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DEFLATION WITHIN AN ACCOUNTING FRAMEWORK: WITH REFERENCE TO AUSTRALIAN DATA

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I. INTRODUCTION

THE development of national accounts in current prices has proceeded to the stage where the estimates of many countries are now presented within a comprehensive and integrated accounting framework. These formal properties of the statistics have been found to offer major advantages in their compilation and interpretation. It is natural enough that a comparable presentation of the results in systematic form should again be considered in reviewing the extent to which the components of these accounts can be adjusted for price change and expressed in constant prices. There would seem to be very considerable advantages in this case in the adoption of an accounting framework, principally because of the possibility which it offers for indirect deflation of aggregates, such as saving and national income, and broad components of this latter aggregate, where direct deflation is scarcely practicable, and for the consistent procedures which it indicates for deflation of the entries of the external transactions account, where some of the most critical problems of deflation arise.

The question is, however, whether such a project could be undertaken on a conceptual and statistical basis which would preserve the meaning of the various accounting aggregates and components for purposes of analysis. And further, whether deflation of the entries of a system of national accounts beyond the industrial product and the final expenditure estimates now widely produced would provide sufficient new analytical material to justify the effort involved. An answer to the first of these questions was attempted in a paper presented to the fifth meeting of this Association,[1] and represented, with marginal changes and additions, in a recent publication of the Statistical

[1] R. W. Burge and R. C. Geary, 'Balancing of a System of Accounts in Real Terms', paper presented to the fifth conference of the IARIW, De Pietersberg, September 1957.

Office of the United Nations.[1] This paper sought to describe (a) the current value entries of the United Nations Standard National Accounts (SNA)[2] which might usefully be 'factorized' into their price and quantity components, with concomitant price indexes, and (b) the form which might be adopted to systematize the presentation of the entries in constant prices and the price indexes resulting from this factorization. A balancing system of five accounts, including entries additional to those derived from the accounts in current prices, was adopted to govern the presentation of the constant price data.

It was noted in these papers that there has been wide agreement concerning the principles governing deflation of the domestic product account (account I) of SNA. The United Nations report *A System of National Accounts and Supporting Tables*[3] makes this point in the following terms:

> 'The major step that can be taken in this direction [to make comparisons over time in terms of constant prices] is the preparation of measures of the volume of the national [domestic] product.[4] This task can be approached in two different ways which in principle should yield identical results. Index numbers of production originating in the various industries can be aggregated to yield measures of total production. Alternatively index numbers of the real volume of expenditures on final products can be aggregated to yield the same total.'

There is also some consensus that deflation of the entries of a consolidated set of accounts for a closed economy would be practicable, although in this case reservations are held concerning the meaning of particular components, such as real saving.[5] There has been less agreement concerning the principles and conventions which should be adopted in deflating the accounts for an open economy, and the entries covering the external

[1] United Nations, *A System of Price and Quantity Indexes for National Accounts*, E/CN.3/L.46, December 1957 (Chapter 2).

[2] United Nations, *A System of National Accounts and Supporting Tables*, Studies in Methods Series F, No. 2. New York, 1953.

[3] *Ibid.*, p. vii.

[4] The term 'domestic product' might be substituted for 'national product' in this sentence to avoid any question concerning deflation of the net foreign investment component of the latter aggregate.

[5] See Richard Stone, *Quantity and Price Indexes in National Accounts*, Organization for European Economic Co-operation, Paris, November 1956, for detailed study of this subject.

transactions in particular, although the differences noted may in some cases be slight in practical effect. Points of correspondence and difference were noted briefly in earlier papers where the opinion was expressed that it should not be difficult to secure agreement, if sometimes of a conventional character, on outstanding issues.[1]

It is the purpose of the present paper to assist this process by presenting constant-price data for a particular country in the form of an integrated set of accounts, as a basis for practical study of the system proposed here and in earlier papers. At the same time, the question of the 'worthwhileness' of the material, raised above, can be reviewed by reference to some of the analytical uses of the full set of accounts. This study is carried out in following sections by reference to strictly unofficial national accounts data in constant prices for Australia for the period 1953/54 to 1957/58. Discussion of the formal aspects of the accounts is restricted to a preliminary description of the accounting framework and concepts needed for the interpretation of the empirical data.

Statistical questions affecting construction of the estimates have been examined at length in the United Nations document, *A System of Price and Quantity Indexes for National Accounts*,[2] and although relevant, will not be examined further in this paper. The estimates in real terms for Australia given here are of a fairly rudimentary character, without the detail and precision needed to support close methodological examination.

