INDUSTRY COMMISSION

The Measurement of Effective Rates of Assistance in Australia

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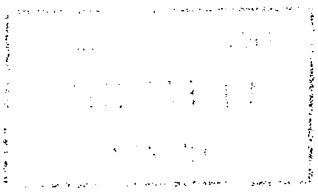

PREFACE

This working paper is a copy of a paper prepared for the Organisation for Economic Cooperation and Development (OECD) and presented to an ad hoc meeting of experts on 7-8 April 1992 in Paris.

The Economic Policy Committee of the OECD had requested the experts to evaluate a proposal from the Australian delegation to calculate effective rates of assistance for member countries as a means of enhancing domestic and multilateral surveillance of industry and trade policies, and of promoting structural reform. The Industry Commission was asked to prepare a paper which examined the practical aspects of measuring and interpreting effective rate of assistance measures in Australia.

Working papers provide access to work undertaken by Commission staff that is not published in a report or discussion paper.

This paper was prepared by Herb Plunkett, Ross Wilson and Steven Argy. Comments or inquiries should be directed to Herb Plunkett (06) 264 3121.

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LIST OF ABBREVIATIONS

ABS	Australian Bureau of Statistics
AGPS	Australian Government Publishing Service
AM	Assisted value of intermediate inputs (materials)
AP	Assisted value of production (output)
APMI	Articles produced by manufacturing industries
AICC	Australian import commodity classification
ASIC	Australian standard industrial classification
ASCC	Australian standard commodity classification
AVA	Assisted value added
cife	Cost, insurance, freight and exchange
CTE	Consumer tax equivalent
df	Nominal rate of assistance on outputs
dm	Nominal rate of assistance on materials
EMDG	Export market development grants
ERA	Effective rate of assistance
fob	Free on board
g	Effective rate of assistance
GSE	Gross subsidy equivalent
IAC	Industries Assistance Commission (Australia)
IC	Industry Commission (Australia)
ldf	Landed duty free
NRA	Nominal rate of assistance on outputs
NRM	Nominal rate of assistance on intermediate inputs
NSE	Net subsidy equivalent
PNG	Papua, New Guinea
PMV	Passenger motor vehicles

PSE	Producer subsidy equivalent
QR	Quantitative import restriction
SMA	Statutory marketing authority
SVA	Subsidy to value adding factors
TCF	Textiles, clothing and footwear
TEM	Tax equivalent on intermediate inputs (materials)
UM	Unassisted value of intermediate inputs (materials)
UP	Unassisted value of production (output)
UVA	Unassisted value added
vfd	Value for duty
X	Materials to ouput ratio (in unassisted terms)

1 INTRODUCTION

The aim of this paper is to provide a guide to practical aspects of measuring effective rates of assistance (ERAs) to industry. It draws on the experience of Australia in measuring ERAs on an annual basis for the Australian agricultural, manufacturing and mining sectors.

The paper begins by outlining the use of ERAs in the industry policy debate in Australia. The concept of effective assistance, the ERA and associated measures of assistance are then outlined. This is followed by a description of the system of estimating average nominal and effective rates of assistance for the manufacturing sector. Separate attachments present details of the manufacturing effective rates system, and the method of analysing major forms of assistance.

The ERA is used because it has a number of useful characteristics:

- it can include most forms of barrier and non-barrier assistance to industries;
- it includes both the benefits and costs of assistance to individual industries;
- it provides an indicator of the extent to which the overall structure of assistance advantages or disadvantages an industry relative to other industries;
- it provides a consistent measure across the traded goods sectors of the economy;
- it provides a consistent measure over time; and
- it provides a single, easy-to-grasp indicator of the net incentive effect of the many different forms of assistance.

Some associated measures and components of effective rates of assistance, particularly nominal rates of assistance and subsidy equivalents, are also used to highlight particular aspects of the assistance structure in an economy.

2 POLICY APPLICABILITY AND IMPACT

The purpose of quantifying industry assistance is to enable governments to make more informed policy decisions that will lead to an improved allocation of a community's scarce resources and thus to an improvement in the community's welfare.

The information generated has also resulted in a more informed public, and in more informed press comment on industry policy matters. An informed public is more likely to support policies which benefit the community as a whole and result in a community which is more likely to resist policies which protect particular sectional interests at the expense of the general well-being.

In Australia, tariffs have been the principal means of assisting the manufacturing sector. Domestic pricing schemes have been the principal means of assisting the agriculture sector. The mining sector has received relatively little direct support. In addition to tariffs and domestic pricing schemes, there has been a wide range of other mechanisms used to support particular activities. As support provided by tariffs and domestic pricing schemes has been phased down over recent years, the relative importance of other assistance mechanisms has increased. Many of these provide assistance indirectly under complex arrangements which obscure the impact and costs. In this situation, a means of quantifying the assistance provided on a consistent and comparable basis becomes increasingly important.

