

THE 1993 REVISED SYSTEM OF NATIONAL ACCOUNTS: WHERE DO WE GO FROM HERE?

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The 1993 System of National Accounts is a remarkable document, but the System also has some major imbalances and omissions. The present paper spells out four aspects of the SNA that require further development: (1) accounting for the costs of economic change; (2) delineation of information as an economic commodity; (3) overhaul of the methodology underlying input-output accounts; and, (4) consequences of the System's implicit use of compacted accounting. These developments can be incorporated in a Supplementary Document in the near future. We need not wait 25 years.

1. INTRODUCTION

The purpose of this paper is to outline some ideas as to where the new System of National Accounts (SNA, 1993) may evolve in the near future. The paper, in effect, suggests four areas where the SNA needs further developments. These areas are *not* the ones mentioned in the SNA Document in a section called "Looking Ahead: The Research Agenda." Nor are the areas of a type that are currently being considered as part of a Handbook or Technical Manual Series in support of the new SNA.

The suggestions for further development outlined here are all of the evolutionary kind in the sense that they naturally follow from the "rules of the game" underlying the 1993 SNA. The proposals are not dogmatic, but are suggested in the spirit of options that may be available for their implementation. In all cases specific references are given to individual chapters of the SNA where the suggested proposals are most relevant. The proposals are also backed by references to the accounting and economics literature. The *Conclusion* mentions some ideas as to how proposals and revisions of this nature might be incorporated into the SNA without having to "wait" twenty-five years!

Most of the suggestions for further development initially arose from this writer's experience working with problems of industrial and commodity classification and standardization. At least, this is the background for the following sections 2, 3 and 4. The areas involve problems that appear to have been overlooked in the experts' discussions leading to the publication of the new SNA. On the other hand section 5 considers a topic and makes suggestions with respect to an area of a fundamental nature—Compacted Accounting. This topic *is* very briefly mentioned in the new SNA, but will probably be overlooked by most readers.

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Finally, it might be noted that it is easy to add more items to our list of candidates for further developments. The additional items, however, would almost certainly coincide with suggestions made by other writers and so are not described here. It should be clear that the present paper is not meant to be a comprehensive critique of the 1993 SNA.

2. ACCOUNTING FOR ECONOMIC CHANGE

The new SNA implicitly accounts for the complex of production relationships in an essentially *static* manner. The relevant production activities, including their corresponding institutional entities, are characterized as already existing and stable. The various production processes of the System either replicate themselves over time or grow in a smooth and continuous manner.

It should be noted that these considerations are not made explicit in the SNA; it is rather an *impression* gained from reading Chapter 5, "Establishments and Industries," Chapter 6, "The Production Account," especially the section on intermediate consumption and Chapter 10, "The Capital Account," especially the section on gross capital formation. There is, indeed, a distinct impression that there is something "missing" from the System.

In the comfortably static world of the SNA it is easy to identify and measure input-output and other production function relations. It is also easy to inquire about the connections between the costs of production inputs and the revenues earned from production outputs. It makes sense to classify and hierarchically aggregate the economy's productive units, for purposes of Standard Industrial Classification (SIC), by means of their common denominator production-based relationships (further analyzed in Postner, 1994a). All these relations are not essentially disturbed by the length of the observed accounting time period. Precisely what, then, is "missing?"

The 1993 SNA does not explicitly show the *dynamic* peculiarities of economic change featuring the introduction of new products and processes and new institutional arrangements. In these cases, the industrial production costs that are evidently observed often turn out to be costs of economic change rather than conventional costs of production. (We overlook the purely financial and redistributive transactions that may accompany economic change.) The costs of economic change cover both pre-production costs and post-production costs and include both primary factor costs and commodity costs. The commodity costs embody expenditures on both tangible goods and intangible services.

