries, notably wholesale and retail trade, are defined in national accounts as their gross margins—sale minus cost of goods sold (which is a generally accepted accounting term, so the result is normally recorded in retailers and wholesalers records). Certain financial industries are treated in national accounts in a somewhat parallel manner: For example, if one thinks of a bank as buying and selling finance, instead of cabbages or shoes, then the national accounts “net interest” treatment of banking has apparent, though not exact, parallels with the national accounts treatment of trade.

This parallel has also been invoked to justify the net premiums treatment of insurance. The gross margin in trade is a measure of retailing or wholesaling services. A retail shoe store is not depicted in national accounts as selling shoes, but as selling the service of selling shoes. The net premiums in insurance is also proposed as a measure of services provided to policyholders.

The only response to this analogy is that analogies are never exact. In the workshop, someone asked why the textile mill was not depicted as selling the service of weaving, instead of the product textiles. Additionally, in productivity statistics, shoes stores are usually portrayed as selling shoes, their output is not the gross margin, so obviously the choice of output measure in the trade sectors is not completely settled. The parallels between trade and insurance may be suggestive, but cannot be not conclusive. Insurance output questions need to be decided on the basis of an analysis of the insurance business, not on analogies with some other business.

**6. “Not gross premiums” arguments.** Some participants in the debate on insurance present arguments that do not so much favor the net premiums approach but point out problems with the gross premiums approach. This is fair enough, though in the end the impact of negative arguments on each position must be totaled up, and sometimes the balance is not clear.

Peter Hill noted that insurance claims may not always be used for repairs, or to replace the item that was lost or damaged. When a consumer receives a claim for car damage, or for a stolen television set, the consumer might not repair the car or replace the television, but rather buy new clothes. In this case, the consumer does temporarily have more command over resources; the consumer may behave as if the increased command over resources were equivalent to an increase in income, and make a consumption decision independently of the nature of the loss for which the claim was paid. It is not clear that one wants to treat the insurance company as purchasing clothing, in this example.

On the other hand, the consumer's decision not to replace the car will draw down the consumer's capital account, which could be recorded, in principle, though it presents data difficulties. It was also noted that in both the U.S. and in Europe, insurance companies are moving to a system in which they repair the car directly or directly replace the stolen television set. This is motivated by reduction of insurance fraud.

**7. Data availability questions.** Under some implementations, the gross premiums approach has the insurance company, not the household, paying for car repairs. This implies that one would have to separate revenues from car repair shops to isolate those expenditures that are made by consumers from those made by the insurance company (this is necessary to get an accurate measure of consumer expenditure). Data might not be available to make this allocation. Additionally, Eurostat materials distributed at the workshop discuss whether consumer expenditure surveys do or do not record car repairs made by insurance companies as consumer expenditures. There seems ambiguity on this matter.

Whatever data are available on the proportion of car repairs that are paid by insurance companies, national accountants must *now* remove all repairs made to business owned automobiles from auto repair shop revenue. Netting out, additionally, insurance company expenditures on car repairs is the same kind of calculation, and it is not clear that it presents more serious data problems than are encountered presently in computing consumption expenditures in national accounts.

Data problems might be even more severe for other kinds of insurance claims. As Anne Harrison noted (personal communication with the author), many insurance claims do not involve capital or repairs. Examples are household goods (treated as current expenditure in all national accounting systems), including jewelry and cameras, and liability payments for pain and suffering and so forth. Whatever those insurance claims are spent on, it is not likely that one could separate out neatly consumer expenditures that are and are not the result of insurance payments.

Obviously, data availability is not a fundamental conceptual point. It is, rather, a matter of the relative ease of implementing two proposals. Ease of implementation is an impressive argument, but it does not clarify the concept. One might argue for a second best implementation on data availability grounds, but not that net premiums are conceptually preferred to gross premiums.

**8. Positions that mix output with value added considerations.** In national accounts, the word "production" is frequently employed to mean value added. Elsewhere in economics, production is usually the process that results in output (in national accounts language, "gross output"), not in value added. Terminology does not matter so much, so long as meaning is clear, but sometimes it is not.

The BEA Working Group contended that the concept of current economic production is most useful if it is consistent with some measure of the economic resources used in the production. It thought that in the case of insurance, these costs are approximated by the service charge component of the

insurance payment.

One would certainly agree with the first statement. However, the second makes clear that the group was thinking of value added, not output. Thus, the economic resources that go into replacing items lost through accident are not being considered in the BEA statement.

However, the BEA Working Group also seems to have overlooked the fact that value added is the same under the gross premiums and net premiums approaches to insurance industry output.

## **B. Productivity Measurement and Industry Studies**

Though the choice between gross premiums and net premiums as a measure of insurance industry output may have little overall impact on GDP, it may have a substantial impact on the measure of insurance industry productivity. Premiums are far greater than premiums minus claims. Thus, by the gross premiums definition, insurance industry output is far greater than it is under the net premiums definition. Productivity equals the ratio of output to input. The level of productivity, therefore, is far greater under the gross premiums approach to insurance industry output.

But is the change in productivity is greater or less under the gross premium definition of insurance output? At the workshop, some participants expressed the view that the premiums-net premiums distinction does not really matter, empirically.

Hirshhorn and Geehan (1980, page 153), in their response to Denny (1980), calculated alternative labor productivity measures for the Canadian life insurance industry, 1955-73: Under a gross premiums output concept, labor productivity grew 5.0 percent per year, compared with 2.8 percent per year under the net premium concept.<sup>12</sup> Popkin (1990) made a similar estimate for the U.S. accident/casualty industry: Using gross output instead of the net output measure in the U.S. national accounts raised the industry labor productivity growth rate from 1.9 % per year in the then-published BEA data to 4.4%, over the interval 1980-1988.

