

## **PUBLIC SECTOR IN NATIONAL MEASURES OF SAVINGS AND CAPITAL FORMATION**

Uma Datta Roy Choudhury\*  
Amaresh Bagchi

### **1. Introduction**

THE Central Statistical Organisation has recently brought out a New Series on National Accounts Statistics. The primary object of the revision is to adopt a more recent base for the constant price estimates. Thus for the constant price series the base has been shifted from 1970-71 to 1980-81. In the process, of course, the data base and the methodology employed in the estimation of the various aggregates have been comprehensively reviewed and all revisions considered necessary have been incorporated. However, so far as the public sector estimates are concerned, the basic source material has remained the same between the old estimates and the New Series though there has been some major changes in methodology in the form of:

- (i) introducing provision of consumption of fixed capital in the administrative departments for the first time, and
- (ii) estimating consumption of fixed capital in respect of departmental and non departmental commercial undertakings using the new method of estimation which in essence requires the derivation of the figures from independent estimates of gross fixed capital stock obtained

\*I have benefited tremendously from discussions with Dr. Arun Ghosh, which have been immensely helpful in formulation of my ideas  
—Uma Datta Roy Choudhury.

by the Perpetual Inventory Method, rather than on the basis of the depreciation provision as given in the accounts as hitherto.

This change in methodology and approach has resulted in a substantial revision of the estimates of net savings and net capital formation in the public sector. The two tables presented next (Tables 8.1 and 8.2) highlight the extent of the difference between the old and the new estimates of capital formation and savings. Thus in the New Series, net capital formation in the public sector is less by as much as 24 per cent in 1980-81 and by 21 per cent in 1984-85 as compared to the old series while for net savings the corresponding reductions are 110 per cent and 270 per cent in 1980-81 and 1984-85 respectively. Since in the public sector the revisions in the estimates are not due to use of any fresh data but are due to conceptual and methodological changes, it is important to examine carefully these changes in concepts and methods and their appropriateness in the context of measurement. It is also necessary to study the implications of these changes on the actual estimates. This paper seeks to bring out these implications, focusing on a few of the substantive issues.

## **2. Scope of Public Sector**

The annual Reports on National Accounts brought out by the Central Statistical Organisation has a separate section giving the details of public sector transactions in the context of national accounts. Several aspects of the public sector transactions are covered in the annual Report—the more important of these are product originating and capital formation in the public sector and their sectoral breakdown, final consumption expenditure of government administrative departments, finances of capital formation in the public sector, separate estimates of savings generated in administrative departments, departmental and non-departmental commercial enterprises within the public sector, the complete institutionwise economic accounts of the public sector and purposewise classification of expenditures of government administrative departments.

Public sector, by definition, comprises government adminis-

TABLE 8.1 Composition of Net Domestic Capital Formation in Public Sector by Industry of Use, 1980-81 and 1984-85 (At Current Prices)  
(Old and New Series)

Economic activity	1980-81			1984-85			(Rs. crore)
	NAS 1987	NAS 1988	Percentage difference	NAS 1987	NAS 1988	Percentage difference	
	(2)	(3)	(4)	(5)	(6)	(7)	
1. Agriculture etc.	1920	1573	-18.07	2694	2018	-25.09	
1.1 Agriculture	1828	1502	-17.83	2515	1877	-25.37	
1.2 Forestry & logging	92	71	-22.83	179	136	-24.02	
1.3 Fishing	—	—	—	—	5	—	
2. Mining & quarrying	775	816	5.29	1362	1968	44.49	
3. Manufacturing	2262	2107	-17.76	3996	3430	-14.16	
3.1 Registered	2562	2107	-17.76	3996	3430	-14.16	
3.2 Unregistered	—	—	—	—	—	—	
4. Electricity, Gas & Water supply	2611	1837	-29.64	4675	3199	-31.57	
5. Construction	230	187	-18.70	120	67	-44.17	
6. Trade, hotels and restaurant	-358	-319	10.89	1242	1243	0.08	
7. Transport, storage and communication	1347	658	-51.15	2232	1257	-43.68	
7.1 Railways	650	291	-55.23	851	371	-56.40	

(Contd.)

Table 8.1 (Contd.)

Economic activity	1980-81		1984-85		Percentage difference	(7)
	NAS 1987	NAS 1988	NAS 1987	NAS 1988		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
7.2 Transport by other means	425	211	-50.35	661	385	-41.75
7.3 Storage						
7.4 Communication	272	156	-42.65	720	501	-30.42
8. Financing, insurance, real estate and business services	103	78	-24.27	203	218	7.39
8.1 Banking & insurance	103	78	-24.27	203	218	7.39
8.2 Real estate, ownership of dwellings & business services	—	—	—	—	—	—
9. Community, social & personal services	2798	2168	-22.52	4720	3447	-26.97
9.1 Public Admin. & Defence	2276	1922*	-15.55	3849	3136	-18.52
9.2 Other services	522	246	-52.87	871	311	-64.29
10. TOTAL	11988	9105	-24.04	21244	16847	-20.70

\* Rs. 132 crore shown against real estate and business services (administrative departments) have been included under public administration and defence.