A suggested "package" and associated *classification* of the costs of economic change would be: (1) start-up costs, (2) change-over and re-tooling costs, (3) re-organization costs, and (4) close-down costs. It is not difficult to see that these costs bear no significant relation to current production outputs during the time period when the cost expenditures are made. In fact, current production output could be zero! A good deal would depend on the length of the accounting period. Nor should these costs of economic change be confounded with the typical costs of ancillary units described in Chapter 5 of the SNA. (Some costs of economic change might be the responsibility of central head offices of multi-establishment enterprises.) It should also be remarked that our notion of "costs of economic

change” goes considerably beyond such expenditures as market research and advertising that are briefly mentioned in Chapter 1 of the SNA.

The main proposal of this section could not be stated. Costs of economic change should be broken out and regarded as a kind of investment expenditure, namely *meta-investment*, since the benefits from such cost expenditures normally accrue in future accounting periods. This idea follows the seminal paper of Anne Carter (1994).

Once the costs of economic change have been identified and capitalized, then the whole apparatus for treating: (1) gross capital formation, (2) consumption of capital, and (3) capital assets in the balance sheet—becomes applicable. We would expect the normal service lives of some of the items that are capitalized to be relatively short compared to traditional fixed capital formation. Other items might have longer service lives. In some contexts, the new kind of meta-investment expenditures described here would be simply contracted out. In other contexts, the expenditures could become an own-account capital formation. These latter contexts permit the capitalization of associated primary factor costs and also may call for the introduction of entirely new items in commodity space (a matter for future research).

It could certainly turn out that some of the costs of economic change, as classified above, are already recognized as *bona fide* (fixed) capital formation in the 1993 System. However, in most cases, we would expect the costs of economic change to be currently expensed as intermediate commodity costs or as primary factor costs in the SNA. This would mean that unless the meta-investment expenditures are appropriately broken out, the underlying production function relationships are obscured by dynamic “noise” (further discussed in section 4).

Before continuing, we might note that the economic changes accounted for in this section are related to, but are not identical to, the demographics of business establishments. For example, an establishment may experience neither “birth” nor “death” and yet could still experience the range of dynamic production costs through the life cycles of new product and new process innovation.

The above classification of costs of economic change includes “close-down costs.” Here we are not dealing with the introduction of new products or processes, but with the *termination* of existing products or processes and institutional arrangements. Two examples of close-down costs would be environmental clean-up costs and severance payments to (former) employees. The accounting mechanics of close-down costs, as a meta-investment, has some peculiar features that are worth spelling out.

It may be possible to explain the mechanics of close-down costs *via* reserve fund accounting for liability contingencies. Indeed, the funds that are “invested” at close-down time may be accumulated through reserve accounting. However, for our purposes it seems best to avoid this route since the SNA does not appear to recognize reserve funds and the SNA does not want to become involved with liability contingencies (SNA, paragraph 13.22).

The first point to clarify is whether close-down costs actually qualify as a meta-investment. After all, expenditures made at close-down time cannot lead to future benefits if the economic unit concerned ceases to exist! The benefits, in fact, have already accrued during the past operating life of the unit in the sense that

the unit existed and operated during its lifetime without taking explicit account of the costs of eventual termination. So the meta-investment concept with respect to close-down costs is entirely *reversed* when compared to start-up and organization costs.

Is there anything wrong with this? The answer is definitely: No. When we examine the amortization process related to investment expenditures, it turns out that start-up costs and close-down costs have a lot in common and only differ in terms of perspective. The investment expenditures related to start-up costs are amortized over the (expected) future operating life of the economic unit involved—a prospective view. The investment expenditures related to close-down costs are amortized over the (known) past operating life of the unit—a retrospective view. This is essentially done by *revising* the historical accounting records of the unit at the time of termination. So revisions are an integral part of the story even though revisions and their consequences do not appear in SNA.

3. INFORMATION AS AN ECONOMIC COMMODITY

The new SNA often makes distinctions between “goods” and “services” as economic commodities. The distinctions play a key role in defining various boundary conditions, such as the production boundary, the consumption boundary and the capital asset boundary (see e.g. Chapters 6 and 10 of the SNA). There is also a new tendency to show some convergence between the traditional goods/services criteria. Nevertheless the notion of an economic commodity, as it appears in the SNA, does not cover the peculiar characteristics of “information” as a commodity. There is an impression that the SNA regards information as mainly a kind of services commodity.