Premiums are not only far larger than premiums minus claims, premiums are growing faster than the premiums/claims margin. Evidently the choice of output concept for insurance makes a great amount of difference in estimates of productivity for the insurance industry.

## **IV. Should Investment Income of Insurance Companies Be Added to Output?**

The very essence of the insurance business requires that premiums be paid before claims. In some kinds of insurance, medical malpractice insurance for example, premiums may be paid a very long time before claims are filed. But even for casualty insurance, it is doubtful that a "spot" market for insurance could ever exist, because incentives would be too strong for persons to buy insurance when risk of imminent loss becomes apparent. This is known as "moral hazard." Generally, individuals who most anticipate losses are most likely to buy insurance.

Limiting moral hazard in insurance creates a fund--reserves held against future claims. Insurance

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<sup>12</sup> They removed the saving component from whole life policies. Term and group life insurance policies are "non-life" insurance in the definition of SNA93, and hence grouped in with accident insurance.

companies, not unnaturally, invest these reserves. Indeed, Dennis Fixler pointed out at the Brookings workshop that investment of reserves is such an established part of the insurance business that U.S. insurance regulators typically require it. It is also well known that investment earnings lower insurance premiums. Competition among insurance companies that earn positive returns from investing reserves frequently drives premium revenues below the value of claims paid.

Participants at the Brookings workshop discussed whether, and how, insurance company investment income should be included in measures of the price of insurance and the output of the insurance industry. There seems broad agreement that the investment earnings of insurance companies should be treated as part of insurance industry output, though some disagreement was also expressed at the workshop. The 1993 SNA, the PPI insurance indexes (described in Dohm and Eggleston, 1998) and the papers by Sherwood (1999) and Weiss in her discussion at the workshop all contend that it should be. Investment earnings are not included in insurance industry output in the U.S. NIPA.

The rationale for inclusion of investment income, however, differs greatly and different rationales lead to substantial differences in the measurement of insurance output and price. One rationale has the insurance company in two lines of business (selling insurance and investing). The insurance company thus has two outputs. This rationale implies a distinction between (1) insurance as a product (what goes into the CPI, or into input flows to industries that buy insurance, in an input-output table, for example) and (2) the output of the insurance industry, where insurance companies may have multiple lines of business. By analogy, a sugar beet refiner has two products—sugar and beet pulp—only one of which goes into the CPI. This “two product” rationale implies the need to measure two prices and two output quantities.

A second, very different, rationale is the one in SNA93. Because in SNA93 insurance companies are assumed to act as agents, or managers, for their policyholders, their investment income also belongs to the policyholders. The investment income is therefore imputed to the policyholders. In an additional step, SNA93 assumes that the policyholders pay the investment income back to the insurance company in the form of higher premiums (called “premium supplements” in SNA93). Thus, on the SNA93 rationale, the higher is the investment income of insurance companies, the higher is the cost of insurance.

On the price side, these two rationales are equivalent to asking whether the PPI price concept (a price index covering all of the outputs of the insurance industry) differs empirically from the CPI price concept (the price corresponding to the consumer’s consumption of insurance). If insurance companies are regarded as being in two lines of business (provision of insurance and engaging in investment), then the PPI and CPI concepts diverge, because the CPI consumption concept only includes insurance products, not insurance company investment products. If the investment activity is treated as an inherent part of the insurance service, as in SNA93, and if that implies an unrecorded increment to the nominal price paid for an insurance policy, then the CPI and PPI concepts are similar because both include the investment activity in some form (though perhaps not in exactly the same form).

Several positions on the treatment of investment income can be distinguished. They correspond to different positions on the rationales listed above. In part, the different positions on investment income can also be identified with the models of insurance company behavior discussed in section I. And they depend also, though to a far lesser degree, on the economic measurement that is of interest. It is convenient to organize the discussion around the different uses for insurance statistics.

## A. National Accounts (SNA)/Eurostat Harmonized CPI

The rationale in the 1993 System of National Accounts (SNA93) for the treatment of insurance was explained in the paper by Peter Hill (1998) and in his informal remarks to the Brookings workshop. Recall first that the SNA has adopted the risk pooling view of insurance, so the insurance company acts as an agent for policyholders; premiums minus claims is the fundamental output measure for the insurance industry, and is the measure of the consumption of insurance by using industries and households.

The old (pre-1993) SNA output definition for insurance (premiums minus claims) often yielded negative insurance industry output, because it is often the case that actual insurance premiums are insufficient to cover claims. As Hill's paper notes, adding insurance company investment income to the SNA net premiums output definition, which occurred with the SNA 1993 revision, eliminates the negative gross output of insurance that resulted from the old definition, or at least makes the output less negative. This was part of the motivation for the change, as explained in a paper by Vanoli (1988).

The SNA policyholders' agent model of insurance company behavior carries over to its treatment of investment income: The investment income is imputed to the policyholders (as transfer income). But at the same time, the policyholders are treated as paying the entire investment income back to the insurance company, as if the investment earnings were additional insurance premiums: "The policyholders are treated as paying it [investment income] back, in the form of what are called 'supplementary premiums.'"

Hill explains: "In the SNA philosophy... it's argued that insurance companies, in fixing their premiums... also take into account their investment income..., so that actual premiums are lower than what they would be in the absence of investment income." He elaborated on this point during the discussion: "I don't think that the investment income should be regarded as a component of the gross output.... [T]hat investment income is effectively replacing additional premiums that would have to be paid in the absence of these reserves."<sup>13</sup>

Another part of the SNA93 treatment of finance also influenced its treatment of insurance company investment income. In the SNA, interest is not viewed as a payment for a productive service, and therefore cannot be output of the firm that receives it. Indeed, in measuring industry output, the SNA (and the U.S. NIPA) normally follow the convention that output includes interest paid minus interest received; in the case of firms—such as insurance companies—that earn a substantial amount of interest or other investment income, the SNA net interest paid convention contributes negatively to their output.