Within Australia, effective rates of assistance have been measured by the Industry Commission (formerly the Industries Assistance Commission) on a consistent basis across industries since the early 1970s.[1] Estimation began with the industries in the manufacturing sector. This sector was accepted as being the most highly assisted in the Australian economy and was the focus of the reform agenda at the time. In later years, estimates were extended to cover agriculture, minerals processing, and more recently, the mining industries.

The time series of ERAs for the agriculture and manufacturing sectors are presented in Figure 1. Also shown are changes over time in the disparities of ERAs between industries in those sectors.

Estimates for individual activities, usually at a more disaggregated level, have been published in reports the Commission presents in response to government requests for advice on assistance to particular industries. These more narrowly based estimates have drawn on the regularly published industry-wide estimates as benchmarks. Also the opportunity for more detailed investigation of an industry has enabled a refinement of data and methodology used for the economy-wide estimates.

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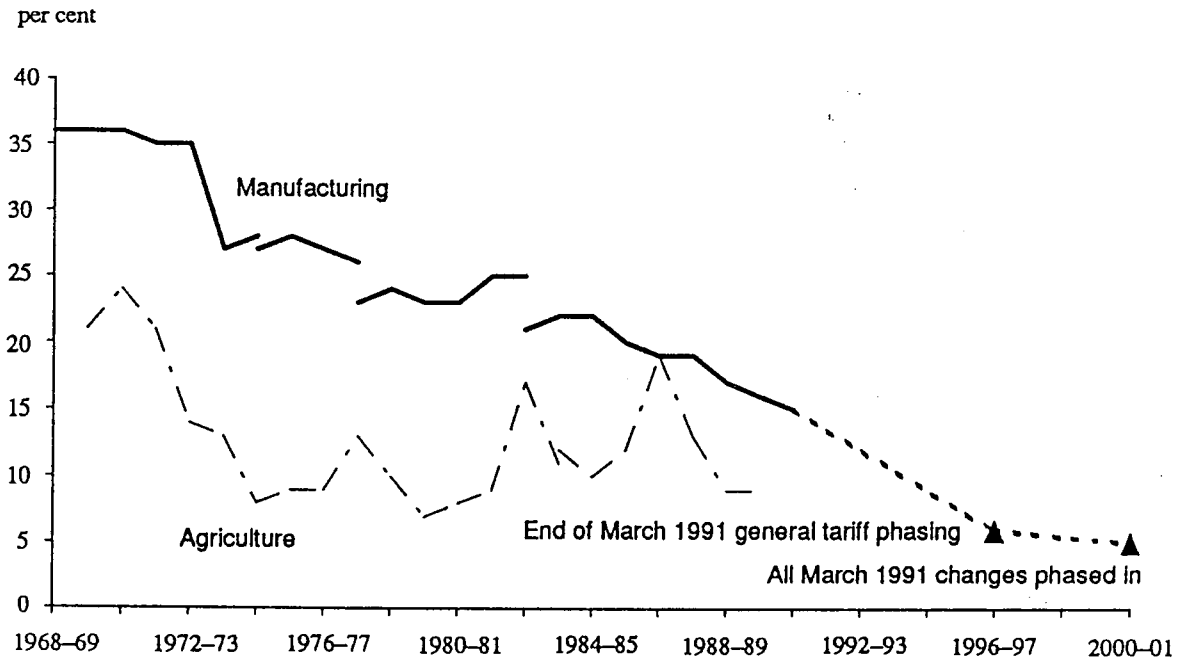
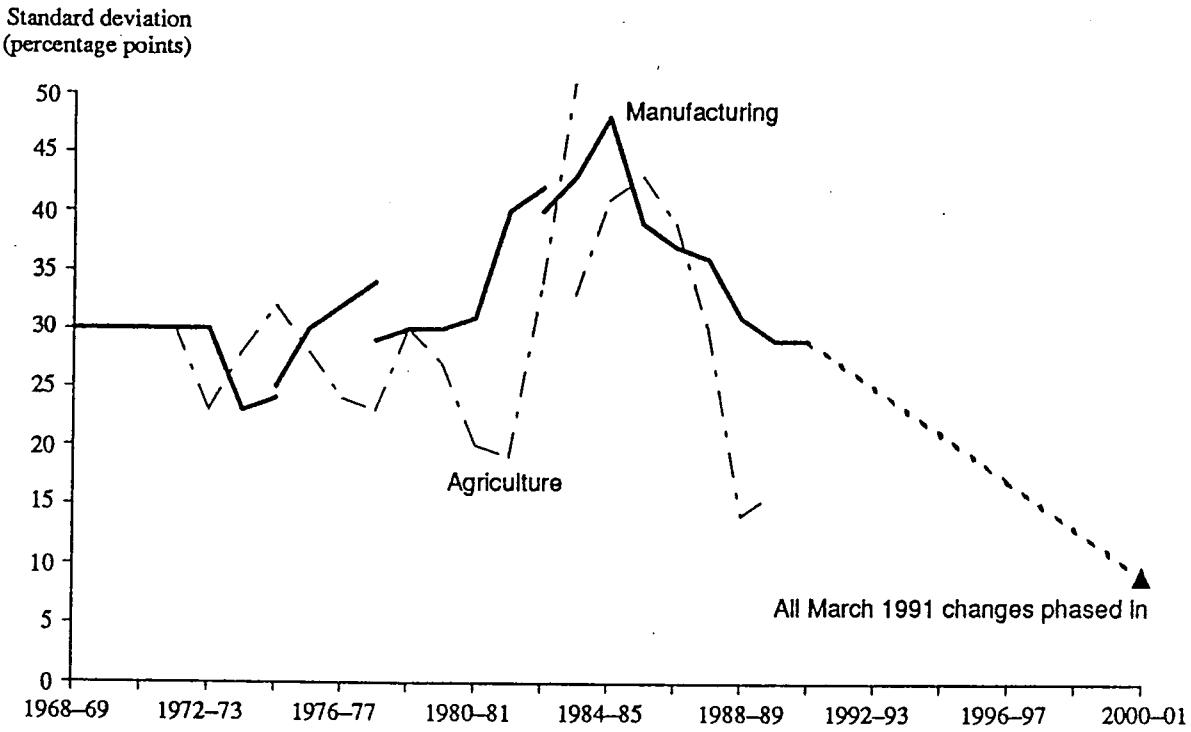
[1] The Australian Tariff Board, the predecessor to the Industries Assistance Commission began calculating effective rates of assistance in the mid 1960s, with the concept of effective rates of assistance outlined in an Appendix to its 1966-67 Annual Report.

