

**Price, Output, and Productivity of Insurance:  
Conceptual Issues**

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# **Price, Output, and Productivity of Insurance:**

## **Conceptual Issues**

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As noted in chapter 5, the insurance industries have not experienced high productivity growth rates, at least as measured by using the data in the Bureau of Economic Analysis industry accounts. Insurance carriers appear to have had negative labor productivity growth over the whole 1987–2001 period (table 5-4), and both the insurance carrier and the insurance agent industries had negative measured multifactor productivity (MFP) for most of that interval.

In April 1998, the Brookings Program on Output and Productivity Measurement in the Services Sector convened a workshop, “Measuring the Price and Output of Insurance,” that included 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 (see, for example, Voorburg Group 1993) the all-day Brookings workshop was the most intensive and comprehensive discussion of measurement issues in the insurance sector to date.<sup>1</sup>

This chapter reviews the measurement of insurance output and prices in the economic measurement literature and in economic research on insurance; among other sources, we make use of the papers presented at the workshop and the enlightening discussion among workshop participants. However, this chapter is not intended to be 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 the state of the art of measuring insurance output today. We have organized material from the Brookings workshop and elsewhere in a way that is intended to advance understanding of the issues. For example, our discussion of models of insurance company behavior makes explicit a topic that was mainly implicit in the workshop discussion; however, explicit behavioral models clarify insurance measurement issues.

In addition, we have drawn on 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 appeared in the literature and that are reviewed in this chapter. Partly because of this split, no publicly available document was produced, but we found the materials developed by the team useful in preparing our 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>

## **[1] A Summary of Measurement Issues[end]**

As noted in chapter 5, measuring the output of the finance and insurance industries is more difficult than measuring the output of industries that produce goods such as automobiles or computers. The finance and insurance industries produce outputs that are as heterogeneous as the outputs of the automobile and computer industries, so the quality change problem in measuring output is fully as difficult for them as for industries that produce cars or high-tech goods. But finance and insurance output is difficult to measure also because in these industries there is no

agreed-on unit from which to begin. It is not just the deflated, or constant price, output measure that is controversial; in finance and insurance, controversy surrounds the measure of current price output as well.

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 with the computer industry, where we agree on the units and the measurement issues revolve around measuring quality change, with insurance the units are themselves at issue—which is not to say that the quality change question is less of an issue.

Speaking of services industries’ 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 [services industry] providers.”<sup>3</sup> Bradford and Logue make a similar remark with respect to insurance,: “In the case of property-casualty insurance, it is not clear what one means by ‘price’ or ‘quantity.’”<sup>4</sup> 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 the insurance policy and the administrative services that the companies provide to their policyholders.

Two bodies of literature address insurance output measurement questions, either directly or indirectly. First, insurance is the subject of a not-insubstantial economic measurement literature—statistical agency materials, *Studies in Income and Wealth* volumes (for example,

Ruggles 1983), and economics and statistics journals. In this first literature, measurement questions are addressed and discussed directly and explicitly—a great advantage, particularly when the strengths and weaknesses of various alternatives are compared. But in this measurement literature, the implications of alternative measurements of insurance output and of alternative concepts for measuring output are seldom tested by using them in an economic analysis or by subjecting them to a hypothesis test. The arguments tend to be abstract, divorced both from the uses of economic data and from analysis of the behaviors of buyers and sellers of insurance.

Insights on measuring insurance output also emanate from economic research on insurance, which requires price and output measures. The advantages and disadvantages of the insurance research literature are the opposite of those of the economic 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 that the 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 including an analytical appendix on the topic “What data should we have had to explore this problem?” One must infer the answer from the content.

Unless otherwise indicated, the topic of this chapter 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. We also omit social insurance (in the United States, Social Security, unemployment compensation, and so forth), which usually is treated integrally with private insurance in the national accounts literature. However, as Lippman and McCall (1981) point out, institutions for managing risk are pervasive in a modern

economy. Because such institutions are not limited to private and social insurance schemes, extending the scope of this chapter beyond the private insurance industry threatens its focus on a single class of issues.<sup>5</sup>

In discussing the main positions in the insurance output debate, we have tried to be even-handed. We have, however, developed our own position, which inevitably colors what we write about others, so the reader ought to know what it is at the beginning: we favor what we describe below as the “risk-assuming” model of insurance and not the “risk-pooling” model that is incorporated into national accounts in the United States and other countries. This implies that we reject the “premiums-minus-claims” definition of insurance output that is used in national accounts. Our empirical estimates in this chapter indicate that changing the concept of insurance in national accounts—and changing the deflators—would eliminate the negative measured labor productivity growth in the insurance carrier industry in recent years, though growth would remain very low.

#### **[1]Models of Insurance Company Behavior[end]**

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. The output unit is the insurance policy, so we would count output growth in the insurance industry by the increase in the number of policies sold, adjusted of course for differences in the characteristics of the policies, including, but not limited to, changes in the amount of risk assumed. Ancillary activities also may be included in the output definition.

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 consists of these administrative services, perhaps on a per policy or per policyholder basis.

In the North American national accounts and economic measurement literature, the premiums-minus-claims position is usually called the “net premiums” position, even though that is not the definition of net premiums employed in the U.S. insurance industry.<sup>6</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 and others 1993) have differed in this respect in the past.

However, the gross premiums–net premiums debate is only one manifestation of two different views of how the insurance activity functions and of what insurance companies do. Each of these views leads to one side of the 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, and it collects the premiums and pays the claims of the policyholders. The insurance company is essentially a cooperative, in which the members of the cooperative pay a service fee to the insurance company for performing 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 insurer's 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 (plus profit)—premiums minus claims, or in national accounts language, net premiums. The price of insurance is the service fee charged for administering the pool on behalf of the policyholders.

—**Assuming risk.** In the alternative model of insurance, the insurance company assumes the risk. In this risk-assuming or risk-absorbing view of insurance, the policyholders buy a service—having their assets or income protected against loss. As Bradford and Logue 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."<sup>7</sup> In this view of insurance, the service provided by the insurance company to policyholders is the reduction of risk. Without insurance, an automobile accident implies the loss of the car; with insurance, household wealth is unaffected by the accident.

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 sold 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. Obviously, in order to absorb risk, the company must also form and operate a risk pool, administer the policies, and pay the claims, as in the risk-pooling model of insurance. The difference in the two models is who bears the risk—the policyholders or the insurance company.

Associating the gross premiums–net premiums debate with behavioral models of insurance companies 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.

Therefore it is not so much that contributors to the economic measurement literature and the participants at the Brookings workshop were debating the appropriate way to implement *a model* of insurance. 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 of double counting in national accounts the output of auto repair shops paid for by insurance companies. But such pragmatic arguments are ancillary to the main conceptual issue.

In the following discussion, we review the arguments for and against the two behavioral views of insurance, examining national accounts, productivity, and CPI and PPI measurements separately. We later discuss a second set of issues—the treatment of insurance company investment income in output and price measures. In principle, investment income could be added to either 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.

#### **[1]The Risk-Assuming, Gross Premiums Position[end]**

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 with Richard Ruggles's review of issues in national accounts. Ruggles states: "What households are purchasing is protection against loss, and the cost of such protection . . . consists of the full premium and not the net premium."<sup>8</sup> Denny is equally explicit: "The output of the insurance company is the quantity of risk shifted to the insurance company."<sup>9</sup> 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 it has mostly been ignored or dismissed rather than discussed seriously.<sup>10</sup>

Other contributors to the measurement literature who have endorsed the gross premiums alternative include Hornstein and Prescott (1991) and Popkin (1992). In the papers prepared for the Brookings workshop, the gross premiums position was advocated 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 for the insurance industry. In addition, as discussed below, insurance industry researchers, including Bradford and Logue (1998) and Bernstein (1999), generally have adopted the gross premiums view of insurance price and output.

It is not necessary to explain at any great length 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 companies. Long ago, Clark Warburton (1958) 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, various points of confusion about the gross premiums position have arisen, largely in the national accounts context. The following sections discuss some of them.

## **[2]Calculation of Value Added under the Two Proposals[end]**

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 shown in the following paragraphs.

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

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

Under the net premiums approach now used in national accounts, gross output equals premiums minus claims. Value added is obtained by subtracting purchased inputs and services from net premiums. Therefore,

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

For value added, the two alternative definitions of insurance output imply only that claims are subtracted from premiums at different points, either as one element subtracted from gross output to get value added or in the calculation of gross output itself. 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 level of GDP. Sherwood (1999) makes the same point.

## **[2]Treatment of Claims[end]**

Because confusion exists 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 our 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. In the U.S. NIPA, insurance claim payments are treated as income to consumers, who may use the income to pay, for example, for car repairs. (Claim payments are treated as transfer payments in SNA93.)