TABLE 8.2 Public Sector Net Saving by Type of Institution  
(Old and New Series)

Institution type	(Rs. crore)					
	1980-81	1981-82	1982-83	1983-84	1984-85	
(1)	(2)	(3)	(4)	(5)	(6)	(6)
1. Administrative Departments and Departmental Enterprises						
Old series : total	2509	3593	2927	1136	—	483
New series : admn. dept.	1795	2842	1764	-- 122	--	1893
: dept. enterprises	--1216	--1400	--1426	--1624	--	1932
: total	579	1442	338	--1746	--	3825
Difference (new--old)	--1930	--2151	--2589	--2882	--	3342
2. Non-Departmental Enterprises						
Old series	116	1046	1560	1476		2128
New series	-- 820	-- 46	504	484		1023
Difference (new--old)	-- 936	--1092	--1056	-- 992		--1105
3. Public Sector : Total						
Old series	2625	4639	4487	2612		1645
New series	-- 241	1396	842	--1262		--2802
Difference (new--old)	--2866	--3243	--3645	--3874		--4447

trative departments, commercial undertakings run departmentally by the government and classified as departmental commercial undertakings (DCUS) and non-departmental commercial undertakings, i.e., government companies and statutory corporations (NDCUS). Government administrative departments include all Central, State and local government offices, district authorities and other bodies engaged in administration or defence of the country and maintenance of law and order. Departmental commercial undertakings are unincorporated enterprises owned and controlled by the public authorities. These undertakings have accounting data for production, costs, sales, income, etc., but not a full set of accounts. Non-departmental commercial undertakings are mainly owned/controlled by the government and have a full set of accounts.

### **3. Data Availability**

For the public sector generally, the availability of basic data gives little cause for complaint though a great amount of reclassification of original data becomes necessary to bring them in line with national accounts concepts and to present the results in the desired format. For government administrative departments and DCUS the reclassification is of the details contained in the budget documents and annual accounts of Central and State governments, Union territories, local authorities and similar other bodies. In the case of non departmental enterprises the problem is less complicated as the data are obtained by analysing the annual profit and loss accounts and balance sheets besides other details available from their annual reports.

The purpose of this description is to stress the point that for government administrative departments, though the details of revenue and expenditure are readily available and form the basis of the estimates presented in National Accounts Statistics annually, the estimates depend very much on the criteria adopted for reclassification of different entries in the budget documents. Thus for compiling the economic accounts, various items of transactions, which appear in the budget documents and annual reports, are classified into different economic categories. In this process it is necessary to classify these transactions into

current and capital expenditures, segregate administrative services from entrepreneurial activities and separate the transactions relating to current consumption from financial transactions.

The accounts of the government that are normally available are kept on a very simple basis of cash accounting, which involves the recording of all actual receipts and disbursements of cash as and when and where they occur. At the same time, distinction is drawn between the items of revenue, capital, debt and remittances and all transactions are entered in the budget accounts accordingly. The revenue account broadly contains all items supposed to relate to current revenue transactions. The distinction drawn by the public authorities between revenue and capital transactions do not always tally with the distinction desirable from the point of view of national income accounting. The categorisation is influenced mainly by the nature of the sources of finance, and therefore, if some item of capital nature is financed out of current proceeds of taxation it is likely to be recorded under revenue account. For national accounts, all such entries need to be reclassified. To cite a few examples, building and construction activity, even when included in revenue account of the budget, are to be reclassified as capital expenditure. Similarly all outlay on civil works, debited to revenue account in budgets, are treated as capital expenditure. Following national income convention, all defence expenditure even when they are of capital nature, are treated as current expenditure, since capital assets required for defence purposes are assumed not to form part of the productive resources of the community. Of late, however, housing and border roads constructed out of "defence expenditure" are being treated as capital outlay.

#### **4. Method of Estimation**

Having completed the reclassification of the budgets of administrative departments and DCUS as well as analysis of the annual reports of NDCUS, the estimates of their contributions to gross domestic product, gross capital formation and savings originating are estimated. Thus for capital formation estimates, all the actual expenditures incurred under fixed capital formation, increase in stocks and purchase and sale of

second-hand assets are culled out from these sources to prepare the estimates.