II. CONCEPTS

The system of accounts which governs the following estimates for Australia in constant prices consists of five accounts, namely the domestic product account, the national income account, the capital account, the consumption account and the

[1] R. W. Burge and R. C. Geary *op. cit.* and United Nations *A System of Price and Quantity Indexes op. cit.* For further discussion of these questions, including the calculation of the trading gain and the definition of national income and national product, see G. Stuvel, 'The Uses of National Accounts in Economic Analysis', *Income and Wealth*, Series IV, London, 1955; 'A New Approach to the Measurement of Terms of Trade Effects', *Review of Economics and Statistics*, August 1956; and 'Asset Revaluation', *Economic Journal*, June 1959; P. Norregaard Rasmussen, *Studies in Inter-Sectoral Relations*, North-Holland Publishing Company, Amsterdam, 1956; *Statistics of National Product and Expenditure*, No. 2, 1938 and 1947–55, O.E.E.C., Paris, 1957; *Economic Survey for Latin America*, E.C.L.A., United Nations, New York, 1956.

[2] *Op. cit.*

external transactions account. The consumption account represents a consolidation of the households and general government current accounts given in the SNA system; the capital reconciliation accounts of the SNA system have been omitted; and the entries in the accounts retained have been abridged considerably. The structure of the accounts is based on the following system of relationships:

Account 1

Gross domestic product at factor cost
Plus indirect taxes net of subsidies
(Gross domestic product at market prices)

Equals

Consumption
Plus gross domestic capital formation
Plus exports net of imports
(Expenditure on gross domestic product at market prices)

Account 2

Compensation of employees
Plus gross business and property income
Less transfer effect of indirect taxes and subsidies
(Gross national income)

Equals

Gross domestic product at factor cost
Plus net factor income payments from abroad
Plus trading gain (terms of trade effect)
(Gross national product at factor cost)

Account 3

Gross domestic capital formation
Plus surplus of the nation
(Gross investment)

Equals

Gross saving

Account 4

Consumption
Plus gross saving
(Gross national expenditure)

Equals

Compensation of employees
Plus gross business and property income

Plus indirect taxes net of subsidies
Less transfer effect of indirect taxes and subsidies
(Gross national income and net indirect taxes)

Account 5

Exports
Plus net factor income payments
Plus trading gain
(Receipts from abroad)

Equals

Imports
Plus surplus
(Disposal of receipts from abroad)

Some broad properties of this system may be noted:[1] Expenditure flows involving transactions in goods and services are defined as the value in constant prices of the commodities exchanged. Income flows are defined as the real value of the goods and services against which the income is ultimately exchanged, to measure the rewards of factors rather than factor inputs.[2]

These principal definitions, applied within the framework of a balancing set of accounts, affect the definitions of the adjusting entries. Thus, the item of real net factor income payments from (to) abroad is calculated by reference to the real inflow or (outflow) of commodities which these payments finance, rather than by reference to quantities of factors involved. Similarly, the trading gain entry is designed to measure the increase or decrease in the volume of goods and services available for the payment of real incomes brought about by changes since the base year, in the terms on which exports exchange against imports. These two adjusting entries, net factor income payments and the trading gain, are employed in the system to convert the domestic product to the national product, equals national income, aggregate.

National product is used up in consumption, capital formation, and net foreign investment; in conformity with the concepts governing the present system, the export surplus or deficit is defined as the real commodity flow corresponding to this

[1] In this paper no particular attention is given to index formulae and the fundamental index number problem.

[2] As an exception, the man-hour input of employees at base year rates is shown in Account 2 below as a sub-item to permit comparison with the real remuneration of employees.

balance to measure the real value of resources applied to investment abroad. Gross saving is then defined (by Account 3) as equal to domestic capital formation plus this external balance to measure the volume of resources directed to non-consumption purposes.

When relative prices paid and received by a sector change, the price changes effect a transfer of real income between sectors. The present accounts include entries, namely, the transfer effect of indirect taxes and subsidies, the trading gain, and the wage increment, which measure three such transfers. Other transfer entries, and in particular the 'trading gain or loss' of the farm sector, might usefully be added.

Within this broad framework, the individual accounts and their principal entries are defined as follows:

The final expenditure items on the right-hand side of Account 1 refer to commodity flows which may be deflated unambiguously by corresponding price indexes. The sum of the items on the left-hand side of the account, gross domestic product at market prices, represents the gross commodity output of all producers, less their inputs of intermediate commodities; transactions in intermediate commodities appear on both sides of the individual production accounts and cancel out on aggregation, in both current prices and real terms, leaving aggregate net output equal to the sum of the final expenditures shown on the opposite side of the account. The equation represented by this account in constant prices has been referred to earlier in a quotation from the UN report as a generally accepted proposition.

The real indirect tax and subsidy entries in this account may be derived by regarding the component taxes and subsidies as value flows, with corresponding commodity flows represented by the goods and services on which the taxes and subsidies are levied or paid; quantity series may then be constructed in the conventional manner, although not without some statistical difficulties and approximations.