Figure 1

A: Average effective rates of assistance for the manufacturing and agricultural sectors[a]



B: Disparities in effective rates of assistance for the manufacturing and agricultural sectors[a]



a The discontinuities in the series reflect the periodic rebasing of the estimates to account for changes in the structure of the sectors.

Source: Industry Commission estimates.

Information on effective rates of assistance have highlighted the position of those industries that are particularly highly assisted compared to others. Governments have thus had the information to enable them to focus debate and policy reform on those highly assisted industries. Measurement of levels of assistance has also been important because in the past the major forms of assistance for the highly assisted industries were through quantitative import restrictions whose effects were not always apparent to either the general public or to policy makers. Indeed, some industry advocates were known to call for assistance by way of quantitative restrictions in the mistaken view that, unlike high tariffs, such restrictions did not increase prices. In addition, quantification also enabled changes in levels of assistance to be monitored, particularly the automatic increase provided by quantitative restrictions on imports as the competitiveness of such highly protected industries declined.

The use of effective rates of assistance has become a common feature of the industry policy debate in Australia. Press reports often use the estimates made by the Industry Commission. A recent example was an article in the Australian Financial Review of 16 December 1991. The article, when referring to the recent increase in assistance to the Australian wool industry, said:

> The Commission put the effective rate of assistance to the wool industry in 1990-91 at 28 per cent, compared with about 3 per cent throughout the 1980s, and the nominal rate at 12 per cent compared with 1 per cent. The rise, which also reflected a big drop in the industry's revenue, moved wool up to the assistance level of the sugar and rice industries but still well below the heavily regulated dairy industry.[2]

In addition, ERAs have become a yardstick for measuring change.[3] In 1991, the Prime Minister said;

> By 1992 our existing programs will have slashed the nominal rate of assistance to the manufacturing sector by over one third, from 13% to 8%, and the effective rate from 22% to 12%.[4]

The published analysis by the Industry Commission of the changes to manufacturing industry assistance resulting from the Australian Government's March 1991 Industry Policy Statement provides an example of the use of effective rates and associated measures in the formulation and evaluation of reform proposals.[5]

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[2] Cathy Bolt, Eight-fold Jump in Wool Aid, *Australian Financial Review*, Monday 16 December 1991, p. 4.

[3] For a history of the Australian tariff policy debate, see: L. Glezer, *Tariff Politics, Australian Policy-making, 1960-1980*, Melbourne University Press, 1982; and G. A. Rattigan, *Industry Assistance: the Inside Story*, Melbourne University Press, 1986.

[4] Department of the Prime Minister and Cabinet, *Building a Competitive Australia, 12 March 1991, Statements by Prime Minister, Bob Hawke; Treasurer, Paul Keating; Industry Minister, John Button*, Australian Government Publishing Service, Canberra, 1991, p. 1.5.

[5] Industry Commission, *Changes to Manufacturing Industry Assistance March 1991*, Information paper, Australian Government Publishing Service, Canberra, 1991.

3 THE EFFECTIVE RATE OF ASSISTANCE

The ERA and associated measures, provide a comprehensive set of easy-to-grasp indicators of the influence of government trade and industry policies on industries in an economy.

