

## **SNA update item #16: Government owned assets (valuation of non-market output)**

Author: Michael Wolf, Senior Economist, National Accounts Dept.,  
Statistics Sweden

### **Summary**

In the discussion of government assets some fundamental aspects of the concept “non-market“ seems to be undervalued. We argue that the proposed changes in valuation of government output should be rejected mainly because:

- non-market and non-profit are two sides of the same activity and we do not solve the problem of output valuation by using the same standards as for market production
- output of non-market and market producers differ in respect of quality
- statistical problems involved in the measurement of asset values and
- problems of defining and measuring the rate of return

The argumentation in this paper is divided in two parts. The main arguments are discussed first and the more theoretical aspects follows in a separate annex.

### **Introduction**

With the proposed introduction of a calculated return to assets used in production the status of SNA as a guideline for the statistical system of economic accounts will be endangered. The proposed change in valuation of the output of non-market producers tends to move SNA in the direction of a theoretical system, i.e. a theoretical construct, rather than an accounting system filled with statistical information. The ambition might be to make comparisons between different producers and nations more accurate in sense of market values. But this misses the important fact that producers act on different markets and under specific market rules (including legislation). Some market producers act as monopolists others are under competitive pressure and we still treat them the same way. We account for their output and input as if they have the same opportunities, i.e. without any corrections for monopoly profits.

The fact that non-market producers exist is mainly because private enterprises have been unable to raise funds (capital) and satisfy all the needs at profitable prices. Needs without the possibility to pay profitable prices (by economists: low willingness to pay) are neglected by those enterprises so production has been organized without the demand of profitability by governments and/or non-profit organisations.

#### Non-market and non-profit

By their characteristic non-market producers are also non-profit producers. One way of understanding this is in relation to the risk market producers face by undertaking production that has to be sold on the market. There is no guarantee that all costs for R&D, market research, investments in production facilities, advertising and so on will pay off. On the contrary a non-market producer faces no or little uncertainty about the payment. This is simply true by definition of the concept "non-market" or when the producer and the consumer is the same institutional unit, which is the case of governments and in a sense also of households.

Market producers make decisions of how much to produce in relation to the expected prices and rate of return. A monopolist might expect a higher rate of return than a producer facing competitive pressure. But what they both have in common is that they need a positive net operating surplus to be able to generate (attract) capital and to pay dividends to their shareholders. Who expects privately owned enterprises to undertake production if it does not pay back?

But this is what we expect non-profit institutions like governments to do. Non-market producers also makes a dual decision but with the aid of different resources (taxes, fees etc) and by deciding on non-monetary goals (like free health care for children whether their parents are willing to pay or not). It is a cost-benefit decision where the benefits rarely can be given any precise monetary value.

## The characteristics of non-market products

In the SNA there is made a distinction between institutional sectors based on their principal functions, behaviour and objectives. One of the main distinctions made is the one between market and non-market producers. So, if we have recognized that there is a major difference between market and non market producers why should we try to measure their output by the same standard? One reason is that identical products produced by different producers should have the same value. This is obvious if we want to do comparisons. If the products have the same characteristics the institutional arrangement should not influence their valuation. But the question is what is really meant by identical products?

One reason of including non-market producers in SNA is to avoid biased international comparisons because production is organized differently among countries. The same argument goes for household production but so far without being incorporated in the SNA (except for owner occupied dwellings). The measurement of non-market output has always been under discussion due to the lack of so called economically significant and mutually agreed transaction prices.

At first we might think of identical products as products that have the same important physical characteristics. This is an objective criterion but we could instead use a subjective criterion and by identical mean all products that fulfil the same need. Because of problems with subjective valuations, like comparisons over space and time, the objective criterion is the one being used. But even if we restrict us to objective comparisons we put different values in how the products are supplied. We accept differences in valuation of the same product sold at a supermarket or sold by a specialized retailer. How a product is supplied influences the quality of the bargain and is thus accepted as causing differences in the pricing or valuation. Non-market products are in the same sense supplied differently from the kind of market supplies we know of. So, in this sense there is no reason to treat non-market products *as if* they are produced by market producers.