Under the gross premiums approach, consumers would be depicted as paying more for insurance (because premiums are larger than premiums minus claims. However, claims would no longer contribute to household (transfer) income; they would instead be costs to the insurance company.

Under the gross premiums approach, the insured party is portrayed as having a shiny car both before the accident and afterward, but the accident itself and the repair of the car increase neither the insured's income nor expenditure. The loss of the property and its restitution by the insurance company are changes to be recorded in the insured's capital account, but not in the insured's income and expenditure.

Suppose that there were more car accidents and that premiums rose in step with claims. The present national accounts net premiums approach would show no increase in the cost or purchase of insurance, but the rise in automobile accidents would create a flow of income (transfer) to consumers and an increase in household expenditure on car repair. Therefore an increase in automobile accidents, with the subsequent increase in claims and repairs, results in higher real consumption, an anomalous result that surely reduces the usefulness of the national

accounts for analyzing consumption behavior. Similarly, casualty insurance claims paid to nonfinancial 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, if automobile accidents increase, consumers pay more for insurance (because premiums go 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 on car repair would be unchanged.

In addition, changing the treatment of insurance provokes 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 its allocation among sectors.

Of course, the measured volume of car repair is 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 also are possible.

Finally, there is no inherent double counting in the gross premiums approach, although this has sometimes been alleged by national accountants. It is true that changes to the *present system* are required to avoid double counting, but competent national accountants will work out

the implications of the gross premiums position, just as they worked out the implications of the net premiums approach years ago.

## **[2]What Does Insurance Do to the Amount of Risk?[end]**

One argument that has been made against the gross premiums position is that it implies that the insurance company reduces the amount of risk in the economy, whereas the net premiums position does not. This seems a confusion.

When an insurance company absorbs risk, it does not reduce the quantity of risk in the economy. Insurance increases utility because individuals are not indifferent to the choice between losing a small amount with certainty (the premium) and losing a large amount with a probability *that results in an equal expected value*. This is one of the oldest results of utility theory. The nature of the gain from insurance therefore depends on the nature or form of insurance and on the consumer's utility functions defined over risky states. This problem was the subject of Erwin Diewert's (1995) paper and of George Akerlof's comments at the Brookings workshop.

A parallel often has been drawn between insurance and gambling. Both obviously involve behavior toward risk, but insurance consumers are usually thought of as avoiding risk and gamblers as cultivating it.<sup>11</sup> Akerlof noted in the workshop that insurance and gambling probably should not be considered as parallel. He suggested that gambling had entertainment value—that even though gamblers wanted to win, they normally did not play with 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 we will not pursue it to any greater extent here because it is tangential to the main subject of the chapter.

### **[1]The Risk-Pooling, Premiums-Minus-Claims Position[end]**

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 and others 1993); in the *Balance of Payments Manual* (International Monetary Fund 1994); and in the European Harmonized Indexes of Consumer Prices (Eurostat 1999). As Robert Parker (1998) documented in his paper for the Brookings workshop, net premiums also describes the treatment of insurance in the U.S. National Income and Product Accounts—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 also has 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 Union<sup>12</sup> The report of the Oslo meeting of the Voorburg Group (1993) recommends premiums minus claims as the international measure of insurance output for industry statistics.

Therefore 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 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 John Astin explained 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).

## **[2]National Accounts Rationale[end]**

As Peter Hill (1998) pointed 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 so doing, it concurred with present and past U.S. practice.<sup>13</sup> However, as Hill also reports, dissatisfaction with the measure of insurance industry output arose because in many countries insurance output so defined is negative: in some periods and sometimes for many years, insurance companies pay out more in claims than they receive in premiums.

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 purchased 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 makes no economic sense.

For these reasons, 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 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.<sup>14</sup>

As Hill also pointed out in the Brookings workshop, the net premium position on insurance holds that *gross* output of insurance is measured by premiums minus claims; it does

not hold 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). Therefore the gross premium–net premium distinction for insurance output is not equivalent to the usual national accounts gross output–net output distinction (that is, output compared with value added). Some confusion on this point appeared during the discussion at the workshop and has undoubtedly clouded the discussion of the real issues elsewhere.

Confusion about value added under the two insurance output proposals also arose during the workshop and probably also exists 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. We made this point earlier, but because of its importance it bears repeating.

If the output concept makes no difference with respect to the 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.

### **[3]Validity of the risk-pooling concept[end]**

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:

**[excerpt]**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.<sup>15</sup>[end]

This SNA view of the insurance business is buttressed by a passage in SNA93 that notes that claims are paid out of premiums: “This emphasizes the fact that the essential function of non-life insurance is to redistribute resources.” Insurance claims paid are treated as transfers to the claimants.<sup>16</sup>

The BEA work team described the SNA (and NIPA) treatment of insurance as consistent with the view that insurance companies provide pool administration services for their policyholders. It also contended that mutual insurance companies and retrospectively rated insurance plans operate explicitly like risk-pooling arrangements and offered their operations as a justification for the net premiums treatment of insurance output.

Collins 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.”<sup>17</sup> Other examples come from Eurostat regulations for the HICP and for industry statistics. The Eurostat insurance statistics manual 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 funds on the financial markets.”<sup>18</sup> The manual also explains that the output definition for insurance industry statistics is the same as for national accounts.<sup>19</sup>

Of the sources cited above, only the BEA work team considered explicitly the gross premium alternative for insurance output. Alternative concepts for insurance output were also discussed by the Voorburg group, an international statistical agency group on measuring

services, in Williamsburg, Virginia, in October 1992 and in Oslo in September 1993 (the final report of the Williamsburg meeting makes reference to the fact that two alternatives exist).<sup>20</sup> No alternative model of insurance was mentioned in Eurostat HICP materials and papers on insurance, and apparently no alternative model was considered. As John Astin indicated in the workshop, the HICP decision on insurance was made partly because of a desire to integrate the HICP with national accounts.

The empirical validity of the risk-pooling model of insurance may not be the crucial issue for national accountants (we later suggest why it might not be). If it is, however, then empirical tests of the risk-pooling model should be crucial in determining how to measure insurance output. One might ask whether there is evidence that demanders and suppliers behave according to the risk-pooling insurance output model in the SNA or whether the alternative, risk-absorbing model is 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, insurance company output is the fee for administering the risk pool. However, one cannot find an insurance contract that is written that way—there seems to be no price charged for a service so defined. Put another way, there is no unit 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:

**[excerpt]** 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.<sup>21</sup>**[end]**

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 the insurance policy seems as natural a unit from which to begin as does a pen or a computer. We can readily observe the unit and the transaction that corresponds to the risk-absorbing model.

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 United States and the United Kingdom) behave differently from other insurance companies in the same line of business. Born and others (1998) investigated the economic behavior of U.S. insurance companies that were organized as mutual companies (nominally owned by the policyholders) and stock insurance companies (nominally owned by shareholders). A third class of property-casualty insurance companies also exists in the United States—nominally stock companies that are owned by nominally mutual insurance companies. They found no significant behavioral differences:

**[excerpt]**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.<sup>22</sup>**[end]**

This one finding might be taken as weak evidence that mutual companies act more as custodians for the policyholders, but overall the authors do not conclude that there is a difference in insurance company behavior.

However, the Born and others results show only 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 work team suggested; if so, the empirical results of Born and others say that nominally stockholder-owned insurance companies function the same way. Alternatively, those empirical results may suggest that insurance companies that are organized as policyholder-owned mutual companies—or that 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 and others indicate that there are no major differences in insurance company behavior.

Perhaps competition forces investor-owned insurance companies to mimic mutual companies and behave as agents for their policyholders. This idea, which is consistent with economic models of agency behavior, was suggested by Brian Newson (the head of Eurostat national accounts) at the Brookings workshop. Or perhaps it is the other way around: competition forces cooperatives to behave as profit-making enterprises, a result that is well known in economics. One of the authors of this book has an automobile insurance company that carries the word “mutual” in its title. It periodically sends a small refund check when it has a

favorable claims experience. We interpret that as trying to hold on to a customer, but perhaps the company's motives differ from our perceptions.

This insurance company never tries to charge an additional premium when it suffers an unfavorable claims experience, although it may use such an experience to justify increasing rates for the subsequent period. Again, that behavior probably is forced upon it by competitive conditions. The company knows that if it tried to bill after the fact for the company's losses, consumers would not pay because they could renew their insurance with another company. If one was in some real sense the owner of the company, one 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. The first is the fact that no insurance contracts are written with a price equal to an administration fee. The second is that there seems to be little evidence that insurance companies think they are administering a pool on behalf of the policyholders. 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 instead of the stockholders. One of us 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 then told a story about some financial manipulation involving a mutual company. These questions are certainly worth exploring at greater length in empirical studies, but what comes out of existing studies and anecdotes does not provide much support for the view of insurance companies as policyholders' cooperatives.