3.1 Background to development of the ERA

The effective rate of assistance is an extension of the concept of the effective rate of protection which was developed in the 1960s from the study of the effects of tariffs and other trade taxes on resource allocation within a country. The major insight behind the effective rate concept, as spelt out by Corden in 1966, is that:

> Ordinary *nominal* tariffs apply to commodities, but resources move as between economic activities. Therefore, to discover the resource-allocation effects of a tariff structure one must calculate the protective rate for each activity, that is the *effective* protective rate. The effective protective rate is the percentage increase in value added per unit in an economic activity which is made possible by the tariff structure relative to the situation in the absence of tariffs but with the same exchange rate. It depends not only on the tariff on the commodity produced by the activity but also on the input co-efficients and the tariffs on the inputs.[6]

The key thing to note is that *effective* rates apply to activities. *Nominal* rates apply to commodities. Where a local producer supplies goods to the domestic market in competition with imported goods, a tariff on those imports assists the local producer by allowing him to increase prices on the domestic market. The tariff, however, penalises consumers and other producers that use the goods. Thus the benefit a producer receives on the goods he makes may be offset to some degree by tariff protection to local production of the materials, etc he uses. By taking into account both those effects, effective rates measure the net assistance provided by tariff protection.

The *effective rate of assistance* is closely related to the *effective rate of protection* in that both measure the net incentive facing activities producing tradeable goods. The main difference is that the effective rate of assistance includes not only border tariffs and taxes, but also non-border interventions that differentially influence the returns to value adding factors in an industry. In essence, the effective rate of assistance uses the same theoretical framework as the effective rate of protection but extends it to incorporate such non-border assistance as production bounties, input taxes and subsidies, special credit facilities, special depreciation allowances, special tax arrangements and the provision of industry-specific infrastructure. In this way it enables a more complete picture to be built up of the pattern of incentives on resource use in industries as a result of the totality of government intervention.

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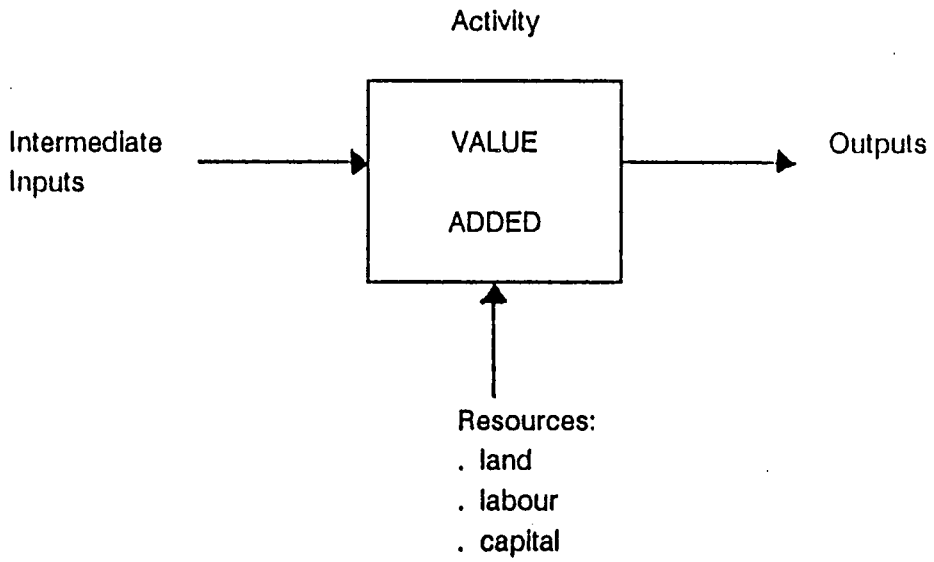
[6] W. M. Corden, The Structure of a Tariff System and the Effective Protective Rate, *The Journal of Political Economy*, vol. 74, no. 3, June 1966, p. 222.

3.2 Underlying concepts

Underlying the effective rate of assistance concept is a recognition that the production of goods and services, for either domestic consumption or export, is the result of separate economic activities in which purchases of intermediate inputs (either produced domestically or imported) are used together with scarce national resources to produce the activity's output. The production of goods and services is undertaken within individual firms. Industries, industry groups, sub-divisions and divisions of industries, are various levels of groupings of the firms that produce similar goods and services.

The net contribution of each activity or industry to the economy is the value added to the intermediate inputs by the use of resources in that activity or industry. This value added basis of economic activity is illustrated in Figure 2.

Figure 2: **Value added basis of economic activity**



The value added in an activity or industry may be measured directly from the returns received by land, labour and capital (that is returns to value adding factors). Alternatively it may be measured from the difference between the returns received from sales of goods and services and costs paid for intermediate inputs used to produce those goods and services.

The specific interventions used to implement Government trade and industry policies, such as tariffs and subsidies, typically operate on goods and services markets so as to change unit returns and/or costs. However, the decision to use resources in an activity depends on the returns achieved in that use relative to others. The incentive to use resources in a specific activity can be changed by intervention that alters any one of three things, namely:

(i) the returns received from outputs;

(ii) the cost of intermediate inputs used to produce those outputs; and

(iii) the returns to the specific use of resources (that is land, labour and capital) in the activity.