The purpose of this section is to show that information, as an economic commodity, raises a number of accounting and conceptual issues that are of growing importance and that are overlooked in the 1993 SNA. The economics of information dates back to the writings of Kenneth Arrow and Jacob Marschak in the 1960’s, but the treatment outlined below is based on new developments in Carter (1989a), Beth Allen (1990) and Postner (1993). One important consequence of the following analysis is that information, of various specific types, should not be subsumed with goods and services in a Standard Commodity Classification (SCC). Information commodities, carefully subscribed and distinguished, deserve their own classification hierarchy and aggregation structure. This latter theme is further pursued in Postner (1994b). It might also be noted that a new set of commodity unbundling rules governing composite commodities that embody information will need to be formulated.

Economic commodities are categories of items that can be produced at a resource cost and potentially marketed for a price. A commodity is usually specified by its complete description, on both demand and supply sides, including its time and place of delivery. Information becomes an economic (and desired) commodity when its acquisition, either by purchase or by trade or by own-account production, helps economic agents to reduce or resolve problems of uncertainty with respect to the state of the world. For simplicity, the case of “pure”

information commodities is presumed in this paper. (The approach is only partly related to the well-known Shannon measure of information and uncertainty.)

We can immediately state two distinguishing features of information as a commodity: (1) economic agents typically must decide whether to acquire information before they could learn the outcome conveyed by the information, and (2) information is a highly differentiated commodity and we would generally expect to find uncountably many information commodities in the economy.

It is, however, possible to impose a partition on the complete set of information commodities so as to reduce their uncountable number to a more reasonable quantity (as in Allen, 1990). The information commodities within any one group of the partition can be regarded as virtually identical for economic purposes. The information partition would then form the ultimate basis for commodity classification and hierarchical aggregation.

There are other distinguishing features of information that come closer to the potential concerns of a SNA. The demand for information is a derived demand—useful for reducing conditions of uncertainty. In this case, satiation occurs at one unit of information of a given type and duplicates are essentially superfluous. The preferences for information are not exogenous but are price dependent and even wealth dependent, since pure information is of no value unless the economic agent can afford other expenditures conditional on the information. Information commodities are inherently indivisible and useful only in integer amounts; either an economic agent “learns” a group in an information partition and conditions on it or the agent does not learn the group. From this summary and Allen (1990) we can see that information as an economic commodity violates standard assumptions in economic theory. Information is *not* merely a kind of services commodity.

A key consideration arises with respect to the “public goods” nature of information commodities. Information does not require rivalry in use. Information could be shared and traded with other economic agents without loss of the information *per se* by either trading partner. Within high-tech circles, information sharing is called *knowhow trading* (as in Carter, 1989a). The growing popularity of this form of economic barter exchange probably arises from the well-known difficulties of simply selling information on the open market in the absence of special legal protection. Indeed, as Kenneth Arrow pointed out, no amount of legal protection can make a thoroughly excludible commodity out of the inherently intangible properties of information.

Before continuing it might be noted that knowhow trading *per se* is only one of a great variety of possible informational exchanges. These various exchange transactions each reflect special properties of information as an economic commodity and can be found in both medium-tech and high-tech circles.

In the following analysis, we will assume that the costs of assimilating and transmitting information are negligible. However, in the spirit of Jacob Marschak, the costs of maintaining, storing and retrieving information are not negligible. These processes are often categorized as ancillary activities, but should be broken out as own-account production activities for a complete treatment of information as an economic commodity. It is not difficult to see that if economic activities in support of information are not performed, then information commodities would

cease to exist. Information can also become obsolete and lose its critical property of “uncertainty reduction”; to qualify as an informational commodity, well-specified standards must be met.

Barter transactions in existing goods are considered in Chapters 3 and 9 of the new SNA. Barter transactions in existing services are not explicitly considered in the SNA, but the extension is reasonably straight forward since some services can be “inventoried” at a cost. Can the SNA accounting treatment of barter transactions be applied to the process of *information sharing* among different economic units? There are two critical problems.