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 SNA decision making. At the Brookings workshop, Peter Hill remarked:

**[excerpt]**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.**[end]**

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."<sup>23</sup>

### **[3]Other SNA conceptual points[end]**

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, as Bradford and Logue (1998) point out, is 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." 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.”<sup>24</sup>

The payment of an insurance claim is regarded in isolation as a payment to the policyholder without any compensating services. The BEA work team notes that the *Balance of Payments Manual* (International Monetary Fund 1994) also advocates treating insurance claims payments to policyholders as transfer payments, on the grounds that “the policyholder is receiving an economic benefit . . . without giving up anything in return.”

It sometimes is 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 we 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 of 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 bankruptcy of

the HIH insurance company in Australia, the company 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 SNA statement that contingent contracts cannot be valued is incorrect, even in the case of insurance contracts.

With respect to the argument on transfers, two points of confusion 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, for example, his or her suffering a loss of a capital asset. It is not true that, as the BEA work team quotes the *Balance of Payments Manual*, “the policyholder is receiving an economic benefit . . . without giving up anything in return” or, quoting the SNA, 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 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 has a shiny new car before an accident, after an accident, and 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, not 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 to be 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 national accounts[end]**

Consistency is important in national accounts, so it is not surprising that it features prominently in the argument in behalf of the net premiums concept for insurance output. Therefore the majority members of the BEA work team 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 work team 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). First, in national accounts, the sale of a financial instrument is always treated as an exchange of assets, not as the purchase of services. Moreover, the risks involved in insurance company activities are sometimes asserted to

be similar to the risks involved in stock or commodity options, hedging plans, financial derivatives, loan payment guarantees, and gambling. In none of these does the SNA take revenue as the measure of output. Casinos, as noted previously, 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.

Consistency can be a treacherous or ambiguous argument. The call for consistency with other parts of national accounts is not convincing when the other parts are themselves controversial. It is true that the treatments of insurance and of banking in national accounts have always been linked, and it is apparently also true that no one has ever criticized one of these two conventions and supported 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 and the discussion of banking in chapter 7 of this book), the consistency argument in regard to 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 and therefore open to the criticism that the analogy is not exact. In general, analogies are useful as illustrations, less so as matters of logic.

Many contentions with respect to consistency concern finance. If an insurance policy is *defined* as a financial instrument subject to SNA rules for financial instruments and if the present definition of financial instruments 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 for retaining the net premiums approach to insurance output; it is simply an argument against making changes.

**[3]Capital account issues[end]**

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 given was the destruction of a house by fire or storm. A new house is investment under all present national accounting systems.

It is not entirely clear why investment goods were deemed a problem. With the gross premiums approach, one would presumably still record the new house as investment, but it would be investment made by an insurance company, not by a household. Other accounting conventions might also be worked out.

The BEA work team 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 (that is, premiums minus claims). Only the second component would represent the output from current production of the insurance industry.

Barry Bosworth noted in the discussion of this point that the United States has no “other changes in assets” account. The appropriate treatment of hurricane damage to the housing stock in the SNA other changes in assets account is omitted from the present discussion and probably needs additional thought. But investment goods do not seem to present a fundamental obstacle 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.

### **[3]Parallels with retail and wholesale gross margin definitions of output[end]**

The outputs of certain industries, notably wholesale and retail trade, are defined in national accounts as their gross margins—sales minus cost of goods sold. Cost of goods sold is a generally accepted accounting term, so the data are normally recorded in retail and wholesale records. One might invoke this parallel to justify the net premiums treatment of insurance. The gross margin in trade is a measure of retail or wholesale 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 approach to insurance output also is proposed as a measure of services provided to policyholders.<sup>25</sup>

In the workshop, someone asked why the textile mill was not depicted as selling the service of weaving, instead of selling, say, sheets and towels. Indeed, it is conceptually possible that almost any kind of activity could be conducted as a margin industry. Occasionally, a nominally manufacturing industry is conducted by processing clients' inputs and charging for processing (some smelting processes and historically grain mills were run this way). If the economic activity is conducted like a margin industry and if a price is set for the margin, then it makes economic sense to estimate its price and output this way. There is no “natural” way that a business has to be run and no natural analogy between insurance and some other industry that happens to be treated as a margin industry in national accounts. In addition, in Bureau of Labor Statistics productivity statistics, shoe stores are portrayed as selling shoes. Their output is not the

gross margin, so obviously the choice of output measure in the trade sector is not completely settled.

**[3]“Not gross premiums” arguments[end]**

Some participants in the debate on insurance present arguments that do not so much favor the net premiums approach as 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 to make repairs or to replace the item that was lost or damaged. When a consumer receives a claim payment for car damage or for a stolen television set, the consumer might not repair the car or replace the television but buy new clothes instead. In this case, the consumer does temporarily have more command over resources. He or she may behave as if the payment were equivalent to an increase in income, regardless of the nature of the loss for which the claim was paid. In this example, it is not clear that one wants to treat the car insurance company as purchasing clothing.

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. Spending the insurance claim on clothing is equivalent to consuming out of capital—that is, to dissaving. It was also noted that in both the United States and Europe, insurance companies are moving to a system in which they repair the car directly or directly replace the stolen television set in order to reduce insurance fraud.

**[3]Data availability questions[end]**

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 made by consumers from those made by the insurance company (this is necessary to get an accurate measure of consumer expenditure and to avoid double counting). Data might not be available to make this allocation. In addition, 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 to be ambiguity on this matter.

National accountants must *now* remove all repairs made to business-owned automobiles from auto repair shop revenue, because repairs for business autos are an intermediate expense, while repairs for autos owned by households are a final product. Netting out, in addition, 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 those encountered currently in computing consumption expenditures in national accounts.

Data problems might be even more severe for other kinds of insurance claims. As Anne Harrison noted, many insurance claims do not involve capital or repairs.<sup>26</sup> 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 that are not the result of insurance payments.

Obviously, data availability is not a fundamental concept. 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 the

grounds of data availability, but one cannot claim that data availability makes net premiums conceptually preferable to gross premiums.

### **[3]Positions that mix output with value added[end]**

In national accounts, the word “production” frequently is employed to mean value added. Elsewhere in economics, production usually is the process that results in output (in national accounts language, “gross output”) not in value added. Terminology does not matter so much as long as meaning is clear, but sometimes meaning is not.

The BEA work team contended that the concept of current economic production is most useful if it is consistent with some measure of the economic resources used in production. It is 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. Therefore the economic resources that go into replacing items lost through accident are not being considered in the BEA statement. However, the BEA work team 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.

### **[2]An Estimate of Productivity Measurement Bias from BEA’s Inappropriate Insurance Output Definition[end]**

The choice between gross premiums and net premiums as a measure of insurance industry output affects the measure of insurance industry productivity. Premiums are far greater than premiums minus claims. For example, in 2000, A. M. Best reported that property-casualty

premiums earned were \$293 billion; in the same year, premiums minus claims amounted to \$93 billion. By the gross premiums definition, output in this portion of the insurance industry was more than three times greater than it was under the net premiums definition. The level of labor productivity therefore is far greater under the gross premiums approach to insurance industry output. But is the change in productivity greater or lesser under the gross premiums definition of insurance output? At the Brookings workshop, some participants expressed the view that the premiums–net premiums distinction does not really matter, empirically, for productivity measurement.

In their response to Denny (1980), Hirshhorn and Geehan (1980) calculated alternative labor productivity measures for the Canadian life insurance industry over the 1955–73 period: using the gross premiums output concept, labor productivity grew 5.0 percent a year, compared with 2.8 percent a year with the net premium concept.<sup>27</sup> Popkin (1992) made a similar estimate for the U.S. accident/casualty industry: using the gross premium output concept instead of the net premium measure in the U.S. national accounts raised the industry labor productivity growth rate from 1.9 percent a year in the then-published BEA data to 4.4 percent over the 1980–88 interval. (In this period, BEA would have been publishing only value added in its industry database.)

Evidently in previous years the choice of output concept for insurance makes a great deal of difference in estimates of productivity growth for the insurance industry, and the national accounts output definition results in lower growth in industry productivity. These studies imply that premiums are not only larger than premiums minus claims but that premiums were growing faster than the premiums-claims margin—that is, the margin was shrinking. They also show that the measurement bias from the national accounts definition of insurance industry output is substantial.

In chapter 2 (tables 2-4A and 2-4B), we reported negative growth in labor productivity in the insurance carrier industry: -1.7 percent a year over the 1995–2001 period, estimated as a trend rate. Insurance industry MFP grew not at all (0.0 percent a year) over the same interval. Does measurement bias from the national accounts output definition account for, or contribute to, negative measured productivity in the insurance industry? To assess this issue, we constructed a measure of insurance output growth corresponding to the premiums definition, using for consistency a combination of BEA and A. M. Best data.<sup>28</sup> We then compared this new measure with the insurance output growth rate in the BEA data. (See chapter 5 for a description of BEA’s methodology.) The results are in table 6-1.