## Valuation of inputs

A way to understand an imputed return on assets is that resources have alternative uses and that they should be valued accordingly. The output of governments would then be valued differently because, if the resources were used by a private market producer they would produce at prices giving a return on capital. And this return, it is argued, is in SNA assumed to be zero for non-market producers. But depending on the market situation a market producer might not be willing to pay the same price for the asset as governments have done. Or, which is the real case, they have to produce the same output with less labour to be able to make profits. But since output measurement is the real problem (to be solved) we do not really know what the savings on inputs causes in terms of output quality.

The opportunity cost is not an actual cost borne by the enterprise or government but a way of comparing the actual income with what could have been earned if the assets had been used in the most profitable way. What could have been earned is the "cost" of not using it in that way. But it is not clear from the AEG recommendation if assets should be valued *ex ante* or *ex post* of the investment decision. The difference between *ex ante* and *ex post* is that *ex ante* money can buy any asset and thereby has a wide range of opportunities but *ex post* a given asset has a restricted set of alternative uses. This set is more restricted for specialized assets. A machine used for

tomography has less alternative uses than an office computer or a passenger car.

Ex ante can also be viewed as the theoretical value and ex post is the actual outcome, what can be observed, and as such lies closer to measurement and statistics. This leads us back to the question of what kind of information should be the content in the accounts, calculated figures or statistical data.

## **Output and equilibrium prices**

We can also look at the quantity aspect of non-market, especially government, supply. Economists tend to argue that governments supply too much. But this conclusion is only derived when the same standards as for market producers are used to evaluate government production. Because prices are much lower than marginal costs of production, the “efficient” demand is higher than it otherwise would be and thereby governments tends to supply more than would be the case on a competitive market. Whether the level of supply should be higher or lower can not be settled by the market, it is a matter for the political decision process. We are of the opinion that society, governments and non-market production are complex matters that can not simply be reduced to the logic of market producers. But what some economists misunderstand is the reason why governments undertake production in the first place. One reason for this is that economists tend to overvalue the efficiency of the allocation made by the market mechanism. Governments has decided to undertake production because there exists important but unsatisfied needs. The needs are unsatisfied for one thing because market producers normally neglect those who can not pay profitable prices.

## **Problems of valuing assets**

Normally, because the lack of second hand markets, values of existing assets are not available. This has necessitated the construction of a special calculation model known as the perpetual inventory method (PIM). By this method two needs are fulfilled. One is the allocation of the original value of the investment, over the accounting periods it is used, and the other is the revaluation of assets and the consumption of fixed assets to a common price level. The assumptions made in the PIM will have influence on the asset value in two respects. First, the assumed service life or depreciation rate will determine the calculated asset level or remaining value of the original investment. This will then be the foundation in the rate of return calculation. Second, the price index used to revalue assets is not an index based on the

market price development of the asset when it ages but rather an index based on the production prices of the product group closest to the original asset. This is as close as one possible can get to the concept of replacement costs. The concept replacement costs should not be interpreted strictly, as if it has to be the price of exactly the same kind of asset, but rather as the price of an asset providing the same task and with the same productive capacity. This is because some assets still in use might not have been produced for several years and the cost of producing such assets might not be representative, but this is not the intention with the concept.

In short, these two “shortcomings” to the PIM will make the asset value diverge from the theoretically correct opportunity cost valuation. This has also been acknowledged by the Canberra II group in their discussion. By the proposal of using ex ante price changes of assets rather than actual or ex post price changes the problem of higher (or lower) return to assets than the operating surplus can be eliminated, at least partly. But, using the theoretically correct prices in this case would in fact additionally increase the difference between the statistical and the theoretical accounting framework.