First, the SNA does not possess a commodity classification, even at a crude level, for information commodities. One possible exception would be the services associated with (own-account) research and development (R&D) activities as seen in Chapter 6 of the SNA. So there is little basis upon which to account for information sharing. It should be noted that our notion of information as a commodity goes considerably beyond R&D services.

Second, the SNA accounting treatment of barter transactions for existing goods (and services) is inapplicable to information sharing. The SNA method involves the recording of negative imputed expenditures for each unit offering commodities for barter. This implies, following double-entry bookkeeping principles, that the bartered (offered) commodity is no longer available to each economic unit. However, this is *not* the situation in the case of economic barter exchanges with respect to existing information commodities. The double-entry bookkeeping rules of exchange, for each trading partner, do not work in the case of information sharing.

Have we, then, discovered a gross violation of the 500-year old principles of double-entry bookkeeping? The answer to this question is negative. Rather, the principles of double-entry bookkeeping require some flexibility to be applicable to the case of information barter exchange (as seen in section 5 below). However, at the present time, it is evident that information sharing and knowhow trading are “off the books” of the SNA and, therefore, leave neither paper nor electronic trails for national accountants.

Finally, it is also evident that the SNA does not furnish a convenient conceptual framework to distinguish between “new” and “existing” informational commodities and their respective roles in networked economic transactions. This, however, raises complex issues regarding boundary problems that are not pursued in the present paper.

4. INPUT-OUTPUT ACCOUNTING IN THE NEW ECONOMY

Generally speaking, the 1993 SNA takes a business-as-usual approach to accounting for supply and use tables and input-output (I-O) as seen in Chapter 15 of the Document. There are hints in Chapter 15 that new problems are on the horizon, but these hints could easily be missed. One purpose of this section is to relate the developments of sections 2 and 3 to the input-output accounting area. This section also deals with other new developments impacting on I-O.

It will be evident that changes in the production and information economy are increasingly difficult to “model” according to standard I-O conventions. This

proposition holds with regard to *both* of the two major applications of I-O accounting: (1) as a commodity flow framework with convenient symmetry properties for data compilation and consistency checking, and (2) as a coefficient modelling device for analytical and classification purposes.

First it is known that the standard case for I-O accounting becomes weaker in a services-dominated economy. Services industries are less dependent on other industries for their intermediate inputs and their own observed commodity input structures are relatively uniform in nature. Indeed, many of the new information industries depend significantly on highly specialized input flows that are difficult to trace and to value compared with conventional inputs. This is an argument carefully made in Carter (1989b) with specific illustrations.

Some of the potential intermediate inputs and outputs of services and information industries might become more apparent with a new revised SIC, featuring more disaggregation and possibly based on a generic functional approach. A lot would also depend on the complementary SCC structure where information commodities (and activities) need to be broken out (externalized) and classified. It seems clear that revisions of both the SIC and the SCC are an interrelated package.

However, the situation with respect to I-O accounting is more complicated. As outlined in section 2, in an economy experiencing rapid economic change, there is a major problem of *disentangling*: (1) the inputs costs of conventional production, from (2) the input costs of economic change. The first kind of costs enter I-O tables as primary factor costs and intermediate commodity costs as well as capital costs with traditional service lives. The second type of costs are meta-investments, tangible and intangible, *all* of which should be amortized as capital costs, many with relatively long service lives.

Unfortunately, the two kinds of costs are presently *confounded* in the I-O accounts of SNA. In effect, I-O entries become overly sensitive to the duration of the accounting time period; there is no accounting invariance with respect to periodicity. The cost of economic change are not intertemporally amortized as capital costs; there are sudden and unexpected “bumps” due to concentrated and mis-allocated intermediate costs; the calculated I-O coefficients become unstable over time. Indeed, unless the two major types of production costs are tracked and distinguished, parts of the “costs of economic change” become lost or may be industrially allocated in an arbitrary manner. The situation with respect to environmental clean-up costs at close-down time is particularly notorious. Chapter 15 of the new SNA is silent on all these matters.