Under the current BEA output definition (premiums minus claims), current price output of the insurance carrier industry grew at the rate of 3.1 percent a year from 1995 to 2000 and at 3.3 percent a year from 1995 to 2001 (table 6-1, panel A). We provide estimates for two end years to avoid undue influence from 2001, which was an atypical year, but as the table shows, that is not a real problem. The table also shows that current price output growth was below the growth rate of the insurance industry deflator, so that constant price output growth was negative, at -1.5 and -0.5 percent a year for 1995–2000 and 1995–2001 respectively. This negative growth rate of constant price insurance output in the BEA database is the cause of the negative productivity rates displayed in table 6-1 and also in tables 2-4a and 2-4B of chapter 2.

**[table 6-1]**

BEA output for the insurance carrier industry is made up from separate lines for life insurance, health insurance, workers’ compensation insurance, and property-casualty insurance, as described in the notes to table 6-1, plus own-account software and construction (both of which

are quite small). Property-casualty (PC) insurance is around half of the total. We focus on the PC portion.

Using a combination of A. M. Best and BEA data (which itself is derived in part from the Best data), we estimated growth rates for alternative definitions of PC insurance (panel B of table 6-1). The first line of panel B presents the BEA output definition (premiums minus claims). As the table shows, the output growth rate we estimate for PC insurance using BEA's output definition and Best's data is approximately equal to the growth rate for the whole industry in BEA's data file. (Compare the first lines of panels A and B in table 6-1—the two differ by only about one-tenth of a point or less.)

Next, using the Best data and matching BEA procedures otherwise, we calculated current price output growth for the alternative “premiums” definition of insurance industry output.<sup>29</sup> This calculation also is displayed in panel B of table 6-1. Using 2000 and 2001 as alternative end points, we find that premiums grew 3.5 and 4.0 percent a year respectively since 1995—0.5 to 0.8 points faster than premiums minus claims. This clearly indicates that moving to a premiums definition of output would raise industry output growth and therefore labor productivity growth in the insurance carrier industry.

Discussion at the Brookings workshop and the analysis below suggest adding insurance company investment earnings to the insurance output measure. We followed this suggestion—that is, we treated investment income as an output of the insurance business, not as a contribution to the price of insurance (as in the SNA treatment). Again, our data source was A. M. Best. Though adding investment income increases insurance output, it does not appreciably alter the rate of change, raising it only by about one-tenth of a point a year, as panel B of table 6-1 shows. Therefore the bigger empirical effect comes from the move from premiums minus claims to

premiums as a measure of insurance output. Adding investment income has a small but still positive effect on output growth.

Our final measure for PC insurance output growth is 4.1 percent a year for the 1995–2001 interval, which was used for our estimates of industry productivity growth in chapter 1. This is 0.9 points above BEA’s output growth for the same portion of the industry. Our new output growth estimates in panel B of table 6-1 apply only to current-price output changes for property-casualty insurance. But labor productivity (LP) growth, for example, can be written (where all symbols are interpreted as rates of change) as

$$LP = (\text{output} / \text{price}) / L.$$

Therefore if current price output growth for property-casualty insurance is estimated at 4.1 percent a year instead of 3.2 percent (panel B of table 6-1) and property-casualty insurance is about half of BEA insurance industry output,<sup>30</sup> estimated insurance industry output growth will rise by roughly half of the difference, which feeds directly through to change our labor productivity estimate. We neglect term life insurance and other insurance for this exercise and note only that changing the insurance industry output concept in national accounts would affect other components of insurance as well. Because we make no additional adjustments to output for the other half of the insurance industry, we believe that our estimates are conservative.<sup>31</sup>

We restated the PC insurance output in the BEA insurance industry file by substituting, year by year, the “premiums + investment gains” output definition in panel B of table 6-1 for BEA’s output definition in panel A of the table; following BEA methodology, we used our new output definition as an extrapolator for PC insurance output. The output shares for PC insurance were the yearly totals in the BEA file. From this, we obtained new output measures for the industry. We then used the existing BEA deflators and labor input to recalculate LP for this

industry (note that changing the output definition would also change the shares and the deflators, but we made no adjustment for these terms).

As with the earlier Canadian and U.S. findings described above, substituting the new definition of insurance output for the one used by BEA raises measured labor productivity in the insurance carrier industry. The changes are relatively modest. For 1995–2001 LP increases by 0.4 point a year, but labor productivity still is growing at a negative rate (–0.55 average annual rate of change a year, compared with –0.92 in the existing BEA data). The choice of output measure does bias labor productivity growth in insurance, but in recent years the bias does not seem as large as in the earlier estimates cited above.<sup>32</sup>

Therefore we conclude that a conceptually more appropriate measure of output would lead to more productivity growth in insurance than is indicated by present BEA data. However, the changes are not large, at least for recent years, and still leave the industry with negative labor productivity growth.

**[1] Should the Investment Income of Insurance Companies Be Added to Output or to the Price of Insurance?[end]**

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 the incentive to buy insurance when risk of imminent loss became apparent would be too strong. This is known as “moral hazard”: generally, individuals who most anticipate losses are most likely to buy insurance.

Limiting moral hazard in insurance calls for creating a fund—reserves held against future claims. Insurance companies, not unnaturally, invest those 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 also is well known that investment earnings lower insurance premiums because of competition among insurance companies that earn positive returns on invested reserves.

Participants at the Brookings workshop discussed whether and how insurance company investment income should be included in measures of the price of insurance and of the output of the insurance industry. There seemed to be broad agreement that the investment earnings of insurance companies should be treated as part of insurance industry output, though some disagreement also was expressed. 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 investment income should be included. Investment earnings are not included in the BEA insurance industry output that we used for this study, but that was changed in the 2003 benchmark revision to GDP, and, we presume, that change will be followed in subsequent revisions to the industry accounts.

The rationale for inclusion of investment income, however, differs greatly. Conceptually different rationales lead to substantial differences in how investment is treated.

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 insurance as a product and the output of the insurance industry, in which insurance companies may have multiple lines of business, only one of which is insurance. The insurance product goes into the CPI and into input flows to industries that buy insurance, in an input-output

table, for example.<sup>33</sup> The investment output does not go into the CPI nor into the inputs of the business units that buy insurance. 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 insurance industry prices and two output quantities and to direct these two outputs in different directions in the input-output table.

A second, very different rationale is the one used in SNA93, under which insurance companies are assumed to act as agents or managers for their policyholders. Their investment income belongs to and therefore is imputed to the policyholders. The form of the SNA imputation is determined by the SNA convention that interest or other investment income cannot be treated as a productive service.<sup>34</sup> To avoid this, SNA93 assumes in an additional step that the policyholders pay the investment income back to the insurance company in the form of higher premiums (called “premium supplements” in SNA93). Thus under the SNA93 rationale, *the higher the investment income of insurance companies, the higher the cost of insurance*. Of course, it is clear that higher investment income lowers the premium paid for insurance. But the SNA price of insurance is measured inclusive of the investment earnings.<sup>35</sup>

On the price side, these two rationales are equivalent to asking whether the price concept of a PPI (a price index covering all of the outputs of the insurance industry) differs empirically from the price concept of a CPI (a price index corresponding to consumers’ consumption of insurance).<sup>36</sup> If insurance companies are regarded as being in two lines of business (providing insurance and engaging in investment), then the PPI and CPI concepts diverge, because the CPI concept includes only insurance products, not insurance company investment products. The PPI price for the insurance industry includes both prices. On the other hand, if the investment activity is treated as an inherent part of the insurance service itself, 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 (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. The different positions on investment income can also be identified with the models of insurance company behavior discussed previously. They depend also, though to a far lesser degree, on the economic measurement of interest. It is convenient to organize the discussion around the different uses for insurance statistics.

## **[2]SNA and HICP[end]**

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 at 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 it is the measure of the consumption of insurance by using industries and households.

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 reason for the change, as previously explained. Note that had the SNA adopted a premiums definition of insurance in the first place, this particular reason for adding investment income to output would not have been valid, but that would not necessarily preclude adding investment to output using some other rationale, as described below.

The SNA policyholders' agent model of insurance company behavior carries over to its treatment of investment income: 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 in the form of what are called "supplementary premiums."

Hill explained: "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>37</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 payment for a productive service, and therefore it cannot be considered 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 (see the additional discussion of this matter in chapter 7).

Therefore, under its current conventions for interest, the SNA cannot simply recognize insurance company investment income in the accounts. Indeed, using the SNA net-interest-paid convention, if investment earnings were added to the SNA premiums-minus-claims insurance output convention, it would make insurance output even more drastically negative. Accordingly,

it was necessary to provide some *non-interest* rationale for the insurance company's investment income. The SNA "premium supplement" rationale solved the problem (or most of the problem) of negative output of insurance companies.