For measurement of savings of the government administrative departments, the total current expenditures are deducted from total current receipts. The items of expenditure include (i) consumption expenditure, (ii) interest on public debt, (iii) subsidies and (iv) current transfers, while the receipts consist of (i) direct taxes (ii) indirect taxes, (iii) income from entrepreneurship and property and (iv) miscellaneous receipts. In the process, there is a difference between the "revenue surplus or deficit" of government and "government saving" as calculated for national income accounting purposes. The net savings of government companies and statutory corporations (NDCUS) are estimated using the results of the analysis of the annual accounts of these companies and corporations. The net saving is obtained as the aggregate of net transfers to balance sheet and net transfer to reserve.

Besides estimating domestic product, final current consumption expenditure, capital formation and savings, the detailed information available are utilised to prepare the economic accounts of the public sector separately for administrative departments, departmental and non-departmental enterprises further split into subsectors wherever possible. For the economic accounts, the results of the analysis of the budgets and annual reports are consolidated in a meaningful form, thus separating out all current expenditures from the capital ones, administrative services from entrepreneurial activities and transactions in commodities and services from financial transactions. For NDCUS the annual reports detail in the form of trading/contract/manufacturing account, profit and loss account, appropriation account, expenditure during construction account and the balance sheet are used to prepare the economic accounts. The Capital Finance Account within the system of economic accounts contains the relevant details of capital formation, its sources of finance, and changes in financial assets and liabilities. The primary source for this account is the balance sheet though the appropriation and profit and loss accounts also provide some details.

### **5. Changes in Method of Estimation**

In the past, for public administration and defence, estimates of consumption of fixed capital were neither available nor attempted, it being argued that maintenance expenditure of capital owned by government administrative departments included in the budgets were sufficient to keep the capital intact and no independent provision of fixed capital consumption need be provided. Moreover, all expenditure on works (other than repairs and annual 'contingent replacements) were treated as part of gross capital formation. Since the budgets follow the principle of cash accounting, thus recording all actual receipts and disbursements of cash as and when they actually occur, this approach did not disturb the overall principles of budget data and their correspondence with the national income statistics and economic accounts. Because of this approach, for administrative departments of the government, gross capital formation and gross savings were treated as equivalent to the net figures. For fixed capital formation the estimate included new fixed capital formation plus major works and minor works (shown in the budgets as current expenditure). It is however to be noted that maintenance expenditure was not treated as capital expenditure, but as expenditure on commodities and services.

As has already been mentioned at the outset, the major change introduced in the New Series, in the case of government administrative departments has been the adoption of the principle that the concept of consumption of fixed capital is relevant for this sector as well. Since no data on consumption of fixed capital are available in the budgets, the introduction of this concept has necessitated the imputation of the value of consumption of fixed capital for government administrative departments. This has been done by adopting the Perpetual Inventory Method for assets owned by government administrative departments. The introduction of the provision of consumption of fixed capital for public administration and defence in the New Series has meant revision of the estimates of domestic product, capital formation and savings and has in the process disturbed the basic principle of the budgets. This adjustment therefore needs to be followed up with further adjustments required to construct a (limited) Production Account of government administrative departments. In other words, for government admini-

nistrative departments, the introduction of the imputed amount of consumption of fixed capital as an item of receipt in the Capital Finance Account and as an item of input in the Production Account can no longer leave undisturbed the total revenue and total expenditure as available from the budget documents. Thus the implications of the introduction of 'provision of consumption of fixed capital in the administrative departments for the first time' [page 38, paragraph 4.1 (i) of *New Series on National Accounts Statistics*, CSO, February 1988] are manifold and not limited to the three broad measures of domestic product, capital formation and savings. The construction of a Production Account for government administrative departments in this context, and the implications thereof, need to be recognised.

A conceptual issue which arises in this context, can be elaborated as follows. Since now depreciation provision is being "imputed" for buildings and other assets of public administration and defence, should not the maintenance expenditure (currently treated as final expenditure, i.e., services produced for own use) be treated as "intermediate expenditure" and not final expenditure? In the UN system of National Accounts (SNA), all government administrative expenditure is treated either as final consumption or capital formation. Government administration therefore does not have a production account similar to those for commodities/industries and as such does not have any intermediate expenditure which is used in the process of production. In the case of government administrative departments "other goods and services" are mainly produced for their own final consumption expenditure and the relevant Account in the UN SNA is framed accordingly. However the logic of the new methodology adopted by the CSO requires that a certain depreciation provision be "imputed" in respect of all capital assets of government administration; this "imputed" depreciation provision has to be added to the gross domestic product (on the assumption that these assets give a stream of income, by definition equated to the imputed depreciation provision); and the imputed depreciation provision being treated as the consumption of fixed capital would have to be a deduction from gross capital formation to derive net capital for-

mation. One could go a step further and argue that in principle, such imputed income on capital assets of government administrative departments should be computed by taking the prevailing market rates and not equated to imputed depreciation provision. This point is elaborated further subsequently using hypothetical illustration with figures.