Thus, simply recognizing insurance company investment income in the SNA would do nothing to eliminate the negative output recorded under the premiums minus claims output convention. Indeed, if investment earnings were added to insurance output using the SNA net interest paid convention, it would drive insurance output even more drastically negative. It was thus necessary to provide some *non-interest* rationale for the insurance company's investment income. The premiums supplement rationale solved the problem (or most of the problem) of negative output of insurance companies.

The SNA premium supplements view implies that investment income is included in the current

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<sup>13</sup> Collins (1993) describes the policyholders as "voluntarily" giving money to the insurance companies to hold for which they "barter" for lower premiums. It is doubtful that there is any voluntary exchange here, aside from the policyholder's decision to buy insurance.

value GDP of the insurance industry, but it is treated as if it were a part of the *price* paid for insurance, not as part of the (constant price) *output* of the insurance company. Investment income is not part of insurance real output, or of real consumption of insurance, it is part of the price.

The SNA position on insurance price and output is incorporated into the European Harmonized Indexes of Consumer Prices (HICP). Indeed, the SNA position on insurance influenced the HICP position: “We are supposed to use national accounts conventions, where appropriate, and we felt that this [treatment of insurance] is in line with the ESA, the European System of Accounts” (John Astin, in remarks to the Brookings workshop). In the HICP, a “premium supplement” is defined as the investment income earned by insurance companies, a definition consistent with that of the SNA. The insurance service charge for the HICP includes insurance premiums plus premium supplements, and claims and changes in actuarial reserves are subtracted off (because the net approach to insurance is used, as discussed in section II, above). This approach provides the consumption weight for insurance in the HICP. Although Astin noted that the net price was also the preferred concept for the price of insurance, for practical reasons the HICP net weight is moved by a price index for premiums—insurance companies could provide prices for neither the premiums plus premium supplements concept nor the net of premiums so defined minus claims paid and changes in reserves.

In summary, in both the 1993 SNA and in the HICP, the investment income of insurance is included; in both cases investment income is treated as increasing the price of insurance, not of the quantity of output produced by the insurance company (or of the quantity of insurance consumed by households). In both cases, the rationale is: In the absence of investment income, insurance premiums would be higher than they actually are. Adding the investment income, or the “supplementary premiums,” to the price of insurance means that the SNA, and to a somewhat lesser extent the HICPs, *are effectively making an imputation for what the price of insurance would have been in the absence of insurance company investment.*

Note that both the SNA and the HICP treatments use the net approach in defining the service of insurance, they both model the insurance company as if it were a mutual company acting in the interest of the policyholders. The combination of the two procedures implies that there is no difference between CPI and PPI price indexes concepts for insurance (consumption and industry output) and also no difference between the quantity of insurance consumed and the quantity of industry output, after appropriate allocations are made across the different classes of consumers of insurance.

**Discussion.** As Stephen Oliner noted in the Brookings workshop discussion, the SNA treatment implies that when the stock market booms, consumers pay more for insurance. This seems an unsatisfactory depiction of the insurance market—especially for the model in which the insurance company is assumed to act on behalf of the policy holders. When the insurance company acts as the policyholders’ agent (whether or not they “voluntarily” put investment funds at the insurance company’s disposal), one expects rebates of the investment income back to the policyholders, but not that the insurance company then charges them more for insurance coverage.

As noted above, conventions on interest in the SNA mean that interest cannot be treated as a payment for a productive service. Banking output in the SNA is also subject to a convention that reinterprets bank interest earnings and payments as non-interest flows to depositors and borrowers. Some national accountants have contended that the SNA insurance convention is consistent with (analogous to) the SNA imputation of services to bank deposit holders.

Even if correct, the argument is not persuasive because the SNA convention for banking output is also controversial. That the two are analogous is also debatable. In the case of the bank deposit, deposits normally earn income for depositors, and everyone knows that transactions services (such as “free” checks and ATM usage) are provided to depositors in exchange for below-market interest on checking deposits. These transactions services are understandably viewed as an in-kind form of income payment. In the case of insurance, however, no one believes that an accident insurance policy normally earns income for policy-holders; imputing income to the policyholder is a step that is not in accord with the way transactors normally view insurance. Moreover, the SNA insurance imputation is to the *price* of insurance, not the quantity of insurance services. In the SNA banking imputation, the depositors are assumed to receive more banking services, not to pay a higher price for them. The analogy with banking services in the SNA provides little justification for the SNA treatment of insurance, which should be considered on its own.

The SNA insurance imputation is very complicated and it is very difficult to see that it accords with the way either the policyholders or the insurance company views an insurance policy. Imputations, it is true, can always be criticized as not describing actual economic behavior. Reservations have often been expressed, for example, about the universal national accounts owner-occupied housing imputation, in which homeowners are assumed to have accounts in which they charge themselves rent and add the rent back into their incomes. But at least in the housing imputation, there is a market for rental housing, and the price that is being imputed to the owner-occupier is the market price. The SNA insurance imputation treats the price of insurance as if it were substantially higher than the observed premium. It is doubtful that policyholders perceive and act on this SNA price, and indeed this criticism has often been acknowledged within the SNA literature itself.