The SNA premium supplement rationale implies that investment income is included in the current 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.

For the purpose of measuring productivity, the SNA treatment of investment earnings results in less output and a lower level of productivity in both of the alternative output approaches, and it probably also results in lower productivity growth. Under the SNA treatment, an increase in insurance company investment income leads to an increase in the price of insurance. Yet insurance companies devote resources to their investment activity, as Weiss pointed out in the Brookings workshop. It is hard to justify using a productivity measure that effectively forces the productivity of these resources to be zero.

The SNA position on insurance price and output is incorporated into the European Harmonized Indexes of Consumer Prices. Indeed, John Astin, in his remarks to the Brookings workshop, noted that 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." 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 previously). 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 not provide prices for the premiums-minus-claims concept.

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 the quantity of output produced by the insurance company. In both cases, the rationale is that 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 HICP, *are in effect imputing 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 after appropriate allocations are made across the different classes of consumers of insurance, there is no difference between the CPI and PPI concepts for insurance (consumption and industry output) and also no difference between the quantity of insurance consumed and the quantity of industry output.

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 policyholders. When an insurance

company acts as its policyholders' agent (whether or not they “voluntarily” put investment funds at the insurance company's disposal), one expects the policyholders to receive rebates of the investment income but one does not expect the insurance company to then charge them more for insurance coverage.

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 also is 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, few believe that an accident insurance policy normally earns income for policyholders; imputing income to the policyholder is a step that is not in accord with the way transactors—either policyholders or insurance companies—normally view insurance.

Moreover, the SNA imputes the *price* of insurance, not the quantity of insurance services, so the imputation is not parallel. 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 company investment earnings, which should be considered on its own.

The SNA insurance imputation is very complicated, and it is difficult to see that it accords with the way either policyholders or insurance companies view an insurance policy. Imputations, it is true, can always be criticized as not describing actual economic behavior.

Reservations often have 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 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 often has been acknowledged within the SNA literature itself.

Economists would like to use data from the national accounts industry accounts to do economic analysis on industries and to use insurance data in the consumption portions of the accounts in their 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 improved by the insurance convention in SNA93.

## **[2]A CPI or Consumption-of-Insurance Approach[end]**

The SNA and HICP adopt the risk-pooling model of insurance company behavior, so there is no difference between what the industry produces and what the consumer consumes. Because the insurance company is treated as a cooperative, all of its actions are taken on 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 a consumer price index. 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 matter. Therefore, in the risk-assuming model, the PPI and CPI approaches 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 policyholder?” If the policyholder earns it (as would be the case in the risk-pooling model), 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 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 of insurance 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 disposal service to take out his trash. Suppose that the trash hauler discovers something in Triplett's trash that he can sell to someone (the analogy is the insurance company profiting from the policyholders' reserves), and suppose that competition among trash haulers results 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.

With respect to the idea that lower rates arise because consumers let 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, for example, paying insurance monthly instead of yearly or twice yearly—and ask how much lower the semiannual premium is 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. In any event, it is very doubtful that the answer to this question gets very close to insurance company investment earnings, which is Oliner's point.

Monthly insurance payments do not eliminate the fund of reserves—nor, therefore, the problem of insurance company investment earnings. The fund arises from the nature of insurance, from the need 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 of a cost-of-living (COL) index, on one hand, and in an “inflation index” (a CPI that was not erected on a cost-of-living index) on the other. The HICP is regarded in Europe as an inflation index and not as an approximation of a COL index, as is the U.S. consumer price index. Katherine Abraham objected that that 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 in the treatment of insurance was not spelled out).

It seems to us, too, that the distinction between a cost-of-living index and a “consumer inflation index” (on this, see Hill 1998 or Eurostat 1999) 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.

Rosemary Marcuss made a similar point in her remarks: “[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 and the implications of those behaviors for what the consumer is consuming that matter. 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 bought by consumers or any other buyer of insurance. Therefore 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— for example, in an input-output table, 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 also is a growing part of international trade; the United States both imports and exports insurance services, some of it direct insurance and some of it reinsurance. This distinction between industry output and the products it produces is discussed further in the following section.

## **[2]The PPI Perspective[end]**

From the PPI industry output perspective, the treatment of the insurance industry's investment earnings is even more complex. Again, the two alternative models of insurance company behavior underlie the analysis. We begin with the risk-assuming model, followed by the risk-pooling model.

## **[3]The company assumes the risk[end]**

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, accounting for moral hazard results in a fund of reserves held against claims, the insurance company also is in a second line of business, investing and managing investments. Therefore one way to look at insurance is to say that the industry has two products: one is the insurance product that it sells to households and to businesses or perhaps exports; the other is investment income, which is separate from the insurance product. The output of the insurance industry (and the PPI for insurance) should include both products. We call this the two-products view.

Under the two-products view, one might regard investment or investment management activity as a secondary product, to use the language of production statistics (a secondary product is one that is primary to some industry other than the industry in which the establishment that produces it is classified). 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 of which are inherent outcomes of the beef production process. Because of moral hazard, investment income is a joint product of the insurance production process.

As Mary Weiss noted, insurance industry investment income is part of the output of the insurance industry. One wants the output that is attributable to all of the factor inputs, and in the insurance industry there certainly are factor inputs that are associated with investment income.<sup>38</sup> This investment output needs to be priced in order to get a complete price index for the industry, and it also needs to be included in the output of the insurance industry in order to measure insurance industry productivity. Secondary products are found in many industries. They pose no particular conceptual difficulties. They usually are not an integral part of the production process, though they may be. When secondary products exist, their prices are routinely included in the

PPI measures of industry prices.<sup>39</sup> Data on secondary products are routinely collected through the industry statistics programs of the Census Bureau.

Joint products also are 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>40</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.

### **[3] The “activity” view[end]**

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

Sherwood (1999) makes a distinction between what he calls an “activity” that the insurance company engages in for the purpose of creating output and the output itself.<sup>41</sup> He puts the investment earnings of insurance companies in the category of an activity, not of 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. We believe the loading dock illustrates Sherwood's concept of an activity: it is necessary for

producing output, but it is not output itself.

The workshop did not clearly distinguish between the two-products view and the activity view. In part, the distinction was not clearly developed, and in part, it does not appear explicitly in the measurement literature on insurance. We think the two-products view is the more straightforward. The insurance company must be doing something economically besides selling insurance, and that is its investment activity. Our conclusion is embodied in our treatment of investment income in our recalculation of property-casualty insurance output in panel B of table 6-1.

**[3]The company pools the risk[end]**

Risk pooling defines 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.

With respect to the PPI, no North American participant seemed enthusiastic about the SNA treatment of insurance company investment earnings in industry statistics; that might represent an intercontinental 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—on 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.

**[1]The Price of Insurance[end]**

Most writing on and discussion of insurance output is organized, sometimes implicitly, around expenditures, or price (P) times quantity (Q)—that is, around the current price measure of output. The current price output (or input) measure is in dispute. More typically in the economic measurement literature, debate concerns the constant price measure (Q) or the price index (P).<sup>42</sup>

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

**[excerpt]**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.**[end]**

The PQ 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>43</sup> Moreover, as Griliches noted, the price index must in some manner handle the assumption of risk.

## **[2]The Net Premiums Approach[end]**

John Astin (speaking of consumer expenditure) observed that a net premiums definition of the quantity of insurance 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. Astin stated at the Brookings workshop that European insurance companies told Eurostat that a net premiums price index was impractical:

**[excerpt]**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 do 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.**[end]**

In consequence, 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. It is clear that the price of premiums times the quantity of premiums minus claims does not measure  $P \cdot Q$ , whether for premiums or for net premiums. A basic principle of national accounting is that the price index times the quantity index equals the change in expenditure between two periods—that is,

$$P_{12} \times Q_{12} = \text{expenditure}_2 / \text{expenditure}_1,$$

where the subscripts indicate periods 1 and 2 respectively. The HICP and BEA measures violate this basic national accounting principle.

One specification for deflating the net premiums output measure in national accounts draws an analogy with double-deflation methods for producing value added: to compute value added, outputs and inputs are deflated separately to get real value added as a residual. Analogously, to get real, or constant price, net premiums one deflates premiums by a price index for insurance premiums; claims are then deflated by, for example, 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 in the BEA work team.

However, the double-deflation proposal appears to be an implicit repudiation of the net premiums, risk-pooling hypothesis that the consumer is buying management services from the insurance company. In the Brookings workshop, Griliches remarked: “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.” If the company is being paid for its management services, then deflation of the net premiums margin should be done by a price index for management services, as Griliches suggested.