The aggregate of domestic product at factor cost is transferred from Account 1 to the right hand side of Account 2, where net factor income payments to the nation and the gain or loss from changes in the terms of trade (the trading gain entry) are added to yield the value in real terms of the gross national product. Net factor income payments to the nation represent the additional production of resident-owned factors located abroad,

after netting out the domestic production attributable to non-resident-owned factors. The trading gain measures any increment (decrement) in the volume of goods available for distribution as real income which has resulted from changes since the base year in the terms of trade.[1] While it is common practice to regard the trading gain as part of real income,[2] the proposal that this item should also be included with gross national product, as shown in Account 2, has not received wide assent. It is suggested, however, that the national product measure could usefully take account of the particular form of production represented by international trading, leaving the domestic product aggregate to refer to more restricted forms of activity. National product would then be the concept appropriate for economic welfare studies, and domestic product for productivity studies. It is found later that real net exports should, in effect, be adjusted for the trading gain in arriving at the real external surplus; since the surplus represents a component, along with consumption and capital formation, of gross national product, this approach lends further support to the inclusion of the trading gain with national product.

The left-hand side of Account 2 shows the division of real national product, equals aggregate real income, between employees and other income recipients, after adjustment to allow for the income transfer effect of indirect taxes and subsidies. This transfer effect may be described by reference to the following example:

Domestic Product Account

	Quantity	$		Quantity	$
Year 1					
Domestic product at factor cost	100*A*	100	Private consumption	80*A*	100
Indirect taxes		25	Government consumption	20*A*	25
Total	100*A*	125	Total	100*A*	125
Year 2					
Domestic product at factor cost	100*A*	100	Private consumption	50*A*	100
Indirect taxes		100	Government consumption	50*A*	100
Total	100*A*	200	Total	100*A*	200

[1] The deflation of net factor income payments from abroad and calculation of the trading gain are discussed in a later section dealing with the external transactions account.

[2] See OEEC, *Statistics of National Product and Expenditure*, No. 2, *op. cit.*; and ECLA, *Economic Survey of Latin America*, 1955, *op. cit.*

It may be seen from this example that a relative change in indirect tax or subsidy rates by comparison with the price index for general government spending would affect the share of production diverted to government use. In the above example continuation of the basic indirect tax rate in year 2 would have given government a consumption level of 20*A* in that year also valued at $25 in year 1 prices. The relative increase in indirect tax rates in year 2 has had the effect of transferring an additional 30 units of production to government consumption, valued at $37.50 in year 1 prices. Account has to be taken of this transfer effect by inclusion of an especial entry in Account 2 before arriving at the balance of national product available for payment of real incomes to wage-earners, entrepreneurs, and property owners (including government). After making this adjustment for indirect taxes and subsidies by methods described later, the entry 'compensation of employees' is deflated by an appropriate consumers' price index to measure that part of production accruing as real income to wage and salary earners.[1]

This entry may then be sub-divided into 'employee input' and 'employee increment' by deflating 'compensation of employees' by a general wage and salary index to give man-hour input valued at base period rates leaving the balance (positive or negative) between the entries of 'man-hour input' and 'real compensation of employees' to represent the employees' share of any changes in national product due to domestic productivity and to terms-of-trade effects. The deduction from real gross national income, after adjustment to allow for the transfer effect of indirect taxes and subsidies, of the real compensation of employees reveals the sum of the real income of entrepreneurs, real income from property, and real income of general government, gross of depreciation; that is, the real income of these groups would be represented by the value at base-year prices of the goods and services (including capital goods) purchased with these incomes.

In Account 3 the flows of domestic capital formation and the surplus of the nation on current account represent commodity flows valued at base-year prices. The surplus when positive is

[1] Implicit in the use of the consumers' price index is the assumption that all of this income is spent on consumption, or to the extent that this is not so, that the other appropriate price indexes have changed at the same rate as the consumers' index.

deflated by the price index for exports, and when negative by the price index for imports. The components of this surplus, external investment, and international transfers – positive or negative – are thus expressed at the base-year value of the goods and services comprising these external flows, to yield a simple statement of the real cost of external investment, reparations, grants, and other transfers. Gross saving is defined by the Account as equal to domestic capital formation and the external surplus. The saving item measures that part of production (at base-year prices) set aside for the purposes of capital formation, foreign investment, and grants. The real saving figure is therefore of some analytical usefulness in reflecting the effect of changes in relative price levels of capital and consumer goods upon the volume of capital formation undertaken in any year. The right-hand side of Account 4 contains entries previously described. Items 4.4, 4.5, and 4.8 were shown in Account 2 as equal to gross national product at factor cost. The inclusion of items 4.6 and 4.7, real indirect taxes and subsidies, respectively, brings the sum of the items on this side of the account to gross national product at market prices. The disposition of this aggregate between consumption and saving (equals investment) is shown on the left-hand side of the account. The saving item in real terms is obtained from Account 3.