## The problems of measuring the rate of return

If we assume that the rate of return,  $\pi$  is one part of a price (or cost) for using assets the other part being the asset price itself, the former in relation to the total value and the latter in relation to the consumption part of assets (see below) we end up in problems of independently determining the rate of return.

$$\text{cost of using assets} = \pi p_k K + p_k \delta K = (\pi + \delta) * p_k K$$

In this simplified discussion we assume away the effect of taxes and subsidies on the cost of using assets. What we have in a situation of general equilibrium are  $n-1$  independently determined prices of goods and services including labour and interest rate(s) and one numeraire. So, we have a set of  $n$  relative prices but non of them defines a rate of return, simply because there is no market where the rate of return is established (priced) separately. One solution to this is to *assume* that the rate of return is equal to one of the interest rates. Another way is to derive the rate of return by arguing that when hiring assets the payment include a cost of using capital above consumption of fixed assets and the service needed for the assets to be useful (the “pure” service charge). The difference between the total amount paid to leasing corporations and the like, excluding their service charge and the consumption of assets, in relation to the asset value is equal to the rate of return. The problem is that this ratio, if it can be measured at all, only can be measured for a restricted number of assets. We doubt the possibility of separating the payment into the three parts necessary for establishing a rate

of return based on empirical facts. Again we end up in a theoretical construct rather than filling the accounts with facts.

Using an interest rate, we believe, is equal to admitting that the cost is nothing more than a property income and in the SNA property income is accounted for in the generation and distribution of income accounts rather than in the production account.

The theory behind the “capital service” concept assumes in fact that labour and capital can be hired, by an entrepreneur, on the same conditions but this is a simple way of assuming no market imperfections. In reality assets (capital in the theoretical framework) are in the vast majority of cases owned by the same enterprises using them and thus contradicting the theory. Labour on the other hand are rarely owned but always hired. This asymmetry is neglected by the theory and thereby is the property income misinterpreted as a cost of production. And as a consequence the rate of return is misinterpreted as part of a price for using assets instead of a way of relating the income earned to the capital invested.

## Conclusion

The fundamental question to be asked is what the SNA framework should capture. Real economies do not function as in the theory which postulates perfect competition. Markets are organized and managed in different ways and obstacles for entering might be large or small but never negligible. What governments do is more or less to correct the free market outcome and thereby they act differently than market producers. That is also the reason why governments have got the label *non-market producers*. This distinction should be retained in the SNA and the valuation of output should principally be different than for market producers.

## Theoretical annex

### Introduction

In this section we will discuss the theoretical problems in relation to the SNA and the novel concepts of a) rate of return, b) opportunity cost and c) social valuation.

It is argued (by the Canberra II group) that the entire cost of using assets in production is not accounted for in the present SNA and that a proper rate of return would do the job of correcting this flaw. But prior to this conclusion we have to know what is meant by costs and what kind of transaction the return to assets is.

Often the phrase “according to economic theory...” is used before a complicated way of accounting is proposed. Normally this is a way of saying according to what most economists think, but when it comes to assets and capital theory in general this phrase normally should be used with care. In this field the diverging opinions of economic thinkers are the most pronounced and what often is meant by using the phrase is instead “according to neo-classical theory...”

Well, let us now turn back to what is the real problem.

### What is meant by costs of production?

Generally the SNA recognizes costs as the value of goods and services used up or transformed in the production process thus contributing to output. A special kind of cost is the consumption of fixed assets but in all cases there also exist a financial counterpart, a monetary transaction. The difference is that for assets this transaction has to be allocated to the various periods the assets are used (consumed) and re-valued to reflect the actual costs of a specific accounting period. The revaluation is necessary to avoid holding gains and losses of entering the production and transaction accounts.