Moreover, as noted above, the SNA93 decision on the treatment of insurance company investment income was driven more by other conventions in the SNA, especially the ones concerning interest, than by a view of the insurance market. National accountants have sometimes contended that the treatment of insurance (and of finance) should be driven by other considerations in national accounting that are more important than the economic definition of output in these industries. Whether or not one agrees with this, economists also would like to use the national accounts industry accounts structure to do economic analysis on industries, and to use insurance in the consumption portions of the accounts in analyses of consumer or household behavior. The present SNA treatment of insurance makes these portions of the accounts less useful for such purposes—even if national accountants think that, on balance, the entire system of the accounting structure is made better by the insurance convention in SNA93.

## **B. A CPI-COL (Cost-of-Living Index), or Consumption of Insurance Approach**

The SNA and HICP adopt the risk-pooling model of insurance company behavior, there is no difference between what the industry does and what the consumer consumes. Because the insurance company is treated as a cooperative, all of its actions are taken in behalf of the policyholders.

In the risk-assuming model of insurance company behavior, the insurance company is not acting on behalf of the policyholders, at least not explicitly. In this case, one must consider how the part of insurance company output that comes from investment activities should be treated in consumer price indexes (CPI).

Several positions emerged at the Brookings workshop. One position distinguishes between what Zvi Griliches called the “PPI” (or industry output) specification and the CPI (or cost-of-living index) specification.

For the PPI specification, one would ask what the industry produces. The CPI specification would be concerned with what the consumer consumes. The industry may have multiple products (insurance and investment management), but in the consumption of insurance by consumers (or by other producers), only insurance products matters. Thus, in the risk assuming model, the PPI and CPI specifications could differ in the way insurance company investment earnings are treated.

Mark Sherwood put the question another way: “Does the insurance company earn the investment return or the policy holder?” If the policy holder earns it (as would be the case in the risk pooling model of the insurance company as the policyholders’ agent), then the CPI perspective ought to match in some manner the PPI perspective. But if the insurance company earns the investment return, then the issue is somewhat more complicated.

With respect to the CPI specification, Griliches remarked that the consumer just pays the premium; whether the insurance company has a good investment year or a bad investment year is of no concern to the buyer of insurance. If the insurance company has a good investment year, that may be part of the industry’s increased productivity, and the increased productivity may in turn lower the price to the consumer. But only the price of insurance to the household matters in the CPI, the source of the price change—whether from investment income or from some other productivity enhancement—does not matter. Griliches regarded the investment activity of insurance companies as something like a secondary product, to use the language of industry statistics.

Jack Triplett presented an analogy: He pays a service to take out his trash. Suppose the trash hauler discovered something in Triplett’s trash that he could sell to someone (the analogy is the insurance company profiting from the policyholders’ reserves); and suppose competition among trash haulers resulted in a reduction in the price for hauling Triplett’s trash. In Triplett’s view, this is a reduction in the price for hauling trash, and it ought to be so treated in the CPI. He considered it wrong to add back into his trash bill the trash company’s revenue from selling his trash, and to treat the trash company’s sale of his trash as if it were charging a higher price for hauling it away. It is true, however, that in this analogy the trash company is receiving something of value in the trash for which it is not paid explicitly.

With respect to the idea that lower rates arise because consumers let the insurance companies have their money in advance, Steven Oliner distinguished interest foregone for paying the premium up front from the earnings of the insurance company. One could estimate interest foregone from, e.g., paying insurance monthly instead of yearly or twice yearly, and ask: How much lower is the semi-annual premium than the total of six monthly premiums? Some insurance companies offer a monthly option, though one also needs to reduce this estimate by paperwork costs, which are probably most of the total difference.

Monthly insurance payments do not, however, eliminate the fund of reserves, and therefore problem of insurance company investment earnings. The fund arises from the nature of insurance, the necessity to reduce moral hazard. It does not arise because premium payments are paid quarterly, semiannually, or annually, instead of monthly or weekly.

John Astin, noting that Griliches and Triplett were approaching the matter from the theory of the cost-of-living index, asked whether there was a difference between what one would do in a CPI that was

regarded as an approximation to a cost-of-living index, on the one hand, and an “inflation index” (a CPI that was not erected on a cost-of-living index concept) on the other. Katherine Abraham objected that this was not a meaningful question, because there were, as she put it, “many” cost-of-living indexes (though how different specifications of a COL index matter for the treatment of insurance was not spelled out).

It seems to me, also, that the distinction between a cost-of-living index and a “consumer inflation index” (on this, see Hill, 1997, or the HICP manual) does not determine the measurement of insurance, though not for the reason Abraham gave. The essence of the cost-of-living index framework for consumer price indexes is, simply, taking the economic concept of consumption as the relevant way to think about the index (Triplett, 2001). Whether a statistical agency formally adopts a cost-of-living index framework for its CPI or not, nearly everyone agrees that the concept of consumption is the relevant way to think about consumer price indexes. Indeed, the passage from the HICP regulation quoted earlier appeals exactly to a notion of what it is that a consumer is consuming:

“What the consumer purchases with an insurance policy is the service by the insurance company of redistributing the risk” (Eurostat, HICP 98/182, ¶6).

Rosemary Marcuss made a similar point: “[In] the non-cost of living index...you’ve still got to resort to utility and other judgments in order to try to measure quality-adjusted real output. So...how confident are we that there really is a clear distinction in practice between a cost-of-living index and a non-cost of living index in regard to insurance?”

Accordingly, for the CPI it is the distinction between the risk pooling and risk assuming models of insurance company behavior that matters, and the implications of those behaviors for what the consumer is consuming. If one applied the risk-pooling model of insurance to consumption in the cost-of-living index framework, one would get the Eurostat approach to insurance in the HICP.