Implicit in the above procedure is the construction of a hypothetical production account of government administration (similar to those for commodities/industries), whether or not such an account is formulated and separately delineated. It stands to reason that under such situation current repairs and maintenance expenditure, which is today treated as government final consumption expenditure, cannot any longer be so treated and has to be shown as "intermediate expenditure" used in the process of production (in the present instance, for maintenance of the capital assets). To this extent then, government final consumption expenditure should go down. The net product of government administration and defence will be increased (by the imputed income earned from the assets) and gross capital formation by government administrative departments will be measured as capital expenditure *plus* maintenance expenditure (which in the past was treated as adequate to keep intact the stock of capital assets of government administration). Net capital formation will then be obtained as gross capital formation *minus* the consumption of fixed capital (i.e., "imputed" value of depreciation provision).

## **6. Domestic Product**

Considering each of the principal aggregates individually, domestic product would have to be inflated, at the minimum by the total amount shown under consumption of fixed capital if in principle it is accepted that an imputation in this respect is desirable and necessary. This is so because by definition value added by public administration and defence comprises only compensation of employees which are obtained by analysing the budget documents and annual accounts. Thus in the Production Account both gross input and gross output total must increase by the amount of imputed income from the assets of the government. In principle, such imputed income should be com-

puted by taking the prevailing market rates of rent for hiring similar assets and deducting from it the cost incurred by government on their maintenance (e.g., the cost of running the CPWD establishment for Central Government buildings, which of course figures in the Production Account of the Government sector separately under wages, etc.). There can no doubt be a case for deducting the consumption of fixed capital from the imputed income so computed in order to arrive at the net domestic product if it is felt that the expenditure on maintenance is not adequate for keeping the assets "intact". There may be practical problems (and also conceptual objections) in estimating national income from assets like public roads and bridges (the services of which are in the nature of public good) for which there is no rental market. But this cannot be said of assets for which there is a market especially when even the government goes to the market to meet its requirement which its existing assets cannot fulfil. In fact one can argue (as indeed has been argued by Rakshit) that GDP is understated if the imputed rent of assets owned by the government is not included in production account while the rent paid by government for assets hired by it goes into the national income estimates. One problem for which there should be proper consideration is that though maintenance of an asset can extend its life, it cannot obviate its obsolescence. For satisfactory and realistic measurement one has to address oneself to this problem also, which CSO does not.

The proper way to tackle this problem in estimation of GDP is to take the net imputed return on such assets (that is, those for which there is a market) and to deduct depreciation therefrom to arrive at the estimates of NDP. For assets like roads, bridges and dams, no imputation and addition to GDP seems needed or justified, since consumption of the imputed income from these assets can be treated as intermediate consumption for the economy as a whole.

The new series of national accounts seems to proceed on the assumption that "provision for consumption of fixed capital", which is nothing but depreciation itself, constitutes the imputed income from the assets in question. The logic underlying this assumption is not clear. How can depreciation provide a

measure of income generated by a given asset? As Kaldor pointed out in his celebrated Appendix on the Concept of Income in *Expenditure Tax*, in the absence of uncertainty, income can be viewed as a stream of interest on capital. But how can income be equated with capital consumption? If the income from assets were no different from their depreciation there could be no motivation for any capital formation at all. If income is to be imputed to government assets, its estimates should be based on rational principles.

As for depreciation, there can be no doubt that there is a case for providing for depreciation of assets of government administrative departments if it is felt that the expenditure on repair and maintenance is inadequate to keep the asset intact at the end of an accounting period. To quote the 1978 UN Manual on the SNA:

“Consumption of fixed capital may be defined in general terms as that part of gross product which is required to replace fixed capital used up in the process of production during the period of account. This flow is based on the concept of the expected economic life time of the individual assets; and is designed to cover the loss in value due to foreseen obsolescence and the normal amount of accidental damage which is not made good by repair, as well as normal wear and tear. Unforeseen obsolescence is treated as a capital loss at the time at which it actually occurs, rather than as fixed capital consumption. Charges for the depletion of exhaustible natural resources are not included in the consumption of fixed capital.