In the external transactions account, Account 5, exports and imports represent commodity flows valued at base-year prices. Deflation of the remaining entries in a consistent and meaningful manner presents major problems. This subject was examined in some detail in earlier papers.[1] It was then suggested that the surplus should be deflated by an export price index when positive and by an import price index when negative. As indicated above, the real surplus would then measure that part of real product applied to foreign investment and transfers, and a deficit would measure the real contribution to domestic expenditure made by overseas investment and transfers. It was also proposed that an additional variable termed the 'trading gain' should be brought into the external account, to measure the real gain or loss resulting from changes since the base year in the terms of trade. This entry is regarded as a measure of change in the distribution between countries of the total gain resulting

[1] See references given in footnote 1, on p. 9 and 10. (See also the reference given in footnote 5, p. 10 for an alternative point of view.)

from international specialization in production. The measurement of the trading gain is based on the value of goods and services actually exchanged in any year,[1] and does not therefore take account of relative price changes in the export surplus or deficit applied to investment and transfer purposes. This is a conservative approach which excludes *contingent* gains or losses, in respect of the unexchanged surplus or deficit, from both the real surplus or deficit and the trading gain or loss. It is considered, for example, that there would be little value in imputing a real trading gain to a country (and an increase in real income) from a relative rise in the prices of commodities composing an export surplus applied in the form of foreign grants. (But it may be seen that an alternative basis of valuation would not affect the balancing property of the accounts if applied consistently in the computation of both the external balance and the trading gain or loss.)

Besides providing what appear to be meaningful entries in real terms, the above procedures and appropriate deflation of the net factor income payments entry produce a balancing external account.[2]

III. ACCOUNTS FOR AUSTRALIA

The following simplified system of accounts for Australia in prices of 1953–54 has been drawn up for purposes of the present exercise. The accounts are in conformity with the system described above. Some of the component estimates are of a very approximate character, and reflect a lack of price-index data in the accounting form required for present purposes. Official estimates in constant prices are not prepared for Australia. Official estimates in current prices, adjusted where necessary to

[1] The lower of the export and import aggregates in current prices. The appropriate (import or export) aggregate should be deflated by the general import and export price indexes in turn, the difference in the deflated figures representing the real gain or loss as the case may be, brought about by changes in the terms of trade.

[2] Given due attention to deflation of the item 'net factor income payments from the rest of the world'; in practice, deflation of this item when small is often carried out in fairly arbitrary fashion. In principle, this income flow should be deflated by the price index relating to the commodity flow which it finances. For example, when net income payments are used to finance an import surplus, deflation should be carried out by the import price index; conversely, where net exports are financed by a net income flow to abroad, the export price index should be used. A full discussion of this principle is given in the UN report *A System of Price and Quantity Indexes for National Accounts, op. cit.*

conform to standard United Nations definitions, have been shown in the accounts, enclosed in brackets, for purposes of comparison with the real terms data. These adjusted estimates in current prices have been published in the United Nations *Yearbook of National Accounts Statistics, 1958.*

Account 1. Domestic Product

(£A million. In prices of 1953/54. Current price estimates are shown in parentheses)

	1953[1]	1954[1]	1955[1]	1956[1]	1957[1]
1.1. Gross domestic product at factor cost	4,090 (4,092)	4,370 (4,396)	4,610 (4,747)	4,620 (5,115)	4,730 (5,151)
1.2. Indirect taxes	490 (488)	550 (531)	570 (568)	580 (639)	610 (689)
1.3. *Less* subsidies	20 (23)	20 (22)	20 (18)	20 (18)	20 (21)
Gross domestic product at market prices	4,560 (4,557)	4,900 (4,905)	5,160 (5,297)	5,180 (5,736)	5,320 (5,819)
	1953[1]	1954[1]	1955[1]	1956[1]	1957[1]
1.4. Private consumption	2,850 (2,844)	3,090 (3,139)	3,210 (3,358)	3,220 (3,560)	3,380 (3,820)
1.5. General government consumption	450 (447)	460 (478)	480 (535)	470 (553)	480 (573)
1.6. Gross domestic capital formation	1,200 (1,201)	1,420 (1,462)	1,400 (1,547)	1,170 (1,434)	1,240 (1,511)
1.7. Exports of goods and non-factor services	900 (901)	950 (862)	1,050 (879)	1,180 (1,103)	1,150 (934)
1.8. *Less* Imports of goods and non-factor services	840 (836)	1,020 (1,036)	980 (1,022)	860 (914)	930 (1,019)
Expenditure on gross domestic product at market prices	4,560 (4,557)	4,900 (4,905)	5,160 (5,297)	5,180 (5,736)	5,320 (5,819)

[1] Fiscal years beginning July.