On the other hand, under the risk-assuming view of an insurance company, its investment earnings are not in the price of the insurance product, either as paid for by consumers, or by any other buyer of insurance. Thus, if one accepted the risk-assuming view of insurance, the COL index would use the insurance company’s risk-adjusted premium as the price, and if the risk-assuming model were applied to Eurostat’s “inflation index” concept, one would get the same result. The risk-adjusted price of the premium is the CPI price.

This discussion is also relevant to considering insurance as a product—in an input-output table, for example, where insurance is a cost of production for many other industries. The chosen model of insurance (risk pooling or risk absorbing) determines how to measure insurance as an input to using industries. Insurance is also a growing part of international trade, the U.S. both imports and exports insurance services, some of it direct insurance and some of it reinsurance. This distinction between the industry output and the products it produces is discussed additionally in the following section.

### **C. The PPI, or Industry Output, Perspective**

From the industry output perspective, the treatment of the insurance industry’s investment earnings is even more complex. We begin with the model of insurance behavior that has the insurance company assuming the risk. We return to the risk pooling model of insurance company behavior at the

end.

**1. The Company Assumes the Risk.** If the company assumes the risk, premiums are the basic measure of insurance output. There are two ways to regard the investment income of insurance companies.

The most straightforward view, conceptually, is to say that the insurance company is in two lines of business. The primary product is insurance. But because, as noted earlier, moral hazard results in a fund of reserves against claims, the insurance company is also in a second line of business (investing and managing investments). Thus, one way to look at insurance is to say that the industry has two products: one (insurance) it sells to households and to businesses, or perhaps exports. The other is investment income, which is separate from the insurance product that it sells to households and to other businesses. The output of the insurance industry (and the PPI for insurance) should include both products. In the following, we call this the “two products” view.

Under the “two products” view, one might regard the investment, or property management, activity as a secondary product, to use the language of production statistics. Or, one might contend that the investment activity is a joint product of the insurance company, by analogy with the old example of beef and hides: Both products are inherent outcomes of the cattle production process, and investment income is a joint product of the insurance production process (because of moral hazard).

Secondary products are found in many industries (a secondary product is one that is primary to some industry other than the one in which the establishment is classified). They pose no particular conceptual difficulties. They are usually not an integral part of the production process, though they may be. When secondary products exist, prices of these outputs are routinely included in the PPI measures of industry prices.<sup>14</sup> Secondary products are also routinely collected as part of industry statistics programs.

Joint products are also found in other industries. In industrial statistics, joint products are both primary products of the industry that produces them. Manufacturing examples include beef and hides, sugar beet sugar and beet pulp, some metal refining operations and so forth.

One advantage of looking at insurance in this “two products” way is that it is easy to reconcile the CPI-COL view of insurance with the industry output or PPI view. The industry’s revenue (insurance premiums plus investment income) is not the same as the economic flow between the industry and the consumer.<sup>15</sup> In fact, it is generally greater than the flow between the industry and the consumer. Erwin Diewert remarked that he wanted consistency between the consumer side and the industry side; in this resolution, the two sides are not the same, but they are consistently measured.

**2. The “Activity” View.** The alternative way of looking at it is pursued by Sherwood (1999), and indirectly by the Dohm-Eggleston (1998) paper on the PPI. Actually, neither one considers CPI issues (both were working only on the concept of insurance industry output).

In their view, and also in the Brookings workshop discussion by Mary Weiss, insurance industry investment income is part of the output of the insurance industry. As Weiss noted, one wants the output

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<sup>14</sup> Indeed, a typical industry PPI contains separate price indexes for secondary products and for miscellaneous receipts.

<sup>15</sup> In what follows, it should be understood that everything said about the consumer applies as well to business purchases of insurance services.

that is attributable to all of the factor inputs, and in the insurance industry there are certainly factor inputs that are associated with investment income (Cummins, 1999, page 85, reports the cost of investment activity at about 9% of total expenses for life and property-liability companies). This investment output needs to be priced in order to get a complete price index for the industry (this is not in itself inconsistent with the two products view, above), and also needs to be included in the output of the insurance industry in order to measure insurance industry productivity.

Sherwood (1999) makes the distinction between what he calls an “activity”<sup>16</sup> that the insurance company engages in for the purpose of creating output and the output itself. He puts the investment earnings of insurance companies in the category of an “activity,” not an output. An analogy might be helpful: A machinery manufacturing company needs a loading dock where incoming rolls of steel are unloaded and prepared for use in the manufacturing process. I believe the loading dock illustrates Sherwood’s concept of an activity: It is a necessary function for producing output, but what it does it is not output itself.

**3. The Company Pools the Risk.** This is of course the SNA view of insurance, which is incorporated into EUROSTAT industry statistics. As noted before, investment income is not treated as increasing the output of the insurance company, but as increasing the price paid by policyholders for insurance. Everything that has already been said about this convention for measuring insurance in the national accounts applies to the PPI.

**Discussion.** As with national accounts and with the CPI, one’s view of insurance company investment earnings depends on the model of insurance company behavior. With respect to the PPI, no North American participant seemed enthusiastic about the SNA treatment of insurance company investment earnings in industry statistics. There might be an inter-continental difference of views.

On the other hand, industry statistics are precisely the place where alternative approaches to insurance can most readily be displayed. The EUROSTAT insurance industry guidelines suggest collecting all the relevant information that was discussed in the workshop: separate collection of premiums, claims, investment earnings, and so forth. If all of the elements of the EUROSTAT industry survey are collected in individual countries, it should be easy for users to reassemble them as they wish. The issue comes down to the price of insurance, which is discussed in the following section.

The workshop did not clearly distinguish between the “two products” view and the “activity” view displayed above. In part, this distinction was not clearly developed, and in part, it does not appear explicitly in the measurement literature on insurance.