“In principle, the scope of the capital equipment for which consumption should be recorded is given by the definition of gross fixed capital formation. Because of practical difficulties, consumption of fixed capital is not, however, provided for in the case of assets of government services such as roads, dams, breakwaters or other forms of construction except structures. In these instances, it may be considered that outlays on repair and maintenance are sufficient to maintain the assets in their original condition. It should be noted that consumption of fixed capital is to be charged in

respect of all other fixed assets of the producers of government services, including for buildings.”

Recent thinking on the subject suggests that a prudent approach may be called for “where it is apparent that the necessary maintenance is not being done.” But in all such cases (that is, where a provision is thought necessary for depreciation over and above repair and maintenance), only the excess of depreciation over repair and maintenance should be deducted. The revised series does not seem to take this precaution. To the extent repair and maintenance has been allowed for in addition to depreciation there is clearly a double deduction.

It will thus be seen that the innovation in the new series of national accounts by way of charging depreciation in respect of government fixed assets has imparted a downward bias in the estimates of income generated in the public sector, by not taking the imputed income from assets which have a market on the basis of market rental and by providing for depreciation on a national basis even for assets like public roads and bridges, adding the same as imputed income and deducting the same from domestic product of government administrative departments (gross) derived. The impact which this bias can have on the estimates of the domestic product, capital formation and saving of government administrative departments has been illustrated with reference to the figures for a few selected years towards the end of the paper.

### **7. Capital Formation**

Capital formation of public administration and defence covers (i) capital expenditure (including expenditures on major and minor works) on roads, bridges, vehicles, public buildings, (ii) additions to plants and machinery and (iii) fixed assets acquired/constructed in the defence department for civilian use only. These details of expenditures of capital nature need to be culled out from the budgets. Thus, for example, expenditures on works (particularly minor) are often included under current account in the budgets and for national accounts are reclassified to form a part of capital expenditure. The old estimates of gross and net capital formation were treated as equivalent as

maintenance expenditure (both major and minor) was netted out and included under final consumption expenditure of government administrative departments. For the New Series, on the other hand, the imputed value of consumption of fixed capital is being deducted from the old estimates of gross capital formation (which includes no maintenance expenditure) to obtain the new estimates of net capital formation. For a correct measure, revision in these estimates is called for. Since consumption of fixed capital is being imputed, first revised estimates of gross capital formation would have to be obtained as the *sum* of old estimates of capital expenditure and the maintenance expenditure (at least the major ones) recorded in the budget documents and already accounted for under current consumption. To impute and deduct the imputed value of total capital consumption expenditure without adjusting the figures of gross capital formation (old estimates) would imply over-compensating for capital consumption. Therefore for meaningful measures of gross and net capital formation in the case of government administrative departments, first the revision of the old estimates of gross capital formation will have to be carefully undertaken and net capital formation derived thereafter. A mere deduction of the estimates of consumption of fixed capital from the old figures of gross capital formation without adjusting these old figures for higher figures of depreciation (imputed) would not be enough. According to the past practice, all maintenance expenditures on buildings, construction and other items of capital nature incurred by administrative departments (including all expenditures on repairs and annual contingent replacements) were treated as current expenditure and included under final current consumption expenditure of the government. Since the details of such expenditures included in the budget documents and classified under current expenditures of government administrative departments are not readily available in the annual reports on National Accounts Statistics, it is not possible to make such adjustments outright. It is essential in this connection that:

(i) All such expenditures of maintenance nature are first culled out from the budget documents;

(ii) their treatment in the economic accounts identified, and to the extent that they should, by definition, be classified as

likely to merit being treated as if made out of depreciation provision, and those which are of the nature of routine maintenance expenditure segregated, the former being taken to form a part of gross capital formation, while the latter being taken to be *intermediate* expenditure (and not final government consumption expenditure);

(iii) the excess, if any, between the new estimates of consumption of fixed capital and maintenance expenditure identified as part of depreciation should then be added to the old estimates of gross capital formation and, finally,

(iv) net capital formation should be obtained by netting the new estimates of gross capital formation for consumption of fixed capital. In the process final current consumption expenditure of government administrative departments should be adjusted to be net of (a) intermediate expenditure as well as (b) that part of maintenance expenditure which has been defined to form part of gross capital formation but earlier treated as current consumption expenditure.

In other words, currently the New Series *under-estimates* Net Capital Formation of government administrative departments to the extent that there is excess accounting for capital consumption expenditure just as in the old estimates gross capital formation is not estimated at all as large maintenance expenditures are not taken as consumption of fixed capital but are treated as current final consumption expenditure.