If policyholders paid explicit fees for the net premiums part of insurance charges, the deflation problem would be simplified greatly. They don’t. And because they don’t, there are no explicit fees corresponding to the insurance company charges described in the SNA. To our knowledge, no proposals have been put forward in the national accounting literature for

constructing an explicit price index for the insurance management services that are 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. It is not satisfactory to impute the price movement of net premiums from movements of some other prices or from the price movement of gross premiums, or to impute them from the price movements of gross premiums and of repairs and other expenditures bought out of claims.<sup>44</sup> As already noted, these deflation proposals actually conflict with the hypothesis of insurance company behavior that underlies the net premiums view of insurance.

It sometimes has been asserted by national accountants that choosing the output measure of premiums minus claims makes the quality change problem less severe in insurance. They contend that the net premiums approach also nets out changes in risk, which is the major problem in obtaining real output of insurance under the gross premiums approach. 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.

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.

The premiums-minus-claims margin is far smaller than the total volume of premiums written by insurance companies. Even if one thought that the net premiums output definition reduced risk-related quality change, one must then consider the amount of quality change in the pool administration measure. 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 reviewed efficiency studies of insurance industries, particularly results that compare insurance companies that sell through independent agents and those that have their own dedicated agents. They concluded: “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.”<sup>45</sup> 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 service. Services to policyholders must be allowed for in either approach to measuring real insurance output. However, policyholder services are undoubtedly far larger as a proportion of net premiums than of gross premiums. In this sense, the net premiums approach may be more subject than the gross premiums approach to quality change problems, relatively speaking.

Without more studies on the measurement of insurance, one cannot know that the net premiums approach entails fewer quality measurement problems, despite frequent assertions that it does. If the unit for the insurance administration fee is the policy, then how can one tell whether the insurance company does something better for its clients? Statisticians and national

accountants cannot escape the quality change problem in measuring insurance by adopting a net premiums definition of output.

## **[2]The Gross Premiums Approach[end]**

Constructing a price index for gross premiums is 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.” One of the strongest arguments in favor of the gross premiums position on measuring insurance output is that under this position, one can observe a transaction, and that 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. With the gross premiums approach, 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. Weiss remarked in the Brookings workshop that the price of insurance equals the cost per dollar of expected loss, with probabilities constant. Other insurance analysts agree. For example, Born and others state:

**[excerpt]**The ideal measure of a firm’s responses to its environment would be changes in its prices and quantities. . . . 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 copayments are required, and such details are not made public. . . . Firm-level financial data on premiums and losses by year, state, and line of business [act as a proxy for what is wanted, but] such data do not enable us to separate the price and quantity of insurance issued.<sup>46</sup> **[end]**

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 index. Katharine Abraham remarked that this might be a substantial problem in measuring the cost of insurance to the consumer but that 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.

Another problem sometimes is mentioned: suppose that the price of cars goes up and car insurance premiums rise apace, even without changes in risk or anything else. The gross premiums approach 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 a change in risk, lower efficiency in the insurance company, or inflation in car prices.<sup>47</sup> 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.

## **[2]Conclusion on Insurance Prices[end]**

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. Risk creates quality change problems that are comparable to other, well-known quality change difficulties in price indexes.

The net premiums approach substitutes an imputation for direct pricing, because it implies constructing a price index for a transaction that is not normally observed and probably does not exist in a modern economy. Imputations are sometimes necessary in economic statistics, but it seems undesirable to impute when a transaction can be observed. The quality change argument sometimes made on behalf of the net premiums approach carries little weight, because the net premiums approach carries with it quality change problems that are probably as severe, relative to the size of the “price” that is measured. In any event, trying to avoid the quality change problem by imputing the price substitutes one difficulty for another, without notable gain.

The PPI now contains price indexes for the insurance carrier industry. The pricing concept is gross premiums, not net premiums. We agree with this part of the PPI pricing concept, which seems to be the right way to measure insurance output.

Some quality adjustments have been carried out in the PPI indexes for changes in risk—for example, changes in insurance risk associated with changes in the cars for which premiums are collected in the PPI auto insurance index. The PPI quality adjustment is based on the cost of

insuring the vehicles, as reported by the insurance company. When changes in risk are quality-adjusted out of the PPI price index, these changes show up in deflated quantity measures as an increase in output, as we believe they should. So in that respect too, the PPI measures conform to our thinking. On the other hand, these adjustments for risk do not cover very much of the potential risk changes that insurance companies encounter.

Though it treats the premium as the unit for pricing, contrary to national accounts practice, the PPI price index for the insurance industry treats investment earnings as contributing to the price of the insurance policy, so in this respect it conforms to SNA principles. We have been told, however, that insurance industry representatives object to this treatment of investment earnings.<sup>48</sup> For this reason, the PPI also contains an alternative insurance price index that covers only premiums, not investment earnings. We believe that this PPI premiums index is a better price index for insurance than is the industry index that treats an increase in investment income as increasing the price of insurance, even though it leaves part of insurance output without a deflator. That is, we agree with the insurance industry.

#### **[1]Summary and New Estimate of Productivity[end]**

Table 6-2 summarizes the insurance industry output concepts in U.S. data sources and contrasts them with our preferred output concepts, as spelled out in this chapter. With respect to the basic insurance output measure, we and the PPI settle on premiums. We thus differ from the national accounts, which use premiums minus claims.

#### **[table 6-2]**

With respect to the treatment of insurance company investment earnings, we differ from both the PPI industry index and the national accounts. We favor treating investment income as a

second economic activity and therefore a second output of insurance companies. This means that when investment earnings rise, output rises. In the PPI and in the national accounts, when investment earnings rise, this is treated as if policyholders pay a higher price for insurance. However, an alternative PPI is available that excludes investment earnings entirely; this has the defect of omitting the price for part of the industry's output, on our interpretation of it, but at least it does not treat the output as the price.

In the present BEA industry files, the property-casualty component of insurance industry output is deflated by insurance components of the CPI, specifically, homeowners insurance and automobile insurance. Because the price of owner-occupied housing is measured in the CPI as rental equivalent, fire and damage insurance for the dwelling is not included in the CPI; homeowners' insurance is for contents only. Index changes for these CPI insurance components are shown in table 6-3 for various periods caused by discontinuities in the CPI series. For the 1999–2001 period, our aggregation of CPI components (2.73 percent annually) yields almost exactly the BEA industry deflator (2.72 percent a year).

**[table 6-3]**

The new PPI insurance industry price index is more comprehensive than the CPI. It includes fire insurance for houses and covers business, as well as household, purchasers of auto insurance. There is little reason to expect the PPI and CPI insurance indexes to agree closely, even if each is well measured. The PPI index, however, is clearly the one that is appropriate for the BEA industry file, and we presume that it will be introduced in a future revision. For the reasons discussed previously, we use the PPI for premiums, not the PPI insurance industry index, because we believe the latter treats investment earnings of insurance companies inappropriately.

For the various periods in which the two indexes overlap, the PPI rises less than the CPI, 1.4 percentage points a year less, over the four-year period for which both indexes are available (June 1998–June 2003). This seems to be the outcome of a more rapid rise in the PPI for tenant and household insurance and a less rapid rise in auto insurance (see table 6-3). Since property-casualty insurance is about half of total insurance in the BEA data, we apply one-half of the trend difference between the two indexes (that is, one-half of 1.4 points, or 0.7 points) as an adjustment to the BEA deflator. We extrapolate that difference to obtain new 1995–2001 labor productivity estimates.

In addition, we noted above that the PPI industry price index inappropriately treats an increase in insurance company investment earnings as an increase in the price of insurance. This is certainly inappropriate for an output concept, such as the one we use, that puts investment earnings into current price output, as we did in our calculations for table 6-1. We remove this from the deflator by taking the difference between the PPI insurance industry price index and its insurance premiums index. This amounts to about 0.1 percentage point a year.<sup>49</sup>

The results are shown in table 6-4. The top section of the table presents the data in the present BEA industry database (shown in table 6-1); the lower section presents our new estimates. In the lower section, the first line incorporates our adjustments to current price output, from table 6-1. These adjustments add 0.4 points a year to output growth. The third line contains our adjustments to the insurance industry deflator. These adjustments add another 0.6 points to constant price output growth, so it is now estimated to grow at 0.5 percent a year (compared with BEA's estimate of –0.5 and the estimate of –0.1 in table 6-1).

**[table 6-4]**

The final line shows the total impact of all our adjustments on labor productivity growth: we estimate that labor productivity in insurance carriers grew at 0.1 percent a year from 1995 to 2001. This is not a high rate of growth. It is, however, a positive rate, rather than the negative and somewhat implausible rate produced by the present BEA insurance output estimates.