I think the “two products” view is the more straightforward one. If I understand the “activity” view correctly, it would leave the insurance company with negative value added, because claims paid usually exceed premium receipts. The insurance company must be doing something economically besides selling insurance, and of course that is its investment activity. If the investment activity is not put back into the output measure in some way, industry statistics will display the same negative value added anomaly that was discussed above with respect to the old national accounts premium minus claims output definition.

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<sup>16</sup> The language here is a potential for misunderstanding. In international (but not U.S.) usage, “activity” means “industry.” Thus, what in North America is called an “industry classification system” is elsewhere called an “activity classification system.” Sherwood is not using the word “activity” in the international sense.

## V. The Price of Insurance

Expenditures on anything equal price (P) times quantity (Q). Most of the insurance output measurement literature is organized, sometimes implicitly, around expenditures, or  $P \cdot Q$ , the current price, or nominal, measure of output. The current-price output (or input) measure is in dispute, not only the constant-price measure (or Q), which is more typically the concern in the economic measurement literature.

Yet, any discussion of insurance company output, or any discussion of what the consumer buys when and insurance policy is purchased, must concern, ultimately, the measure of P. Zvi Griliches' remark at the Brookings workshop accurately characterizes the whole insurance output literature:

“We’re spending a lot of time on the nominal, because in some ways we can argue about it easier. But the real problem comes in the deflation.... And I think the real conundrum... is how you parse out of this the changes in risk.... Risk is a form of quantity... the assumption of risk is a quantity insured times the probability of loss, and to the extent that the probability changes, there is a change in the quantity of risk assumed. It doesn’t matter for the nominal [output] story, but for the real [output] story it matters whether or not that’s [put] on the quantity side or on the price side.”

The  $P \cdot Q$  relation implies that if we know Q we know P. Any satisfactory measure for the output of the insurance industry (or of the consumption of insurance by households) must also imply a price index. Conversely, a proposed measure of the output of insurance (or of the consumption of insurance) that does not imply the specification of a price index is not an adequate measure of Q, either. Deflation is not just an afterthought or just an implementation issue; the price index is an inherent part of measuring output, whether or not measures of real output are actually produced by deflating by a price index.<sup>17</sup> Moreover, as Griliches noted the price index must in some manner handle the assumption of risk.

**The Net Premiums Approach.** John Astin observed that a net premiums definition of the quantity of insurance (he was speaking of consumer expenditure) implies a net premiums definition of the price index for insurance. This must certainly be correct.

A great defect of the net premiums position on measuring insurance output is that it has never been combined with a net premiums specification for the price index. Both Eurostat, for the HICP, and BEA, for the U.S. national accounts, move a net premiums quantity concept by a price index for gross premiums. In fact, Astin stated at the Brookings workshop that European insurance companies told Eurostat that a net premiums price index was impractical:

“While in principle we should be measuring net premiums, you can’t in practice because what you have to do is to follow the price of specific products, just as with any other item in the CPI. With insurance you have to take the premium with a particular company on a particular model of motor car for a 25-year old civil servant in Washington D.C., or wherever, and follow that premium through time. I just don’t think that it is possible to that on a net premium basis, it’s not the way the companies operate. They couldn’t do that, and in any case, in some months, you’d have a negative net price.”

One specification for deflating the net premiums approach draws an analogy with “double

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<sup>17</sup> For example, if one were to construct a direct quantity index, prices come into the measure as weights.

deflation” methods for producing value added, where outputs and inputs are deflated separately to get real value added as a residual. Analogously, to get real constant price net premiums one deflates premiums by a price index for insurance premiums; claims are then deflated by, e.g., a price index for auto repairs, or by the overall CPI (minus insurance), on the grounds that too many things are bought with insurance claims and no good bill exists of what is purchased with them. Similar proposals for deflating net premiums have appeared in many places, and were favorably considered by the majority view in the BEA Working Group.

However, the net premiums approach to insurance is justified on the hypothesis that the consumer is buying management services from the insurance company, or something like that. Griliches remarked that “it doesn’t make sense to deflate [any part of net premiums] by automobile price [indexes] because there is nothing in the management side of the insurance transaction that should be deflated by [auto repair] price indexes.” Indeed, trying to obtain a constant-price measure of net premiums by separately deflating premiums and claims appears an implicit repudiation of the net premiums, risk-pooling hypothesis.

The deflation problem would be simplified greatly if policy holders paid explicit fees for the net premium part of insurance charges. They don’t. And because they don’t, there are no explicit fees corresponding to the insurance company charges described in the SNA. To my knowledge, no proposals have been put forward in the national accounting literature for constructing an explicit price index for the insurance service that is described in the SNA.

The net premiums position is already an imputation. To implement a deflated net premiums measure, one must impute the price of the management services from the movements of some other prices. Imputing the price movement of net premiums from the price movement of gross premiums, or imputing them from the price movements of gross premiums and of repairs and other expenditures bought out of claims<sup>18</sup> is not satisfactory, and appears to conflict with the hypothesis of insurance company behavior that motivates the net premiums view of insurance.

It has sometimes been asserted by national accountants that choosing the premiums minus claims output measure makes the quality change problem less severe in insurance. On their contention, net premiums also nets out changes in risk, which (as discussed in the following section) is the major problem in obtaining real output of insurance under the gross premiums approach.

Even if this statement were correct, it is an evasion of the basic problem, not a solution to it. Changes in risk, and changes in the way that risk absorption (or pooling) is administered must be at the heart of measuring insurance.