## 8. Gross and Net Savings

For measurement of gross and net savings of government administrative departments the adjustments which are called for are even more complicated. For the old estimates, total current expenditures are deducted from total current receipts to obtain net savings. It is argued that repairs and maintenance expenditure undertaken for capital assets in government administrative departments is sufficient to maintain the capital services of the assets intact and no separate depreciation provision need therefore be provided. Also, since the budget accounts are maintained on a cash basis, recording transactions as and when they actually occur, providing for depreciation provision would require its meaningful treatment, departing

from the general principle of budget accounting and also revision of the figures of total revenue and total expenditure which are the controlling totals of the accounts. The estimates of gross savings were therefore not attempted in the old series. As has already been explicitly stated in the earlier section, the maintenance expenditure which was assumed to keep the capital intact and should normally be added to net savings to obtain corresponding gross saving was not added and these expenditures were treated as part of final current consumption expenditure of government.

The New Series of National Accounts does not apparently consider this aspect of the problem, i.e., the implications of imputation of consumption of fixed capital, especially with reference to the need to set up a separate enterprise 'Product Account' for government administration which will include an (imputed) income from the existing stock of capital. It continues to keep the old estimates of savings undisturbed and obtains the revised estimates of net saving as old estimates of savings *minus* estimated figures of consumption of fixed capital. In other words, total expenditure of government administrative departments is inflated by the amount of consumption of fixed capital with no corresponding adjustment to total revenue for this imputed item introduced as an item of government transaction. The adjustments in the old estimates of savings as well in the New Series have to be carefully carried out to obtain new estimates of gross and net savings if the estimates are to be meaningful and realistic and accounting balance maintained. The adjustments required would be obverse of these carried out with reference to capital formation/capital consumption.

### **9. Capital Consumption of Public Enterprises**

In the case of Departmental and Non-departmental Commercial Undertakings, primary factor leading to the revision of the old estimates of net capital formation and net savings is replacement of the old estimates of consumption of fixed capital by the new ones. Arguing that the previous estimates of consumption of fixed capital for DCUS and NDCUS were based on provision for depreciation in the books of account of the enterprises and therefore require revision, current estimates.

of consumption of fixed capital are said to be more realistic. These are claimed to be based on the Perpetual Inventory Method which in principle assumes to have access to reliable estimates of capital expenditure and age structure of the assets in existence. In principle, this is correct. However, considering the wide-ranging structural differences between the whole gamut of public sector undertakings ranging from Railways and Communication which have been in existence over a century to the most recent technologically advanced sophisticated non-departmental enterprises (e.g., Electronics with high rate of obsolescence irrespective of age) to the sick industries taken over by the public sector from time to time, it is very difficult to appreciate how, reliable data on age structure of the assets in existence and their current replacement value could have been obtained and to what extent they are realistic in the Indian context. One knows, for example, that the Indian Airlines is operating planes which are more than 17 years old but in the CSO estimates the life of planes is assumed at 10 years. (The Boeing 737 which crashed at Allahabad is known to have been 17 years old.) In this context, the difference between normal expected useful age of assets and the economic age of assets (taking account of obsolescence) has also to be kept in mind. In the light of the points raised above, suffice it to say that indications suggest that the estimates of consumption of fixed capital are over-estimated by the use of the new method on the basis of limited available data, resulting in under-estimation of both net capital formation and net savings in the new series.

The likelihood of net savings having been under-estimated in the New Series of National Accounts Statistics is, to some extent, suggested by the level of the estimates themselves, which are presented in Table 8 3.

#### **10. Revision of Estimates Essential: A Hypothetical Exercise**

The discussion so far makes it amply clear that for the government administrative departments, to obtain a set of estimates of domestic product, capital formation and savings consistent with budgets as well as the "imputed" value of depreciation provision, it will be necessary to make several adjustments

TABLE 8.3 Public Sector Net Savings

(Rs. crore)

	1980- 81	1981- 82	1982- 83	1983- 84	1984- 85	1985- 86
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Administrative departments	1795	2842	1764	-122	-1893	-2423
Departmental enterprises	-1216	-1400	-1426	1624	-1932	-1791
Non-departmental enterprises	-320	-46	504	484	1023	1003
TOTAL	-241	1396	842	-1262	-2802	-3211

to the figures presented in the *New Series on National Accounts Statistics*. These adjustments mainly refer to (i) imputation of income on capital assets of government administrative departments and adjustment of domestic product accordingly, (ii) setting up of a "Production Account" for government administrative departments along the same lines as for enterprises with imputed income under (i) above as an output entry, (iii) identification of all maintenance expenditure from the budgets and classifying them into (a) those which are in the nature of routine maintenance and (b) those that are major maintenance expenditure and merit being treated as if made out of depreciation provision, (iv) treating [(iii) (a)] as "intermediate expenditure" in the new Production Account and [(iii) (b)] as part of gross capital formation and gross savings and lastly, (v) reducing final consumption expenditure of government administrative departments by the amount of total maintenance expenditure under (iii) above which now appear either in the Production Account or in the Capital Finance Account of government administrative departments.