Account 2. National Income

(£A million. In prices of 1953/54. Current price estimates are shown in parentheses)

	1953[1]	1954[1]	1955[1]	1956[1]	1957[1]
2.1. Employee input	2,250	2,320	2,370	2,380	2,390
2.2. Employee increment	—	80	170	160	170
2.3. Compensation of employees	2,250 (2,248)	2,400 (2,439)	2,540 (2,659)	2,540 (2,807)	2,560 (2,899)
2.4. Entrepreneurial and gross property income	1,770 (1,770)	1,840 (1,881)	1,840 (2,002)	1,900 (2,221)	1,820 (2,167)
2.5. *Less* transfer effect of indirect taxes and subsidies	—	40	60	30	30
Gross national income .	4,020 (4,018)	4,200 (4,320)	4,320 (4,661)	4,410 (5,028)	4,350 (5,066)
	1953[1]	1954[1]	1955[1]	1956[1]	1957[1]
2.6. Gross domestic product at factor cost	4,090 (4,092)	4,370 (4,396)	4,610 (4,747)	4,620 (5,115)	4,730 (5,151)
2.7. Net factor income payments from the rest of the world	−70 (−74)	−70 (−76)	−80 (−86)	−90 (−87)	−80 (−85)
2.8. Trading gain	—	−100	−210	−120	−300
Gross national product at factor cost	4,020 (4,018)	4,200 (4,320)	4,320 (4,661)	4,410 (5,028)	4,350 (5,066)

[1] Fiscal years beginning July.

Account 3. Capital Formation

(£A million. In prices of 1953/54. Current price estimates are shown in parentheses)

	1953[1]	1954[1]	1955[1]	1956[1]	1957[1]
3.1. Gross domestic capital formation	1,200 (1,201)	1,420 (1,462)	1,400 (1,547)	1,170 (1,434)	1,240 (1,511)
3.2. Surplus of the nation on current account	−10 (−9)	−240 (−250)	−220 (−229)	110 (102)	−160 (−170)
Gross capital formation	1,190 (1,192)	1,180 (1,212)	1,180 (1,318)	1,280 (1,536)	1,080 (1,341)
3.3. Gross saving	1,190 (1,192)	1,180 (1,212)	1,180 (1,318)	1,280 (1,536)	1,080 (1,341)

[1] Fiscal years beginning July.

Account 4. Consumption

(£A million. In prices of 1953/54. Current price estimates are shown in parentheses)

	1953[1]	1954[1]	1955[1]	1956[1]	1957[1]
4.1. Private consumption	2,850 (2,844)	3,090 (3,139)	3,210 (3,358)	3,220 (3,560)	3,380 (3,820)
4.2. General government consumption	450 (447)	460 (478)	480 (535)	470 (553)	480 (573)
4.3. Gross saving	1,190 (1,192)	1,180 (1,212)	1,180 (1,318)	1,280 (1,536)	1,080 (1,341)
Gross national expenditure at market prices	4,490 (4,483)	4,730 (4,829)	4,870 (5,211)	4,970 (5,649)	4,940 (5,734)
	1953[1]	1954[1]	1955[1]	1956[1]	1957[1]
4.4. Compensation of employees	2,250 (2,248)	2,400 (2,439)	2,540 (2,659)	2,540 (2,807)	2,560 (2,899)
4.5. Entrepreneurial and gross property income	1,770 (1,770)	1,840 (1,881)	1,840 (2,002)	1,900 (2,221)	1,820 (2,167)
4.6. Indirect taxes	490 (488)	550 (531)	570 (568)	580 (639)	610 (689)
4.7. *Less* subsidies	20 (23)	20 (22)	20 (18)	20 (18)	20 (21)
4.8. *Less* transfer effect of indirect taxes and subsidies	—	40	60	30	30
Gross national product	4,490 (4,483)	4,730 (4,829)	4,870 (5,211)	4,970 (5,649)	4,940 (5,734)

[1] Fiscal years beginning July.

Account 5. External Transactions

(£A million. In prices of 1953/54. Current price estimates are shown in parentheses)

	1953[1]	1954[1]	1955[1]	1956[1]	1957[1]
5.1. Exports of goods and services	900 (901)	950 (862)	1,050 (879)	1,180 (1,103)	1,150 (934)
5.2. Net factor income payments to the nation	−70 (−74)	−70 (−76)	−80 (−86)	−90 (−87)	−80 (−85)
5.3. Trading gain	—	−100	−210	−120	−300
Receipts from abroad	830 (827)	780 (786)	760 (793)	970 (1,016)	770 (849)
	1953[1]	1954[1]	1955[1]	1956[1]	1957[1]
5.4. Imports of goods and services	840 (836)	1,020 (1,036)	980 (1,022)	860 (914)	930 (1,019)
5.5. Surplus of the nation on current account	−10 (−9)	−240 (−250)	−220 (−229)	110 (102)	−160 (−170)
Disposal of current receipts from abroad	830 (827)	780 (786)	760 (793)	970 (1,016)	770 (849)

[1] Fiscal years beginning July.