The business accounting literature does make some distinctions between the two major types of production costs. For example, organization costs are regarded as an intangible, non-current asset, and have a normal debit balance that is amortized over the life of the organization (Estes, 1985). It includes the costs of incorporating and establishing a business—legal fees, stock issuance costs, administrative expenditures and prepaid insurance. Companies often capitalize service costs and professional fees that are only indirectly related to the fixed capital expenditures of re-tooling costs. Government agencies, faced with close-down, charge severance payments and buy-outs to past periods of employment by revising their historical accounting records. These practices are far from uniform. There is an opportunity

for a future SNA to intervene and standardize accounting practices at the national level.

We argued that I-O accounting could benefit from a new and more active SIC. At the present time, work is underway to construct a new (North American) SIC based essentially on a technological, production-oriented, criterion. However, it is difficult to identify and classify production technologies unless the two major categories of observed production costs are correctly disentangled. Even then there would be a problem of deciding whether production technologies should be delineated and classified *via* their static production characteristics or their dynamic production characteristics. Researchers examining work-sheet I-O entries (and other sources) to characterize industries for SIC purposes are, in effect, basing their proposed classification on an unknown *mixture* of static and dynamic production characteristics. Is there anything wrong with that?

The problem with “mixtures” is that they tend to be unstable and, in fact, misleading particularly for new high-tech and other newly emerging industries in which we may have a special interest (further discussed in Postner, 1994a).

5. COMPACTED ACCOUNTING AND ITS CONSEQUENCES

The 1993 SNA introduces a notion called “compacted accounting.” The notion seems to be original. The actual term “compacted” is only mentioned in Chapter 2, but the notion has implications throughout the System. Here are three brief quotations from Chapter 2 where the term is introduced:

“...the System also often uses categories which are *compacted*, that is, are the result of combining a number of elementary transactions. Change in inventories, for example, is the difference between entries into and withdrawals from inventories and recurrent losses. The same netting happens for transactions in financial instruments...” (paragraph 2.35).

In a previous paragraph the SNA states that:

“In order to provide more useful answers to the questions raised in the analysis of flows, some transactions are not recorded in the System as they might be directly observed.” (Paragraph 2.34.)

In a later paragraph, an important implication is mentioned:

“In many instances, as explained earlier, the difficulty of seeing how the double-entry principle (and quadruple-entry principle) applies is due to the fact that the categories of transactions in the System are *compacted*.” (Paragraph 2.59.)

It turns out, however, that the explicit and often implicit use of compacted accounting in the SNA has repercussions that are far from trivial. Once more, the user of the SNA is left with the feeling that there are important omissions in the System. These omissions are often not obvious and are, therefore, spelled out here.

The SNA does not explicitly cover *credit-card transactions*, say, for household and enterprise accounts. There is, in fact, a complex financial system that lies behind the operations of even the simplest kind of retail credit-card transaction.

A credit card may be run as a non-profit operation (e.g. MasterCard) that links its member banks and their retail merchants together electronically. The member banks' debits and credits, at the end of each day, are typically cleared through a Master Account at the credit-card's own Trust Company.

The whole operation is supported by a complex system of fees, sometimes called "interchange fees," and interest rate charges ultimately paid for by the household consumers and their merchant retailers. In the SNA, all such "internal" operations are essentially netted out on both a sectoral and transaction basis. More precisely, the credit-card mechanism is compacted out. It is, therefore, not possible to identify and measure credit-card operations in the System except possibly for some background "noise."

A second example of omission in the SNA concerns enterprises dealing with either inputs or outputs of homogeneous and storable commodities that are traded on (financial) commodity markets. The enterprises typically become engaged in insurance-like *hedging operations* to cover the risks of future price changes. In fact, any enterprise engaged in international markets must cover itself with respect to the volatility of foreign exchange rates. A good introduction to this area is provided by Russell Krueger (1992).