Considering first the imputation of return to capital asset

of government administrative departments, these assets fall under a number of categories, viz., buildings, roads, bridges, dams, transport equipments, other machinery and equipments and the like. There is a clear distinction between the different categories. The administrative buildings and houses (let out on rent) are on two planes; roads, bridges and dams, etc are yet on a third plane. In so far as the latter are concerned, the benefits accruing from such assets accrue to the community, sometimes identifiable and sometimes not. This benefit would mean increase in income in different industries in the private sector, viz, farms, factories, trade and transport undertakings. When setting up a Production Account and "imputing" depreciation (as met out of income), this element—indeed, the entire imputed income—should be a deduction from the income generated in other sectors. The proportionality of the deductions between different sectors must remain conjectural and arbitrary.

In so far as buildings are concerned, houses let out by government administrative departments pose no problem, the incomes *ought* to be reflected in "income from property", and correct depreciation ought to be charged as a deduction on income generated. But government administrative buildings pose a different issue. Government is supposed to enjoy an income, and by definition, this income has been equated to depreciation provision. This is questionable as today, many government departments function from hired buildings where rent obviously is being paid at market rates. As such, should not the imputation of the rental income be at the same rate for equivalent space as paid by the government for buildings? Such an exercise has been undertaken (Table 3.4) taking the rate of return as 10 per cent which is considered to be most conservative market rate prevailing currently. From the accounting point of view this imputation would mean that the imputed income (less depreciation) must be added to total input of Production Account of government administration and also to output, i.e., government consumption as 'service produced for own use'. In other words, both domestic product and government consumption must change. An additional factor for which the latter must also be reviewed is the inclusion of

TABLE 8.4 Adjusted Estimates of Domestic Product, Capital Formation and Saving of Government Administrative Departments for Selected Years (current prices)  
(Rs. crore)

Item	1980-81		1984-85		1985-86	
	(2)	(3)	(3)	(4)	(4)	(4)
<b>A. DOMESTIC PRODUCT</b>						
1. Gross domestic product	: New Series	5794	10836	12359		
2. Imputed income*	:	1490	2812	3321		
3. Gross domestic product	: Adjusted	7284	13648	15680		
4. Net domestic product	: New Series	5307	6763	7180		
5. Net domestic product	: Adjusted	6797	9575	10501		
<b>B. CAPITAL FORMATION</b>						
6. Gross capital formation	: New Series	3101	5328	6477		
7. Large maintenance expenditures	: Estimated	523	974	1170		
8. Gross capital formation	: Adjusted	3624	6302	7647		
9. Depreciation	: New Series	764	1578	1933		
10. Net capital formation	: New Series	2337	3750	4544		
11. Net capital formation	: Adjusted	2860	4724	5714		
<b>C. SAVINGS</b>						
12. Gross savings	: New Series	2559	-315	-490		
13. Large maintenance expenditures	: Estimated	523	974	1170		
14. Gross savings	: Adjusted	3082	659	680		
15. Depreciation	: New Series	764	1578	1933		
16. Net savings	: New Series	1795	-1893	-2423		
17. Net savings	: Adjusted	2318	-919	-1253		

\*For conceptual basis, see section on "Revision of Estimates Essential: A Hypothetical Exercise" and Notes which follow.

imputed depreciation provision as final consumption in the New Series and the effect which the current exercise of imputed income (i.e., return to capital assets) will have on such a treatment.

As regards government capital assets in the form of roads, bridges, dams and other infrastructure, similar questions might be raised. In other words, government ownership of assets involves investment and hence a cost and therefore "imputation" of a rate of return (at 10 per cent or 12 per cent or whatever rate of discount is recommended) can be deemed justified. This imputed income should then also be entered in the Production Account of the government administration with the amount being treated as *cost* to the rest of the economy and not to the government. This *cost* to the rest of the economy will then need to be deducted as "intermediate consumption" from the income/value-added of the rest of the economy. In other words, this amount is *not* consumption of government but intermediate consumption of other economic activities according to the benefits that they derive (similar to the treatment of irrigation activity under other departmental enterprises). This is very complicated as roads, bridges and other infrastructure benefit not only economic activities like trade or transport but the entire economy. However, since depreciation provision for such items is being imputed, the two might be assumed equivalent and imputed income increased accordingly. This seems to have been done in the New Series of CSO but has not been incorporated here. The reasons for our reservations in adopting depreciation as equivalent to imputed income of the government administration has already been set out above. In view of this, and also paucity of data, it has been decided not to impute for such government investments till the complex theoretical and practical issues involved are resolved satisfactorily. Thus, the adjusted GDP in Table 8.4 possibly suffers from a downward bias.