IV. METHODS OF ESTIMATION

Domestic Product Account

Item 1.1 Gross domestic product at factor cost.

Computed as the residual entry in this account, after deflation of the final expenditure items, indirect taxes, and subsidies.

Item 1.2 Indirect taxes.

To the extent possible, where the component taxes were specific to particular commodities, the taxes in the base year were extrapolated by reference to volume changes in the relevant commodity flows. Where the incidence of the tax was more widespread, or commodity data insufficient, the taxes in the base year were extrapolated by reference to broad commodity flows, such as that of real personal consumption expenditure. The deflated estimates given in the accounts are of a very approximate character.

Item 1.3 Subsidies.

The principles governing deflation of this item should correspond to those described in 1.2 above. No attempt was made to deflate this relatively small item in the present study.

Item 1.4 Private consumption.

Deflated by the retail price index, which is representative of a high proportion of expenditure of wage-earner households, in the absence of a consumption price index representative of all consumer groups.

Item 1.5 General government consumption.

The wages and salaries component of this group was deflated by a general wage and salary index covering employees in all industries. The small residual item of expenditure on goods and services was deflated by the wholesale price index.

Item 1.6 Gross domestic fixed capital formation and increase in stocks.

Various methods were adopted to deflate the components of this entry. For outlays on private dwellings, the base-year expenditure was extrapolated by quantity statistics showing the numbers of dwellings commenced and completed. Outlays on 'other new private buildings' were deflated by a combined wage and building-materials price index. The base-year outlays in the private sector on trucks, cars, and motor cycles were extrapolated by

quantity series showing new vehicle registrations. Private expenditure on 'other equipment' was deflated by the wholesale price index. In the public sector the total expenditure on fixed capital formation was deflated by a combined wage and building-materials price index. In the case of stocks, rough estimates of total stocks at book value were deflated by the retail price index and the year-to-year changes were then derived from the deflated series.

Item 1.7 Exports of goods and services.

Item 1.8 Imports of goods and services.

Deflated by the official export and import price indexes, respectively.

National Income Account

Item 2.1 Employee input.

The compensation of employees in current values was deflated by an index of the average weekly wage and salary earnings per head (adjusted male units) in all industries.

Item 2.2 Employee increment.

Computed as the difference between item 2.3, compensation of employees, and item 2.1, employee input.

Item 2.3 Compensation of employees.

This entry in current values was deflated by a retail price index constructed to measure price movements in the expenditure of wage earners.

Item 2.4 Entrepreneurial and gross property income.

This item represented the residual entry in Account 2.

Item 2.5 Transfer effect of indirect taxes and subsidies.

This transfer effect is estimated as the difference between real net indirect taxes computed by deflating the indirect tax and subsidy series in current money terms (a) by corresponding 'price indexes' for these series (see items 1.2 and 1.3 above), and (b) by a general price index relating to the consumption and capital formation expenditures of general government. Where for any year net indirect taxes arrived at by the method described in (a) above exceed the net indirect tax entry computed by method (b), the difference represents an addition to real gross national product at factor cost available for payment of real incomes. Conversely, where the estimate computed by method (b) exceeds that computed by method (a), the

estimate of real income should be reduced by the difference. The adjusting entry is shown as a deduction on the left-hand side of Account 2 to avoid any adjustment to the aggregate shown on the right-hand side of this account, namely, gross national product.

Item 2.6 See item 1.1.

Item 2.7 Net factor income payments from the rest of the world.
Deflated by the import price index for all years except 1956/57, when the export price index was used as the deflator.

Item 2.8 Trading gain.
Computed as the difference between the lower and the export and import aggregates in current prices deflated in turn by the export and the import price indexes.

Capital Formation Account

Items 3.1, 3.3 See items 1.6 and 4.3.

Item 3.2 Surplus of the nation on current account.
This surplus, when positive, was deflated by a general export price index, and when negative, by a general import price index.

Consumption Account

Items 4.1, 4.2 See items 1.4 and 1.5.

Item 4.3 Gross saving.
This item represents the balancing entry in the account and is derived as a residual.

Items 4.4, 4.5, 4.6, 4.7, 4.8 See Items 2.3, 2.4, 1.2, 1.3, and 2.5 respectively.

External Transactions Account

All components described previously.