Typical examples of interventions that alter output returns are:

- domestic pricing arrangements
- export subsidies or taxes
- local content schemes
- production subsidies
- quantitative import restrictions
- tariffs
- variable levies
- voluntary export restraints

Typical examples of interventions that alter intermediate input costs are:

- commodity taxes
- input subsidies
- local content schemes
- tariffs

Typical examples of interventions that directly alter returns from using resources in particular activities are:

- concessional credit
- income tax concessions
- special depreciation allowances
- special employment allowances

3.3 Measurement of assistance

For measurement purposes, it is convenient to summarise the various forms of assistance into three groups on the basis of their effects on output returns, intermediate input costs and value added. Separate measures have been developed for each (see separate boxes).

Box 1: **Output assistance**

The output assistance provided by Government interventions is the increase in the gross returns from production above that which would apply in the absence of assistance. The gross returns from production with assistance is called the assisted value of production (AP). The (hypothetical) gross returns from that production without assistance is called the unassisted value of production (UP). The increase in the gross returns is called the gross subsidy equivalent (GSE). It is the notional amount of money that would give the same amount of assistance to gross returns as is provided by the existing government interventions.

$$GSE = AP - UP$$

The Nominal Rate of Assistance on outputs (NRA) is the percentage increase in gross returns per unit of output, relative to the (hypothetical) situation of no assistance.

$$NRA = (GSE/UP) * 100$$

Some interventions assist by raising prices (for example, tariffs) while others increase returns without increasing prices (for example, production subsidies).

Box 2: **Intermediate input assistance**

Intermediate inputs are a cost of production. Government interventions, such as tariffs, typically raise these costs. The cost of intermediate inputs with assistance is called the assisted value of intermediate inputs (AM). The (hypothetical) cost of those intermediate inputs without assistance is called the unassisted value of intermediate inputs (UM). The increase in the cost of intermediate inputs is called the tax equivalent on intermediate inputs (TEM). It is the notional amount of tax that would increase the cost of intermediate inputs by the same amount as the existing government interventions.

$$TEM = AM - UM$$

The Nominal Rate of assistance on intermediate inputs (NRM) is the percentage increase in the cost of intermediate inputs per unit of input relative to the (hypothetical) situation of no assistance.

$$NRM = (TEM/UM) * 100$$

Some interventions raise the price of intermediate inputs (for example, tariffs) and some lower their cost (for example, subsidies to users). Measures which assist the production of intermediate inputs without altering their price to user industries (for example, production subsidies) are not included.

Box 3: **Value added assistance**

The assistance effects of government interventions that directly and specifically target land, labour or capital returns in particular activities may be measured as the notional amount of money, or subsidy equivalent, necessary to yield the same increase in returns to the land, labour or capital used in the activity or industry, as is provided by the assistance. This is called the Subsidy to Value Adding Factors (SVA). Interventions that apply generally to the use of resources throughout an economy (for example, income and value added taxes) are not included.

Box 4: **Net assistance and the effective rate of assistance**

The net assistance effect of government interventions on the use of resources in an activity, or industry, may be measured by the notional amount of money, or subsidy equivalent, necessary to provide the same increase in returns to value adding factors as is provided by the existing structure of assistance. The returns to value adding factors, including the effect of assistance, is called the assisted value added (AVA). The (hypothetical) returns to those value adding factors without assistance is called the unassisted value added (UVA). The increase in returns to value adding factors is called the Net Subsidy Equivalent (NSE) and may be derived by adding up output assistance and value added assistance, and subtracting the tax from intermediate input assistance.

NSE = AVA - UVA or
= GSE - TEM + SVA

The Effective Rate of Assistance (ERA) is the percentage increase in returns, to an activity's, or industry's, value added per unit of output, relative to the (hypothetical) situation of no assistance.

ERA = (NSE/UVA) * 100

The net incentive effect of all forms of intervention on the use of resources in a particular activity is indicated by adding up their assistance effects. This net assistance is known as the Net Subsidy Equivalent (NSE) because, in principle in the absence of assistance, it is the amount of subsidy that would have to be paid to value adding factors to provide them with the same returns as is currently provided by the existing structure of industry assistance. The NSE depends on the size of the industry as well as the rate of assistance. The effective rate of assistance (ERA) expresses the NSE as a percentage of unassisted value added and can be used to compare levels of assistance between activities and over time to indicate the net incentive effect on the use of resources in different activities.

As indicated in the box, nominal rates of assistance may be calculated for intermediate inputs used in an activity as well as for outputs from an activity. It is usual, however, when mentioning nominal rates to be referring to the average nominal rate of assistance on outputs. The ERA is the more complete measure of the net incentive effect of interventions on the use of resources in an activity.