It is unfortunate that consolidated (Centre, State, local government, etc.) figures of maintenance expenditure and its components, i.e., routine repairs and maintenance and major maintenance (which merit being treated as if met from depreciation provision) are not readily available and it is not

possible to rework the estimates of gross capital formation and gross savings and the corresponding net figures to demonstrate the extent of actual revision necessary. Preparing the revised estimates using the details from the budget documents is not a difficult proposition, though time consuming. It is also possible that these details are readily available in the overall summary background work sheets of public sector estimates of capital formation and final consumption expenditure prepared by the CSO and reclassification of the figures along the lines indicated above will give the results without much difficulty. For the current exercise, however, the examination of the Demands for Grants for a number of Central Government Ministries suggests that total maintenance expenditure is of the order of 6 per cent of government final consumption expenditure. Using this ratio, total amount of maintenance expenditure has been estimated and it has further been assumed that 2 per cent of this is in the nature of routine maintenance and should therefore be treated as intermediate consumption and the rest added to capital formation and saving to obtain gross figures before depreciation provision as estimated by CSO is deducted to obtain net estimates. Tables 8.4 and 8.5 give the results of the exercise for a few selected years.

## **11. Conclusion**

Because of the comparatively comfortable position regarding the availability of data, measurement of macro-aggregates for the public sector has generally not been considered to be problematic. However, as is obvious from the above discussion, the problem is not as simple as is generally suggested by the data users and the estimators. It is essential that the conceptual problems that arise from the introduction of the new methodology are resolved, and consistent estimates of savings and capital formation for the public sector are prepared after resolution of the issues raised in the paper.

**TABLE 8.5. Adjusted Production Account of Producers of Government Services, 1980-81, 1984-85 and 1985-86 (at current prices)**

(Rs. crore)

<i>Item</i>	<i>1980-81</i>	<i>1984-85</i>	<i>1985-86</i>
(1)	(2)	(3)	(4)
1 1 Intermediate consumption	4673	8341	10543
1.1.1 Current maintenance expenditure	262	487	585
1.1.2 Goods and services used for consumption	4411	7854	9958
1.2 Compensation of employees	8037	14926	17270
1.2.1 Wages and salaries	7464	13649	15736
1.2.2 Pension	573	1277	1534
1.3 Return to capital (imputed)	1490	2812	3321
1.4 Depreciation	764	1578	1933
<b>GROSS INPUT</b>	<b>14964</b>	<b>27657</b>	<b>33067</b>
1.5 Output of goods and services	14964	27657	33067
1.5.1 Services produced for own use	12299	22891	27506
1.5.2 Non-commodity output	1490	2812	3321
1.5.3 Sale of goods and services	1175	1954	2240
	14964	27657	33067

- Imputed income on assets (see Notes).

#### NOTES ON TABLES 8.4 AND 8.5

The following gives the details of the exercise :

1. Net Fixed Capital Stock for administrative departments has been adjusted to exclude assets of roads and bridges.
2. The net fixed capital stock of roads and bridges has been estimated using the ratio worked out on the basis of details in "Estimates of Fixed Capital Stock in India" by Jagdish Kumar, R. P.

- Katyal and S.P. Sharma; *Journal of Income and Wealth*, Vol 9, No 1, January 1986.
3. Rate of return on capital, i.e., imputed income has been estimated at 10 per cent of value of assets.
  4. Maintenance expenditure (total) has been estimated at 6 per cent of government Final Consumption Expenditure on the basis of details in Demands for Grants for Selected Ministries of the Central Government.
  5. Out of maintenance expenditure estimated under (4) above, 33 per cent has been treated as routine current repairs and maintenance and the rest (66 per cent) as large maintenance expenditure which can be deemed to have been made out of depreciation provision.
  6. Gross domestic product of government administrative departments has been assumed to be the sum of (a) compensation of employees and (b) gross imputed income minus current repairs and maintenance.
  7. Gross domestic product at (6) above *minus* depreciation is net domestic product.
  8. Gross capital formation and gross savings are adjusted to include large maintenance expenditure.
  9. Final consumption expenditure is now defined to include both (a) services produced for own use and (b) imputed income on capital *net* of depreciation.
  10. Services produced for own use excludes total maintenance expenditure (both large maintenance expenditure and current repairs and maintenance).
  11. Current repairs and maintenance is defined as sale of goods and services and included in Production Accounts gross output.
  12. Gross input in Production Account excludes large maintenance expenditure which are now included under Gross Capital Formation. In other words, such expenditures are now transferred from Current Account to Capital Account.

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