V. ANALYSIS

The data provided by the foregoing system of national accounts in real terms measure the activities of production, income distribution, consumption, and capital formation for the Australian economy and its current transactions with the rest of the world. Detailed supporting tables in constant prices and a system of price indexes to measure price changes in the purchases

and sales of industries and in the final expenditure flows might usefully be provided as a supplement and, to some extent, as a by-product of this work. Much of this information would appear to be of value in analysis concerned with the workings and performance of the economy. In support of this viewpoint, some of the results and relationships shown by the accounts are now reviewed briefly, without leaning too heavily on the quality of the estimates, to demonstrate their possible usefulness in studies concerned with domestic productivity, wage adjustments, the effects upon the economy of changes in the terms of trade (the share of 'external productivity'), economic welfare, and other matters.

Domestic and external productivity. The aggregate of domestic product at factor cost in Account 1 shows that the real production of all domestic producers increased by about 16 per cent over the period 1953/54 to 1957/58, while comparison of this measure with employee inputs (Account 2, Item 2.1) suggests that domestic product increased by about 8–9 per cent per employee (adjusted male units) in this period. An industrial break-down of these figures would permit an industry-by-industry study in the same terms. While the rise in domestic productivity is impressive, it may be seen from Account 2 that the fall in relative export–import prices between, for example, 1953/54 and 1957/58, principally due to falling wool prices, has had the effect of transferring almost half of the increase in domestic production in the latter year, and practically the whole of the increase in production due to per employee productivity changes, to foreign consumers. This may be seen by comparing the increase in real domestic production over the period, £A640 million, of which more than 50 per cent can be explained as a productivity increment, with the negative trading gain in 1957/58 by comparison with 1953/54 of £A300 million.

The domestic product aggregate (and components) in real terms may be regarded as the measure appropriate for analysis of capital–output, labour–output (productivity) and other technical relationships within the domestic economy. The national product concept is concerned with the production of resident-owned rather than domestically located factors of production; in addition, this concept measures production after taking account of international trading. National product, therefore, refers to the production available for distribution to residents

as real income, and has the characteristics of an economic welfare measure.

Real income distribution. The data presented on the left-hand side of Account 2 show the final result of the various changes in domestic production, relative export–import prices, indirect tax and subsidy rates, wage-rates, and domestic prices upon real income shares. Before considering the major income shares, it may be noted that since 1953/54 there has been a positive income transfer from government to other sectors due to changes in net indirect tax rates relative to prices paid by government. The principle governing this adjustment has been examined briefly in an earlier section. In the present case the increase in indirect tax rates relative to 1953/54 has not kept pace with the increase in wage-rates and other prices paid by government; this development has increased the command over commodities of the employee and business sectors beyond that measured by the increase in national product, to the extent shown by item 2.5, 'transfer effect of indirect taxes and subsidies'. Employee input (item 2.1) measures labour input valued at base-year wages and salaries; this shows increasing employment over the period at a declining rate. Compensation of employees represents total real wages as conventionally defined, that is, wage and salary income deflated by a related cost-of-living price index. The difference between these two employee items represents the employee's share of any increases (decreases) in domestic productivity, international trading gains (losses) and the income transfer effect of net indirect taxes. In 1954/55 and again in 1955/56 real wages and salaries per employee rose by 3–4 per cent (£80–90 million in total annual increment) over the previous year's figures; no further real gains per employee were recorded in the following two years. Real entrepreneurial and property incomes increased steadily, but at a slower rate than real wages through 1956/57, and declined in the following year. Those increases noted were achieved in face of adverse terms of trade, by comparison with the position in 1953/54, and were made possible by the substantial improvements recorded in domestic production. Other statistics suggest that real farm incomes fell sharply during the period, except in 1956/57, so that the separate and perhaps necessarily approximate calculation of the real incomes of farmers would be a useful exercise in the Australian case. This calculation could be based on a production account

for the farm sector in constant prices, after adjustment of the account to allow for changes in the sector's terms of trade.

Investment. Account 3 shows sizeable fluctuations in the effective saving performed by the economy. This item is equal to the value at base-year prices of the goods and services employed in domestic capital formation plus (in the simplest case) the commodities composing the export surplus. Comparison of the real and the money-saving entries would show the extent to which relative changes in the prices of investment and consumption goods have affected the intention to set aside part of income for investment purposes.

The real saving estimates and related data in constant prices may also give some indication of the effect upon the saving processes of changes in the national product due to changing terms of trade. The following table gives the percentage of gross saving to gross national product at market prices for the years 1953/54 to 1957/58, (a) in current money terms, (b) in constant prices, and (c) in constant prices, after adding back the 'trading loss' to both the saving and the national-product estimates.