In practice in Australia, there is a strong correlation between nominal rates of assistance to outputs and effective rates of assistance within a sector, but the relationships differ between sectors (see Attachment 3). The strong correlation between nominal and effective rates may suggest that it is sufficient to calculate nominal rates on output and avoid the added costs involved in calculating intermediate input and value added assistance. This would be broadly true if the concern was only with a broad ranking of industries within a sector and there was no interest in the detail of the provision of assistance to industries or of the cost and relative resource-use effects of that assistance[7]. It is these added insights for policy making and, if not assessed, the ability to substitute input assistance for output assistance that justify the added costs of measuring effective rates.

The direct taxing effect on consumers, of government interventions to assist an activity, depends on the price effects of the output assistance provided to the activity and the importance of local supplies in total consumer expenditure. Forms of assistance, such as production subsidies, which raise producer returns without raising prices have no direct taxing effect on consumers. However, forms of assistance such as tariffs, which raise producer returns by raising prices, tax consumers. The tax on consumers may be significantly larger than the subsidy to producers if domestic production supplies only a small share of consumer demand. This arises because the cost to consumers is made up of higher priced local products plus higher priced (tariff-inflated) imports.

Within a country, relatively high levels of effective assistance to an activity indicate that extra returns are provided to the use of resources in the activity. This encourages additional resources into the activity to expand output or, alternatively, allows resources to be retained in the activity when they could yield more wealth if they were used elsewhere in the community. This misallocation of resources will reduce the potential for economic growth and associated gains in community welfare. An important feature of measuring assistance is to indicate differences (disparities) in levels of assistance between and within industries. The larger the disparities in levels of effective assistance, the greater the potential for resources to be used in activities that do not maximise economic welfare. In addition, wide disparities in nominal rates between goods are indicative of the potential for losses of consumption efficiency.

Between country comparisons of ERAs should be done with a great deal of care. This is because there is no necessary link between the absolute level of effective assistance for an industry and its comparative advantage. At the conceptual level for example, an industry may have a high ERA in one country and a low ERA in a second. Yet the high ERA in the first country could be low relative to the overall level of assistance in that country and the low ERA in the second country could be high relative to the overall level of assistance in that country. In this situation, international resource-use efficiency may be encouraged by lowering

[7] A similar point has been made previously by Corden in relation to protection, see W. M. Corden, 'The Costs and Consequences of Protection: A Survey of Empirical Work', in P. B. Kenan (ed), *International Trade and Finance, Frontiers for Research*, Cambridge University Press, 1977, p. 65.

the already low level of effective assistance on the second and increasing (or preferably lowering the general level of assistance to other industries) in the first. For countries with similar overall levels of effective assistance, such interpretation difficulties are less likely to be a problem. Such difficulties of interpretation are not unique to international comparisons of ERAs, but apply equally to other partial-equilibrium based measures such as levels of tariffs and producer subsidy equivalents.[8]

3.4 Aggregation of industry assistance measures

A feature of using a net measure like value added to indicate the net contribution of an activity to an economy is that the contribution of groups of activities, such as industries, and sub-divisions and divisions of industries, may be derived by simple addition. In like manner, the net subsidy equivalent of assistance to groups of industries may be derived by simple addition. Aggregated ERAs may therefore be derived from sub-totals and totals of net subsidy equivalents and unassisted value added, or as is more usually done in practice, from unassisted value-added-weighted averages of individual ERAs. This means that the interpretation of net subsidy equivalents and ERAs are not influenced by the level at which the estimates are made.

The interpretation of output measures of assistance such as gross subsidy equivalents and input measures of assistance such as tax equivalents on intermediate inputs however, are dependent on the level at which estimates are made. This is because with sales and purchases between industries within the group, the output and input of the group as a whole are less than the sum of individual industry outputs and inputs. Thus the gross subsidy equivalent of output assistance to, say, the textiles and clothing industries as a whole is less than the sum of the individual industry gross subsidy equivalents. Only where there are no inter-industry sales within the group would the two coincide. By way of contrast, the net subsidy equivalent and ERA are net measures. The inter-industry effects of assistance have been netted out in their derivation.

3.5 Underlying assumptions

While the concept of effective assistance is general, the practical application of that concept involves a number of simplifying assumptions. In particular, the ERA and associated measures are derived using static, partial-equilibrium assumptions. These focus attention on the initial impact of interventions on prices, costs and returns. This is both a source of strength and weakness. A strength is that they provide a comprehensive and coherent framework which minimises the data requirements for the measurement and amalgamation of the assistance effects of the many different forms of government intervention. A

[8] The relationships between ERA measures and producer subsidy equivalent measures are set out in Attachment 6.

weakness is that they do not portray the behavioural responses of those initial impacts. For example, while the ERA and associated assistance measures indicate the income transfers associated with interventions, they do not indicate changes in supply and demand of particular commodities nor more general equilibrium effects, such as changes in the balance of payments, and the exchange rate. The data used to derive ERAs, is only a small subset of the more comprehensive data required to portray such effects.

The major assumptions used in measuring ERAs are briefly outlined below. Violations of those assumptions do not necessarily invalidate ERAs as a measure of net assistance for comparative purposes, but they do emphasise the approximate nature of the estimates and that for policy purposes, no great significance should be attached to small differences in estimates.