The proposed cost of owning and using assets in production distinct from the consumption of fixed assets, by the name of a return to capital, is in this respect an odd fowl. Clearly there is no transaction involved so the measurement is a tricky task but the main problem is to grasp what in reality has been consumed, i.e. what kind of cost is accounted for. Well, the obvious answer is: *an opportunity*. The owner has an opportunity to earn more money by using the assets in another activity. But opportunities are like free goods they exist everywhere and one has always to choose between them. When the choice has been made and the outcome known the remuneration is higher or lower than for other possibilities.

According to neo-classical theory a cost occurs if an asset can be transferred to another use and thereby increase output (measured as value added). But to cover the entire opportunity cost of assets we should compare the state of idleness with the “best” use. Best in the sense of giving the highest economic return. This is like comparing having money in the mattress or on a bank account where the interest rate plays the role of the rate of return. If we also assume that all markets are perfectly competitive the possibilities of increasing the output by transferring assets will no longer exist and the economic return in relation to asset values will be equalized all over the economy and we can define something like a normal rate of return. The major drawback, according to critics of neo-classical theory, is the ignorance of income distribution and especially its origin. The post-keynesian theory regards the rate of return as an outcome of the distribution of income between labour and capital. In this sense it is not at all a cost of production but rather the outcome of different events of which the wage struggle is one of the most important. Other important events are the outcome of the competition between companies on output, input and labour markets in the sense of determining prices and thereby setting limits of how much that can be earned, or in relation to the capital value; the rate of return. So, the rate of return depends on the relative powers of labour and their unions and capital and their representatives in company boards and directions, but also on the investment and production strategies undertaken by competitors.

In conclusion the post-keynesian approach implies that in the short run the wage struggle can have large impact but in the long run other market forces will dominate. When the real rate of return equals zero privately owned capital will be reluctant to be funded in production but this does not necessarily go for money used by non-market producers because their objectives are not to maximise profits but to produce as much goods as possible in relation to income restrictions like taxes.

If we want to argue from a theoretical point of view our choice should be determined by an evaluation of the theories in relation to empirical facts. But the problem is that this matter has not been settled yet. The conclusion must then be that economic theory gives no definite guidance in this case.

### **What are the constituting parts of the rate of return?**

A rate normally consists of two parts or aggregates in relation to each other. The numerator in this case is the net income flow attributed to the owners of the assets “giving rise” to the income. In the denominator we put a consistent valuation of the assets and for a given period (normally a year) we then can calculate a rate of return. This is the simple matter all agree on, now to the problems.

The numerator poses the problem of separating the income to a specific asset or set of assets from the total flows of income. This is the same problem as when a resource rent of natural assets like sub-soil assets has to be calculated. Using national accounts data means that only income related to the production activity is recorded and part of the separation is already made. But this data has to be further process to sort out the “normal” income of production.

The denominator poses two main problems, the valuation and what to be included, the boundary so to say. Neo-classical economists usually argue that the assets to be included are those who directly contribute to output, i.e. those assets used in the production process. But from the point of view of investors the total fund of money invested in production is divided into both real and financial assets. Money used to keep stocks of raw materials and financial assets and liabilities like trade credits and deposits are necessary to undertake production. This is because of so called market imperfections assumed away by the neo-classical theory of the firm. Why have companies tried to cut down on stocks if holding stocks do not have an opportunity cost?

When it comes to valuation the substitution of historical cost for an actual valuation can be done in several ways. The two main ways is either to use actual market values including the effect of not normal price changes, on average leading to real holding gains or losses or by using replacement costs (the SNA method). We think that the distinction between replacement costs, opportunity costs and market values is not wholly recognized.

## **Replacement cost versus opportunity cost**

In the SNA the concept of opportunity cost has an imprecise status. It is not mentioned in the core text but rather in the introduction and in relation to satellite accounts.