Moreover, it is not entirely clear that the net premiums approach reduces the importance of quality change problems. The potential for quality change problems in any price index must in some sense depend on the amount of the quality change in the product, relative to the size of the transaction. If computers have more quality change than shoes, this must mean that the value of quality change in computers, relative to the average price of computers, is greater than the value of quality change in shoes, relative to the average price of shoes.

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<sup>18</sup> As Peter Hill pointed out in his discussion, a claim paid for automobile damage might instead be spent on new clothing. That seems to complicate still further the price index imputation.

The premiums minus claims margin is far smaller than the total volume of premiums written by insurance companies. Even if one thought that risk-related quality change were reduced because of the net premiums output definition, one must then consider the amount of quality change in the units in which pool administration is measured. What are the services that the insurance company performs for the policyholder? How important are they in the premiums minus claims margin? How subject are they to change?

For example, Carr, Cummins, and Regan (1999, pp.122-123) review efficiency studies in insurance industries, particularly on results that compare insurance companies that sell through independent agents and those that have their own, dedicated agents. They conclude: “Recent studies provide support for the hypothesis that the higher costs of independent agency firms are attributable to their providing more services, for which they receive additional revenues, leading to insignificant differences in profit efficiency between direct-writing and independent agency firms.” This passage implies that variations in the premiums minus claims margin are substantial across insurance companies, and that they are associated with different levels of services. Services to policyholders must be allowed for in either approach to measuring real insurance output. However, they are undoubtedly far larger as a proportion of net premiums. If so, the net premiums approach may be more subject to quality change problems, relatively, than is the gross premiums approach.

Without many more studies on the measurement of insurance, one does not know that the net premiums approach has fewer quality measurement problems in it, despite frequent assertions that it does. If the unit for the insurance administration fee is the policy, then how can we tell if the insurance company had done something better for its clients? Statisticians and national accountants cannot escape the quality change problem in measuring insurance.

**The Gross Premiums Approach.** Constructing a price index for gross premiums is also not easy. But at least there is a clear starting point. As Griliches summarized it, the price concerns the thing that the consumer buys, which is the insurance policy: “There is no other answer.”

Indeed, one of the strongest arguments in favor of the gross premiums position on measuring insurance output is: Under this position, one can observe a transaction. The transaction has a price, which is the premium for the insurance policy.

The major problem encountered with pricing insurance policies is adjusting for changes in risk. Weiss remarked in the Brookings workshop that the price of insurance equals the cost per dollar of expected loss, with probabilities constant. Born, et al. (1998, page 182), after remarking that “The ideal measure of a firm’s responses to its environment would be changes in its prices and quantities,” note:

“For an insurance policy with a fixed set of contractual terms, it might be possible to construct a time series of prices; however, policies vary in important details, such as the deductible, or whether co-payments are required, and such details are not made public... Firm-level financial data on premiums and losses by year, state, and line of business [proxy for what is wanted, but] such data do not enable us to separate the price and quantity of insurance issued.”

With this formulation, when there is a change in probability of loss, it shows up as an increase in the quantity of insurance purchased, not in its price.

There is, however, some debate on this point. Barry Bosworth put it in the context of

international comparisons: If the cost of insurance is low in a city like Tokyo, which is very safe, compared with some large American city, does that mean that the American cost of living index is higher or not? If risk is held constant in the price index, the American consumer consumes more insurance than the Japanese consumer, so the Americans' cost of living index for market-purchased goods is not higher. On the other hand, one might want to hold constant aspects of the environment in a complete cost of living index; in this case, increased insurance costs to offset a deterioration in the environment would show up as increases in the cost of living index. Katharine Abraham remarked that this might be a substantial problem for the measuring the cost of insurance to the consumer, but it was no real problem if the objective was to measure the price index for insurance companies. Although that seemingly offers a solution for the PPI view (one that is different from the CPI view), not all economists would be willing to accept an industry productivity measure in which unpriced gains to consumers are excluded.

It is worth noting that in the net premiums version of the insurance story, changes in risk do not matter at all. Because of this difficulty in correcting the gross premiums price index for changes in risk (and also for changes in utilization) statistical agencies have sometimes preferred to price net premiums. Griliches remarked on the fact that the BLS has used net premiums as the basis for pricing hospital insurance in the Consumer Price Index (CPI).

Another problem is sometimes mentioned: Suppose the price of cars goes up, and car insurance premiums rise apace, even without changes in risk or anything else. The above formulation implies that this increased insurance premium is consumption of an increased quantity of insurance, and that the cost of insurance has not risen. Viewed as output of the insurance industry, this formulation also seems to make sense.

Yet, the CPI concept ought to be built on a price index for automobile transportation--that is, the cost per mile of constant-quality automobile transportation. In this case, then, an increase in the amount of car insurance shows up as an increased cost of using the car, whether the source of the premium increase is changes in risk, less efficiency in the insurance company, or inflation in car prices. This, again, is a topic in which there might be a wedge between the price index that is constructed for the insurance company (that is, the PPI view) and the corresponding CPI price index.

**Conclusion on Insurance Prices.** On balance, the issue seems to us to play out as follows: Pricing gross premiums implies collecting a price for a direct transaction that can be observed. Changes in risk associated with the policy are quality changes, creating quality change problems that are comparable to other, well-known quality change difficulties in price indexes. Avoiding the quality change problem by using a net premiums approach substitutes an imputation for direct pricing, because it implies constructing a price index for a transaction that is not normally observed. Imputations are sometimes necessary in economic statistics. But it seems undesirable to impute when a transaction is available to be observed, no matter what quality change difficulties may arise in making comparisons between two observed transactions.

## VI. Conclusions

For his study of the efficiency of insurance companies, Cummins (1999, page 84) specified three insurance company outputs:

- risk-pooling and risk-bearing
- 'real' financial services relating to insured losses, and

◦ intermediation.