(i) perfect substitution between domestic and foreign goods of the same description. This assumption allows the assistance effects of border interventions, and other policies such as domestic pricing schemes, to be measured from comparisons of domestic or landed duty paid prices with landed duty free prices of similar goods for import-competing goods and from comparisons of domestic with export unit returns for exported goods. To the extent that the similar goods chosen for the comparisons are less than perfect substitutes, the assistance effects of the interventions would be over-estimated.

(ii) no substitution between nominally different goods. To the extent that different goods substitute for each other, the assistance to one product can affect the level of assistance to another. For example, assistance which increases the price of a good will divert demand toward a close substitute. The substitute indirectly benefits from the assistance through this increased demand. Conversely competition from close substitutes which may be unassisted can undermine the assistance to a particular product.

(iii) infinite elasticities of export demand and import supply. This is often called the 'small country assumption', and means that the demand for imports and the supply of exports do not affect the world price of goods. This assumption does not hold if changes in the quantity of exports, or changes in the demand for imports are large enough to alter the world price. This can be a serious limitation of once-only estimates, but when estimates are made regularly to monitor policy reform there is an automatic adjustment to changes in benchmark prices and hence to the estimates as a result of such things as aggregate shifts in world trade supply and demand.

(iv) the direction of trade in the absence of assistance can be assessed, with import-parity prices forming the benchmark for goods assessed to be import competing and export-parity prices for export goods. Often the stronger assumption of the existing trade orientation is used for assessing the direction of trade. In Australia's experience, the direction of trade assumption is likely to be a contentious issue for only a very few export commodities whose production has been highly assisted. Like the small

country assumption, this is less of a problem if estimates are made regularly and responses to policy changes are incorporated.

(v) in the absence of assistance, prices of goods, services, and factors, represent their opportunity cost to the community. This implies that there are no price or quantity distortions in the domestic market other than those included in the analysis. If major sources of assistance are excluded from the effective rate measure, then judgments as to the relative levels of assistance between industries can be biased;

(vi) production relationships between inputs (that is, intermediate inputs and primary factors) are unchanged by the structure of assistance. This can be a serious limitation as high assistance to an activity is often provided to sustain existing operations so as to avoid the rationalisation of an industry to a more appropriate role in the economy using more appropriate technology. It is also unrealistic to the extent that a high tariff on a particular material input is likely to cause users to substitute toward the greater use of alternative less highly assisted materials. Nevertheless it does emphasise the cost of maintaining existing production relationships. Changes in the relationships are incorporated automatically if estimates are made regularly to monitor progress and databases are updated as part of that process.

In agriculture, production relationships are typically unstable as a result of the influence of such things as climatic factors on yields. To reduce the impact of such fluctuations on ERA estimates, the production relationships in Australia have typically been derived from an average of five or 10 years production data. Also in agriculture, assistance has typically been provided in counter-cyclical forms. This has further reinforced the difficulty of drawing conclusions based on a single years estimates and emphasised that it is more useful to look at the estimates for a number of years. For example, in Australia assistance to dairying and tobacco growing has fluctuated around high levels, while for the meat, wheat and wool industries the fluctuations have been around low levels.[9]

The use of import-parity and export-parity prices as benchmark prices essentially emphasises the opportunity cost of protecting certain domestic production. As such, it does not require the assumption of perfect competition in the world market, simply that the actions of a single country cannot influence world prices. In this situation, it does not matter whether world prices are influenced by fundamental market forces or the protective action of foreign governments. A country would maximize its own resource-use efficiency by purchasing from the cheapest source, and selling at the world price. If countries individually pursued this objective, it would also automatically ensure enhanced global resource-use efficiency.

[9] Until the recent collapse of the wool market and Australia's floor price scheme, wool had received relatively little assistance.

The subsidy and tax equivalent measures associated with effective rates indicate how some groups in the community benefit from assistance at the expense of others. However, they do not measure the economic or welfare costs to the community of assistance. Such costs depend on the behavioural responses to individual interventions and the misallocations of resources in production and of consumption so induced. Measurement of these would require considerable data on elasticities of supply and demand.

For changes that involve significant economy-wide effects, more complete assessment should preferably involve general-equilibrium models. For example, the removal of trade barriers is likely to lead, in the short run, to balance of payments deficits which would lead to a devaluation of the currency. This devaluation, by raising import and export prices in terms of the local currency, would partly offset the loss of assistance to exporting and import-competing industries. General-equilibrium models can be used to illustrate these effects.

3.6 Tradeable and non-tradeable inputs

In practice intermediate inputs are treated as tradeable or non-tradeable on the basis of the influence of world prices on domestic prices. The measurement of the assistance effects of government interventions have typically been limited to tradeable inputs, as the purpose of such interventions has been to isolate domestic activities in some way or other from full exposure to world trade. World trade prices provide accessible unassisted benchmark prices for measuring the assistance effects of domestic interventions. In principle, interventions that directly affect the availability and price of non-traded intermediate inputs to specific activities could readily be incorporated in the ERA framework. However, there is the practical difficulty of quantifying the extent of assistance provided.