A problem arises because it is often difficult to *unbundle* the purely financial operations from the purely production and trade activities that appear in the enterprise's accounting records. Yet these records are the prime source of industrial statistics. In effect, hedging transactions become bundled parts of production transactions, leading to *asymmetries* of measurement in different parts of the national accounts (e.g. a discrepancy could exist between the valuation of the same goods in trade statistics and in accounting records of costs of goods purchased). Chapter 11 of the SNA on Financial Accounts does not deal with this problem, presumably under the influence of compacted accounting. It might also be noted that the occurrence of financial/real bundling tends to obscure the identity of production function relations already analyzed in sections 2 and 4. In particular, input-output relations lose their matrix symmetry properties (the cell of a matrix can become dual valued) when the valuation of underlying transactions depend on, what can be called, transactor "intent."

The SNA does not provide scope for the many cases where the strict symmetry requirements of *quadruple-entry bookkeeping* are violated (seen in Postner, 1994c). This is a clear consequence of the System's bias towards compactness and will not be further discussed here. Because the System can even conceal the simple principle of double entry, there are consequences in terms of economic transactions that cannot be accounted for in the present SNA framework. This phenomenon will now be illustrated using our previous discussion of information as an economic commodity and the related practice of knowhow trading and information sharing.

What are the rules of the game for information sharing? For ease of exposition we choose the simplest possible assumptions without assuming away the whole problem. It could be checked that the following suggested double-entry accounting for information sharing is not critically dependent on the simplifying assumptions.

Suppose there are two business firms each of which has already acquired one unit of information, the type of information being different for each firm. There

are periodic costs of maintaining, storing and retrieving the information and these costs must be expensed since otherwise the information would cease to exist. For simplicity we could assume that the value of the existing information to each firm equals its cost of acquisition and that these values happen to be equal for the two firms. Duplication of information for each firm is free of charge and the value of a duplicate unit of information (i.e. a second copy) is always zero. Now suppose each firm performs the duplication operation. At the moment of duplication, the balance sheet for each firm remains unchanged even though each firm now holds two units of information of the same type.

Abstracting from costs of transmitting and assimilating information, suppose the two firms exchange (barter) their extra units of information. Since each firm now receives a unit of information of a type it did not have before the exchange, there is a debit entry to each newly acquired information commodity, which we may suppose equals the common valuation of an original unit (the first copy) of information. However, there cannot be an equal credit entry denoting the loss of the duplicated and exchanged information on the part of each firm since the valuation of that duplicate is zero and would violate double-entry principles.

To maintain double-entry principles, the credit entry is then made *directly* to “an addition to net worth” not unlike the “other changes in the volume of assets accounts” described in Chapter 12 of the SNA. Thus information sharing does not raise incomes because nothing new is produced, but both firms are better off in terms of their balance sheets and no principle of double entry is violated. One might even say that the credit entry ultimately arises from the fact that an act of information sharing *depletes* the potential for sharing of existing information among different firms. Other interpretations are also possible especially when the simplifying assumptions underlying the analysis are relaxed.

All this, then, is an exercise in what might be called decompacted accounting of transactions presently “off the books.”

6. CONCLUSION: THE END OF AN ERA

By almost any standards, the *System of National Accounts, 1993* is a remarkable document. It represents the culmination of almost fifty years of efforts, beginning with Richard Stone’s work for the League of Nations, to produce a professionally acceptable and comprehensive framework for national economic accounting. It also represents the end of an era. There is no way that one can seriously visualize a future counterpart Document, say, the *System of National Accounts, 2020*.

It seems natural to ask: where do we go from here? The present System certainly has imbalances and omissions. No doubt, other writers will point out other problem areas and some of these areas are already mentioned in the SNA section called “Looking Ahead: The Research Agenda.” So there is considerable work to be done keeping the System up to date and closing some gaps—based again on experts’ discussions. Rather than wait twenty-five years to put it all together (an unlikely prospect), we might consider the following idea.

I would suggest the periodic publication of Supplementary Documents containing official amendments to the 1993 SNA. The Documents could appear once

every three or four years. Some of the areas analyzed in this paper, together with suggested amendments, could easily fit into a Document in the next three years. The general idea would be to retain the present SNA framework, but with additional flexibility and with more dynamic elements. At the least this would represent an interim plan.

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