For property-casualty insurance, the real services can include advice on minimizing loss probabilities, inspections of property, appraisals and evaluations, and so forth, in addition to services in settling claims for actual losses. Settling claims promptly and fully is also an aspect of policyholder services.

Considering insurance as involving three products that are partly or wholly bundled together is another useful way to think about the issues of insurance output measurement.

The SNA-national accounts net premiums view essentially unbundles the policyholders' services component from the policy itself. It proposes to count these two products separately, or rather to ignore the one and price the other separately. That no unbundled transactions can be found is a substantial empirical strike against this view of the insurance business. It is not, however, without precedent in the measurement literature, because bundling of transactions is pervasive in complex goods and services, and approaches to measuring them often involve procedures to estimate the separate parts of the bundle. The most serious flaw in the net premiums position is the failure of its proponents to find (or, actually, even to consider) a way to count, evaluate, and price the services that are crucial to its risk-pooling hypothesis. This comment applies both to the NIPA and SNA implementations.

The gross premiums view of insurance output implicitly accepts that the risk-absorbing insurance products are bundled with their policyholder services. They are, after all, always included in one transaction. On the gross premium view of insurance, changes in risk, and also in policyholder services, become quality change problems in measuring insurance output. It must be acknowledged, however, that relatively little progress had been made in solving either of these two sets of quality change problems.

Because policyholder services appear in both the net premiums and the gross premiums views of insurance, empirical estimates of the size, composition, and implicit prices of these services would advance either measurement. I have not found, however, a single study that quantifies policyholder services.

Even though the national accounts literature can be interpreted as throwing a useful light on the question of policyholder services, the national accounts tradition has also obscured the insurance measurement issues by its failure to focus on appropriate deflator for these policyholder services. One cannot get at the management and services component of insurance by deflating separately insurance premiums and insurance claims, for the reason Griliches gave. To measure policyholder services, one needs a measure of those services and a way to account for changes over time in the quantities and quality of service provided to policyholders. Because in principle the same measures should be developed for measuring insurance output by the gross premiums view, measuring policyholder services deserves a high priority for future research on insurance output.

Finally, there seems general agreement that insurance company investment activities (Cummins uses the term intermediation) represent outputs that need to be included in a comprehensive measure of insurance industry output. Investment activity is a joint product of insurance because moral hazard results in the creation of a fund of reserves that can be invested. It is most appropriate to treat the investment activity like any other joint product, both products are to be counted and both products need a price index.

That insurance investment activity is financial output is a major problem for national accounts, but it is no problem for industry statistics or for industry analyses, including the measurement of productivity. The national accounts approach to insurance company investment activity—treating the investment activity as adding to the price of policyholder services—is hard to defend, either from the

view of the insurance production process, or from the viewpoints of insurance purchasers.

Moreover, it should be emphasized that this national accounts treatment of insurance company financial activities undoubtedly does not stem from a conviction that insurance really works the way the insurance convention suggests—that is, that insurance policyholder services increase in price when insurance companies have favorable investment experiences. It results, instead, from decisions elsewhere in national accounts, particularly on the treatment of interest, that are necessarily forced on the SNA and NIPA definition of insurance industry output.

I have attended meetings where proponents of the net premiums approach to insurance have dismissed, somewhat contemptuously I might say, any discussion of the economic measurement of insurance and finance with the statement: “there are things in national accounts that are more important than the measurement of insurance and banking.” This was not a view held or expressed by any of the participants in the Brookings workshop. Nevertheless, because it has been expressed in some parts of the national accounts community, it is appropriate to respond.

It is of course a methodological bias, but I believe that national accounts have potential uses beyond those of the major aggregates, such as GDP, and should be constructed to accommodate these uses. Industry data from national accounts ought to be usable for analyses of industry behaviors. Elements of the household consumption sector of national accounts should be usable for economic analysis of consumer behavior. One should be able to take the inputs in the input-output table that underlies the estimation of national accounts and analyze purchaser behavior with respect to changes in energy input costs and so forth.

On this view of the uses of national accounts, if decisions elsewhere in the accounting structure result in measures of industry output that are not useful for industry analyses, or result in measures of insurance consumption that are not appropriate for consumer demand analysis, or result in measures of purchasing industry consumption of insurance that are not useful for analyzing purchaser behavior in the using industries, it is a strong signal that the decisions elsewhere in the accounts that drive the insurance industry measures need to be reexamined.

In some sense, the gross premiums-net premiums debate is the wrong debate. Insurance companies do sell insurance policies, there is no evidence that that conflicts with Griliches’ statement that the insurance premium is the only place to begin to estimate the price of insurance, or that suggests that insurance company investment earnings raise the price of insurance company policyholder services. The reason this debate has taken place is not so much that the participants had strongly held views and empirical evidence for the risk-pooling or risk-absorbing views of insurance company behavior. This debate has proceeded because of a long-standing national accounts convention on the measurement of insurance that originates, not in the analysis of insurance itself, but in other decisions in the accounts. The risk-pooling rationale for the national accounts treatment of insurance is a rationale, not a reason.

Whether one looks at insurance as combining two products (risk-absorbing and investment activity) or three products (risk-absorbing, policyholder services, and intermediation) is of no consequence. Either leads to the same result. The real issues in measuring insurance output are those familiar quality change problems that arise so frequently in the measurement of services output and productivity: In the case of insurance, measuring the values and changes in policyholder services and measuring and valuing changes in risk. The real challenge in improving the measures of insurance output in national accounts and in productivity studies and in improving PPI and CPI price indexes is to make progress on estimating those policyholder services and valuing changes in risk.



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