Table 6-4 is hardly the end of the story on the output of insurance carriers. Almost none of the extensive literature and discussion on measuring insurance output has dealt with quantifying and measuring the risk that insurance companies absorb and possible changes in the ways they manage risk. Largely because this chapter is a review of the issues as they stand, we have not addressed this vital question either. In some sense, the issues we have been discussing are the wrong issues: the long debate between national accountants and economists who analyze insurance has diverted attention away from a different issue, namely finding ways to incorporate measures of risk into insurance company output.

One expects that insurance companies that absorb risk would want to improve their management of risk. If they discovered better methods for doing so, then competition among insurance companies would lead to reductions in the margin of premiums over claims. This has happened. Reductions of the premiums-claims margin, other things being equal, should accompany multifactor productivity growth in insurance. It appears to us that the national accounts–SNA definition of insurance output precludes MFP growth from reduction of margins, regardless of the output deflator used. But risk poses many questions. It should be at the center of future debate on measuring insurance, not on the periphery.

## [1]Conclusion[end]

In his study of the efficiency of insurance companies, Cummins specified three insurance company outputs:

- risk pooling and risk bearing
- “real” financial services relating to insured losses
- intermediation.<sup>50</sup>

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

Considering insurance as involving multiple products that are partly or wholly bundled together is a useful way to think about the issue of insurance output measurement. The SNA-national accounts net premiums view essentially unbundles the policyholders’ services component from the policy itself. It proposes counting these two products separately, or rather to ignore 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. 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 the proposition that the risk-absorbing insurance products are bundled with their policyholder services. They are, after all, always included in one transaction. In 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 has 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. We have not found, however, a single study that quantifies policyholder services. This seems very odd in view of the worldwide popularity of the net premiums position in national accounts.

Even though the national accounts literature can be interpreted as throwing a useful light on the question of policyholder services, it also has obscured the insurance measurement issues by its failure to focus on an appropriate deflator for these 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. One needs a measure of policyholder services and a way to account for changes over time in the quantities and quality of service. 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 to be general agreement outside the national accounts community 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 avoiding 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 that of insurance purchasers.

Moreover, it should be emphasized that the national accounts treatment of insurance company financial activities undoubtedly does not stem from a conviction that insurance really works the way that the treatment 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 about the treatment of interest, that are forced on the SNA and NIPA definition of insurance industry output.

One of the authors has attended meetings where proponents of the net premiums approach to insurance have dismissed, somewhat contemptuously, any discussion of the economic measurement of insurance and finance with the statement that “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 we believe that national accounts have potential uses beyond those of the major aggregates, such as GDP, and should be constructed to accommodate those uses. Economists ought to be able to use industry data from national accounts in analyzing industry behaviors. They should be able to use elements of the household

consumption sector of national accounts in analyzing consumer behavior. They 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 input costs and so forth.

In this view of the uses of national accounts, it is problematic when decisions elsewhere in the accounting structure result in measures of industry output that are not useful for industry analysis, in measures of insurance consumption that are not appropriate for consumer demand analysis, or in measures of purchasing industry consumption of insurance that are not useful for analyzing purchaser behavior in the using industries. When this occurs, it is a strong signal that the decisions elsewhere in the accounts need to be reexamined. We think this principle applies with respect to insurance industry output measures in national accounts.

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’s statement that the insurance premium is the only place to begin to estimate the price of insurance, and there is no evidence that suggests that insurance company investment earnings raise the price of policyholder services. The reason this debate has taken place is not so much that the participants have strongly held views and empirical evidence for the risk-pooling or risk-absorbing views of insurance company behavior; it 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 way to avoid negative measured insurance output under the old national accounts convention; it is not an empirically-based methodology for measuring insurance.

Whether one looks at insurance as combining two products (risk absorption and investment activity) or three products (risk absorption, policyholder services, and investment activity) is of no consequence. Either view 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 productivity studies and in improving producer and consumer price indexes is to make progress on estimating those policyholder services and valuing changes in risk.

**Table 6-1**

**Alternative Output and Labor Productivity Growth Estimates for The Insurance Carriers Industry**

**average annual percentage rates of change**

| <b>Output Definition</b>                                                                          | <b>1995-2000</b> | <b>1995-2001<sup>g</sup></b> |
|---------------------------------------------------------------------------------------------------|------------------|------------------------------|
| <b>Panel A</b>                                                                                    |                  |                              |
| BEA/BLS Insurance Carriers Industry Gross Output <sup>e</sup>                                     |                  |                              |
| Current price output                                                                              | 3.11             | 3.26                         |
| Constant price output                                                                             | -1.53            | -0.51                        |
| Price index                                                                                       | 4.71             | 3.79                         |
| Labor                                                                                             | 0.63             | 0.42                         |
| Output per worker                                                                                 | <b>-2.14</b>     | <b>-0.92</b>                 |
| <b>Panel B</b>                                                                                    |                  |                              |
| <b>Alternative output definitions for property &amp; casualty insurance (P&amp;C)<sup>a</sup></b> |                  |                              |
| P&C “premiums – losses” current price output <sup>b</sup>                                         | 3.01             | 3.22                         |
| P&C “premiums” current price output <sup>c</sup>                                                  | 3.55             | 4.03                         |
| P&C “premiums + investment gains” current price output <sup>d</sup>                               | 3.62             | 4.1                          |
| <b>Panel C</b>                                                                                    |                  |                              |
| Insurance carrier gross output, using P&C “premiums + investment gains” <sup>f</sup>              |                  |                              |
| Current price output                                                                              | 3.39             | 3.65                         |
| Constant price output                                                                             | -1.28            | -0.14                        |
| Price index                                                                                       | 4.71             | 3.79                         |
| Labor                                                                                             | 0.63             | 0.42                         |
| Output per worker                                                                                 | <b>-1.9</b>      | <b>-0.55</b>                 |

<sup>a</sup> Property & Casualty insurance (P&C) includes four insurance categories: Health, Property, Auto and Workers Compensation, aggregated to match the definition used in BEA’s industry file (in this definition, both the Property and Auto categories include Auto Physical Damage insurance, while the Health category does not include Medical Malpractice insurance.)

<sup>b</sup> Output defined as Net Premiums Earned after Losses. Source: Data obtained from BEA (email from Sherlene Lum, 11/03/2003), derived from A.M. Best data.

<sup>c</sup> Output defined as “Net Premiums Earned”. Source: data obtained from BEA (Sherlene Lum, 11/03/2003), derived from A.M. Best data.

<sup>d</sup> Output defined as “Net Premiums Earned + Investment Gain on Funds & Other Income”. Authors calculations, estimated by applying the ratio of Investment Gain on Funds & Other Income to Net Premiums Earned, from A.M. Best’s Aggregates and Averages, 2003 edition to “Net Premiums Earned” numbers in previous line.

<sup>e</sup> From BEA industry file, computed as sum of P&C (national accounts definition), Life and Health Life insurance, P&C commodity taxes, own-account software, and own-account construction.

<sup>f</sup> Sum of P&C “Premiums + Investment Gains” definition, plus other insurance components from BEA file. NB: P&C is roughly half of Insurance Carrier output, but the recomputed output series uses the shares for each year.

<sup>g</sup> P&C Growth rates for 2000-2001 from A.M. Best’s Aggregates and Averages, 2003 edition.

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**Table 6-2****Comparisons of Insurance Industry Concepts in Data Sources**

| Data Source                    | Basic output concept  |          | Inclusion of investment income: |       |
|--------------------------------|-----------------------|----------|---------------------------------|-------|
|                                | Premiums minus claims | Premiums | Output                          | Price |
| BEA industry                   | X                     |          | no                              | yes   |
| PPI industry <sup>a</sup>      |                       | X        | no                              | yes   |
| PPI product index <sup>a</sup> |                       | X        | no                              | no    |
| Bosworth-Triplett industry     |                       | X        | yes                             | no    |

a. The Producer Price index (PPI) program of BLS computes both a price index for the industry and a product price index.

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**Table 6-3****PPI, CPI, and BEA Implicit Price Index for Insurance Carriers**

average annual percentage rates of change

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| Type of Insurance              | Price Indexes |                  |                                       |
|--------------------------------|---------------|------------------|---------------------------------------|
| <i>Property &amp; Casualty</i> | PPI           | CPI <sup>a</sup> | BEA Implicit Price Index <sup>b</sup> |
| 1987-1995                      | n/a           | n/a              | 7.84                                  |
| 1995-2001                      | n/a           | n/a              | 3.79                                  |
| June 1998 - June 2003          | 2.82          | 4.20             | n/a                                   |
| 1999-2001                      | 1.77          | 2.73             | 2.72                                  |
| 1999-2002                      | 2.58          | 4.43             | n/a                                   |
| <i>Tenants' and Household</i>  | PPI           | CPI              |                                       |
| 1987-1995                      | n/a           | n/a              |                                       |
| 1995-2001                      | n/a           | n/a              |                                       |
| 1998-2001                      | n/a           | 2.09             |                                       |
| June 1998 - June 2003          | 5.63          | 4.72             |                                       |
| 1999-2001                      | 4.13          | 2.39             |                                       |
| 1999-2002                      | 4.72          | 2.38             |                                       |
| <i>Motor Vehicle</i>           | PPI           | CPI              |                                       |
| 1987-1995                      | n/a           | 6.07             |                                       |
| 1995-2001                      | n/a           | 2.27             |                                       |
| June 1998 - June 2003          | 3.70          | 4.37             |                                       |
| 1999-2001                      | 1.37          | 2.78             |                                       |
| 1999-2002                      | 3.13          | 4.74             |                                       |

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a Home & Auto insurance weighted average. Weights (0.87 Auto, 0.13 Home) derived from Relative Importance Table (motor vehicle insurance, 2.44, tenants' and household insurance, 0.37)

b Insurance Carriers total, authors calculations based on BEA GDP by industry file.