Gross Saving as a Percentage of Gross National Product

	Percentage				
	1953/54	1954/55	1955/56	1956/57	1957/58
(a) In current money terms .	26·5	25·1	25·3	27·2	23·4
(b) In constant prices . .	26·5	24·9	24·2	25·8	21·9
(c) In constant prices after adjustments for trading losses	26·5	26·5	27·4	27·5	26·3

The real saving percentage [item (b)] fell in 1954/55 and again in 1955/56 as the terms of trade declined, recovered partly in 1956/57 as the terms of trade improved, and fell sharply in 1957/58, when the most serious trading loss occurred. The comparison of the real saving and national product series, after adding back the trading loss to both series [item (c)], shows much greater stability. These figures, with due allowance for their tentative character, seem to suggest that the greater part of the losses in the gross national product over the period due to the adverse movements in the terms of trade have been met by a reduction in gross saving. Beyond this, study of separate fixed capital

formation and stocks figures (not shown in Account 3) indicates that fluctuations in the real saving series have been largely absorbed, except for the year 1956/57 when credit restraints against some forms of fixed capital formation were intensified, by corresponding fluctuations in stocks and in the surplus of the nation on current account. Real gross fixed capital formation represented the following percentage of real gross national product at market prices over the period:

Percentage				
1953/54	1954/55	1955/56	1956/57	1957/58
25·4	26·4	25·9	23·9	25·3

Consumption. The following table shows (a) private consumption in current prices as a percentage of gross national income in current prices, (b) the same comparison in constant prices, and (c) real private consumption expressed as a percentage of real gross national income after adding back the trading loss to the latter aggregate:

Private Consumption as a Percentage of Gross National Income

	Percentage				
	1953/54	1954/55	1955/56	1956/57	1957/58
(a) In current prices . .	70·9	72·7	72·0	70·8	75·4
(b) In constant prices . .	70·9	73·6	74·3	73·0	77·7
(c) After adjustment of gross national income to exclude the trading loss .	70·9	71·9	70·9	71·7	72·7

The most stable relationship is that shown by the percentage of real private consumption to the adjusted national-income figure. By adding back the real income loss due to relative changes in export–import prices and in principal effect imputing a stable real income to farmers, a fairly stable consumption–income relationship is discovered. Consumption outlays appear to have been insulated effectively during the period from the fluctuations in income originating in foreign trade.

The real consumption of general government represented between 9·5 and 10 per cent of real gross national product at

market prices during the years 1953/54 to 1957/58. The lower figure of 9·5 per cent was recorded during 1956/57, when the credit restraints which reduced real fixed capital formation were apparently accompanied by some additional restraint in fiscal policy.

External transactions. Australia's export volume increased by about 28 per cent between 1953/54 and 1957/58. The volume of imports rose sharply in 1954/55, was reduced over the two following years to a figure which in 1956/57 was little above the level of the base year, and rose again moderately in 1957/58. The decline which occurred in Australia's terms of trade after 1953/54 was sufficiently severe to offset the post-1953/54 expansion in export volume. The total increase in real exports above the base year level amounted, over the four years 1954/55 to 1957/58 to £A730 million; this is exactly equal to the cumulated trading losses shown in the external transactions account for these years.

The increases permitted in import volume in the years following 1953/54 were therefore financed in whole by increasing the deficit of the nation on current account.

Summary. The foregoing accounts throw some light on questions of domestic productivity, external trading conditions and 'external productivity', consumption patterns, wage adjustments, and capital formation in fixed assets and stocks. It is not difficult to see that a compatible system of price indexes and supporting detail in constant prices would permit much additional analysis to be undertaken. In the situation just reviewed the adjustments imposed on the economy by changes in external trading conditions have been restricted largely to overseas borrowing and the running down of foreign reserves. It would be interesting to consider within the framework of the accounts the internal changes needed to meet a decline in the terms of trade which could not be offset in this way. Prices, wages, and profits of industries supplying the domestic market would presumably be affected; alternatively, any major adjustment might be made by a change in the exchange rate. Similarly, it would be useful to examine within the same framework the processes by which a gain from changes in the terms of trade, originally accruing, say, to the export sector, is subsequently transferred in some part by internal wage and price adjustments to other sectors. In view of the institutional character of some

internal adjustments, it might also be useful to examine the time lags involved in these operations.

As a further example of the possible uses of accounts in real terms, it is suggested that the accounts would provide a useful framework for short-period economic forecasting as a basis for wage and monetary policy, among other matters. In particular, the forecasting of the components of the national income account (Account 2) would presumably shed more light on the subject of wage and price adjustments than a study restricted simply to changes in domestic productivity.

Beyond analysis of the foregoing character, based on accounts in constant prices and related price indices, more complete studies might be permitted by the use of a compatible system of accounts dealing with the money flows of the economy. As a simple example, an increase in export prices and incomes might lead to an increase in the domestic money supply and raise domestic expenditures above the level implied by the initial increase in income. The uses in conjunction of accounts in real terms and money flows accounts would then enable a further analysis to be made in quantitative terms of the way in which real and monetary forces affect production, income distribution, and spending.