“Opportunity cost is calculated with reference to the opportunities foregone at the time the asset or resource is used,... The best practical approximation to opportunity cost accounting is current cost accounting... Current cost accounting is sometimes described as replacement cost accounting...” (SNA § 1.60)

and

“For instance, different methods may be used to value economic flows, as well as assets and liabilities. Some of these methods are included in the central framework; others, such as opportunity cost or the net present value may be considered more broadly in satellite analyses.” (SNA § 21.44)

The reason for using replacement costs is to value assets according to the costs of producing them. In a situation of equilibrium, replacement costs, market values and discounted net present values of future earnings to assets (if possible to separate from total income) will give the same result, but under a situation of disequilibrium the second hand prices corresponding to these different concepts will develop differently. To avoid holding gains influencing the valuation SNA prefers the concept of production prices (replacement costs). These prices are in an empirical sense determined on the market for newly produced assets and thus lying closest to the equilibrium situation where the production price equals the discounted future earnings.

Besides the problem of observing market values for second hand assets these values develops in relation to how the income earned by using them changes. In a case of perfect competition over the entire service life the income in relation to the asset value will be an average (normal) rate of return. But if the relative output prices can be increased the rate of return will be higher than average and thus reflecting a situation of disequilibrium.

If we have invested in oil extraction equipment in 2003 when crude oil prices were about 25 dollar per barrel what would be the opportunity cost of that equipment today in 2005? If we for simplicity assume the same intermediate costs in production and no increase in efficiency in the production we would have increased the income substantially because oil prices have increased to more than 50 dollar per barrel in 2005. Well, if this situation was foreseen by the market, producers and buyers of extraction equipment etc. it would have been reflected in the prices but it was not. So, we have higher than equilibrium earnings partly because of the oligopoly situation on the market and also because of other supply-demand relations increasing prices. Higher earnings will, ceteris paribus, mean a higher value of the existing equipment, valued as the discounted present value of the future net earnings. But probably this is not reflected by the production costs and consequently on the market prices (replacement cost) of new extraction equipment. In this disequilibrium situation there will be a difference between the (concepts of) opportunity cost and replacement cost. The valuation by the opportunity cost principle will give a higher value than the valuation with actual market prices for the same kind of equipment, i.e. replacement cost valuation.

The point here is not that valuation by discounted present values or opportunity costs are theoretically wrong but rather that they are highly problematic for practical reasons like access to data. Thereby they do not fit in when we have to deal with the real outcome of economies, as is stated by §1.60 "The best practical approximation..."

This is actually what it is all about, SNA does not assume a perfect situation where all markets are in a state of equilibrium and therefore practical rather than theoretical accounting guidelines have to be used. But the more

principal question, whether the opportunity cost is a cost of production or not, is another matter (see above).

Replacing the concept of replacement values (or current cost valuation) with concepts like opportunity cost and net present value (as was suggested by Canberra I) will not increase the SNA as a practical guideline but rather to loosen the ties between central concepts in the SNA like production, income and saving.

## **Social valuation**

The opportunity cost concept is part of a specific “social valuation” in optimization theory. If we want to maximize output we should optimize the allocation of resources. So, if we assume resources being optimized we can say that they are valued according to the same principles. In a case where resources not are optimized some resources can be transferred to another activity and thereby increase production. If, in a perfect situation (general equilibrium) assets used by market producers give 5 percentages in return this also goes for non-market producers. So, according to the theory we should use this rate also to value non-market production. But if we instead assume that market and non-market producers optimize their use of assets separately we have a situation of potential sub optimization and nothing can really be postulated about the rate of return on non-market producers by the rate of market producers. And this situation we think lies closer to reality than all assumptions necessary to derive at the “equal rate of return” hypothesis.

## **Conclusion**

In this annex we have more thoroughly explored the practical and theoretical problems of some concepts in relation to the SNA and empirical facts. What should be evidenced is that assumptions of how the economy functions matters for guiding us in how to best collect data and compile national accounts statistics. When a proposal is made arguing is not as straightforward as only paraphrasing “according to economic theory...” Prior to any proposal a thorough investigation of problems and possible alternatives should be undertaken and this has not been wholly achieved by the Canberra II.