Sources: BEA GDP by industry file. BLS, Producer Price Index Industry Data; Consumer Price Index, All Urban Consumers (Current Series).

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**Table 6-4****Alternative Productivity Estimates for the Insurance Carriers Industry**

average annual percentage rates of change

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| <b>Output Definition</b>                                     | <b>1995-2001</b> |
|--------------------------------------------------------------|------------------|
| <b>BEA/BLS IC (Total Industry Gross Output) <sup>a</sup></b> |                  |
| Current-Price Output                                         | 3.3              |
| Constant-Price Output                                        | -0.5             |
| Price Index                                                  | 3.8              |
| Labor                                                        | 0.4              |
| Output/Worker                                                | <b>-0.9</b>      |
| <b>Total Industry (this study, as adjusted)</b>              |                  |
| Current-Price Output <sup>b</sup>                            | 3.7              |
| Constant-Price Output                                        | 0.5              |
| Price Index (adjusted for PPI and concept—see text)          | 3.1              |
| Labor                                                        | 0.4              |
| Output/Worker                                                | <b>0.1</b>       |

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Notes:

<sup>a</sup> Using the output definition from Table 1.<sup>b</sup> Using as the output definition “Premiums + Invest. Gains” for property-casualty, from Table 1

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## Notes

1. The workshop agenda and some of its papers may be accessed at [www.brookings.edu/es/research/projects/productivity/workshops/19980421.htm](http://www.brookings.edu/es/research/projects/productivity/workshops/19980421.htm) [February 2, 2004].
2. Team members were Wallace Bailey, David Kass, Ralph Kozlow, Kenneth Petrick, Mark Planting, John Sporing, Leon Taub, and Ernest Wilcox.
3. Griliches (1992, p. 7)
4. Bradford and Logue (1998, p. 30)
5. Among the comparable arrangements that they list are those to handle uncertainty about prices (futures contracts) and uncertainty over equipment failures (warranty agreements).
6. The term *net premiums* also has different definitions in SNA93 (Commission of the European Communities and others 1993) and in the insurance industry (A. M. Best 2001). Because it is expositionally 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 1996; and Sherwood 1999), for this chapter we adopt the North American *measurement* usage, even though it is not ideal considering the alternative definitions of the net premiums term outside and inside the United States.
7. Bradford and Logue (1998, p. 29).
8. See his appendix on financial intermediaries (Ruggles 1983, p. 69).
9. Denny (1980, p. 151).
10. Ruggles’s paper apparently was not the subject of any internal document prepared for the discussions that led to the adoption of the 1993 SNA, nor have we seen any national accounts documents from any source that either discuss Ruggles explicitly or the issues he raised for the measurement of insurance.
11. The topic also emerges in the national accounts debate on insurance because the net earnings of casinos, not the gross amount wagered, are usually entered into national accounts and other economic statistics. It is sometimes contended that the output of insurance companies should be analogous to that of casinos.
12. However, as noted, 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

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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.

13. The treatment of finance and insurance played a role in the 1947 meeting between Richard Stone and U.S. national accounts experts that eventually led to the NIPA and UN systems going their separate ways (personal conversation of Jack Triplett with the late Edward Denison). However, the two systems historically have contained remarkably similar measures of finance and of insurance. The premiums-minus-claims convention for insurance output entered the U.S. National Income and Product Accounts around 1947.

14. Hill (1998) and a personal communication from Anne Harrison, formerly of OECD, to Jack Triplett.

15. Transcript of remarks at the Brookings workshop, April 1998. 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.”

16. Commission of the European Communities and others (1993, paragraphs 8.87 and 8.88, p. 200).

17. Collins (1993, pp. 213 and 215).

18. Eurostat (1997, p. 1). On the other hand, a subsequent paragraph on the same page states: “The main economic function is to transfer risks to specialized 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.

19. Eurostat (1997, paragraph 5.2.4, p. 117).

20. Voorburg (1992, section 5).

21. Walton (1993, p. 206).

22. Born and others (1998, pp. 189 and 191).

23. Transcript of Brookings workshop. 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 Jack Triplett).

24. Commission of the European Communities (1993, paragraphs 8.27 and 8.28, p. 188). The next paragraph (8.29) explains that life insurance premiums are not treated as transfers, but in the SNA life insurance is what is called

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whole life insurance in the United States. Another section of the SNA notes that the administrative expenses part of the non-life insurance premium is not a transfer but a payment by the policyholders for services that are produced by the insurance company and consumed by the policyholders.

25. 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 retail trade.

26. Personal communication with the authors.

27. Hirshhorn and Geehan (1980, p. 153). 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.

28. We appreciate the cooperation of Sherlene Lum in making the BEA file available.

29. For this, we used data from the line in the A. M. Best data labeled “net premiums earned” (that is, without deducting the losses). As explained earlier, Best’s definition of net premiums earned does not employ the national accounts use of the term net premiums. In Best’s usage, “net” is net of refunds and other adjustments to premiums, not net of losses. To avoid confusion, we retain in the text the national accounts use of net premiums to mesh with writings on national accounts.

30. In 2000, \$155 billion of a total of \$297 billion.

31. On the other hand, we also should acknowledge that we may not have estimated these new PC output growth rates with as much sophistication as BEA would have brought to the same computations.

32. Owing to missing data, we were unable to extend the recalculation of output to the 1987–95 interval. There is some indication that the change would have gone in the opposite direction for the early 1990s.

33. The treatment of insurance in the inputs of business units that buy insurance (that is, in what sometimes is called an “input” price index) follows the treatment in the CPI. To conserve space in the following, I discuss only the CPI. The difference between CPI treatment and treatment in the output of the insurance industry is parallel to the difference between the insurance industry output and insurance as an input to other business units.

34. This matter is discussed at length in chapter 7. Exactly the same issues arise in insurance.

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35. The SNA text observes that the actual premium is in fact lower than it would be without investment earnings. But this is taken to be evidence that the observed price (the premium) is too low.
36. The latter also corresponds to the price paid for insurance by other businesses for which insurance is an intermediate input and also determines the flow of insurance output to using industries in the input-output table.
37. Collins (1993) describes the policyholders as “voluntarily” giving money to the insurance companies to hold; in exchange, they “barter” for lower premiums. It is doubtful that there is any voluntary exchange here, aside from the policyholder’s decision to buy insurance. Collins ignores the reason that insurance companies acquire reserve funds in the first place, the need to limit the risk of moral hazard.
38. Cummins (1999, p. 85), reports the cost of investment activity at about 9 percent of total expenses for life and property-liability companies).
39. Indeed, in a typical industry PPI, the BLS publishes separate price indexes for secondary products and for miscellaneous receipts.
40. In what follows, it should be understood that everything said about the consumer applies also to business purchasers of insurance services.
41. The language here may lead to misunderstanding. In international (but not U.S.) usage, “activity” means “industry.” 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.
42. The SNA uses the term “volume,” which is carried over from the French national accounts. We use “quantity” here, not only because it accords better with normal English usage but also because of the strong and long tradition in economics of speaking of prices and quantities and in the index number literature of discussing price indexes and quantity indexes.
43. For example, if one were to construct a direct quantity index, prices come into the measure as weights.
44. As Peter Hill pointed out in his discussion (Hill 1998), a claim paid for automobile damage might instead be spent on new clothing. That seems to complicate still further the price index imputation.
45. Carr, Cummins, and Regan (1999, pp. 122-23).
46. Born and others (1998, p. 182).

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47. However, in this case, we are no longer interested in measuring the price of insurance; we want to measure the price of transportation services. If a car uses more gasoline or the price of gasoline rises, the cost of transportation goes up. Insurance contributes to the cost of transportation in a similar manner.

48. Conversation with Irwin Gerduk.

49. Perhaps coincidentally, this is about the adjustment to current price output that resulted from adding investment earnings into current price output. Adjusting both current price output and the deflator is not double counting; it is done to be consistent.

50. Cummins (1999, p. 84).