In the theoretical literature there has been a discussion of the relative merits of alternative treatments of non-traded intermediate inputs.[10] One initial method, associated with Corden, was to treat non-traded intermediate inputs as a component of value added. The other, associated with Balassa, was to treat non-tradeable inputs as tradeables with a zero tariff. Both were subsequently modified to account for the effect on the user cost of non-traded intermediate inputs of assistance to their tradeable input content. In the case of Corden, by including the tradeable content as traded input and the primary factor content of non-traded inputs with value added. In the case of Balassa by recognising the assistance provided to the tradeable input content of non-traded intermediate inputs. In effect, the Corden method measures the net incentive effect of the assistance provided relative to resources used both directly and indirectly in the

[10] W. M. Corden, 'The Costs and Consequences of Protection: A Survey of Empirical Work', in Peter B. Kenen (ed), *International Trade and Finance, Frontiers for Research*, Cambridge University Press, 1977.

activity whereas the Balassa method measures it relative to the resources used in the specific activity alone.

Implicit in both methods is the view that the price to user industries of non-traded intermediate inputs reflects the full cost of the efficient provision of such goods and services. On this basis, the effect of intervention on the costs of traded inputs would be fully reflected in the prices of their output. In practice many of the major non-traded intermediate inputs are provided by government business enterprises, such as postal, power and telecommunications services, and their prices may not reflect true costs of efficient provision.

In Australia, for measuring assistance to manufacturing, non-traded material inputs, such as electricity, are included with traded inputs and assigned a zero tariff. Because data are not readily available, the non-traded, non-material inputs, such as accounting services, are by default included with value added (see Attachment 1, section A1.1.9). This simplifies calculations and, while sensitivity analyses show that the different treatments of non-traded intermediate inputs could have a significant effect on estimated levels of ERA a few activities (for example aluminium smelting), it has little effect in general on the relative ranking of different industries.

3.7 Tradeable capital

Capital input, such as plant and equipment, are often as tradeable as other intermediate inputs, such as raw materials. Government interventions can differentially assist activities by directly influencing the cost to user industries of such tradeable capital. In Australia this has been recognised by its inclusion in the ERA measurement systems for the more capital intensive agricultural and mining industries. In these systems the assistance effect of intervention on tradeable capital is derived from its effects on the user cost of capital and included as part of the net subsidy equivalent. Sensitivity analysis indicates that while the inclusion of tradeable capital can have a significant effect on the estimated level of ERA for some activities, it has little effect on the overall level and on the relative ranking of different industries. For example, the omission of the effect of assistance on tradeable capital is estimated to change the measured average ERA for the agricultural sector for 1989-90 from 8.4 to 9.2 per cent.

3.8 Application of the ERA framework

The practical application of the ERA framework for the measurement of industry assistance requires:

- detailed data on the sales and cost structure of industries;
- identification of the government interventions that alter output returns, intermediate input costs, or directly favour the use of resources in particular activities; and

- measurement of each intervention on a common basis so that it can be included in the calculation of ERAs.

3.8.1 Data bases on industry sales and cost structures

The choice of industry sales and cost structures for estimating ERAs depends in part on the purpose for calculating them and in part on the availability of suitable data.

In Australia ERAs have been used by the Industry Commission and its predecessors as part of their statutory function to report annually to Parliament on assistance to industry and the effects of that assistance. Also ERAs have been used by the Commission as an aid to the review and formation of advice on assistance to specific industries under general policy guidelines, specified in the *Industry Commission Act 1989*. These guidelines include the wish to encourage the development and growth of industries that are efficient in their use of resources, self reliant, enterprising, innovative and internationally competitive.[11]

Given the industry policy focus of its work and the importance of disparities in assistance for indicating distortions in resource use, the Commission has tried to choose data bases that allow consistent estimates to be presented at the most detailed level practicable through time. For its estimates of ERAs to manufacturing industries, the Commission has used the detailed industry data made available from the Australian Bureau of Statistics' (ABS's) censuses of manufacturing establishments. This has resulted in estimates at the 4-digit level of the Australian Standard Industrial Classification (ASIC) for 167 industries. Details of the methods used are given in Attachment 1.[12]

For its estimates of ERAs to agricultural commodities, the Commission has used the ABS's estimates of local value of output of individual commodities and derived cost structures for their production from the Australian Bureau of Agricultural and Resource Economics' farm survey results. For its mining estimates, the Commission has used its own disaggregation of mining industries from the aggregated industries given in the ABS's Input-Output table of the Australian economy.

The differences in readily available data bases at a disaggregated level has meant that the Commission has highlighted disparities of assistance between industries within sectors and suggested that caution should be used when making direct comparisons between individual industries in different sectors. This is because small differences in estimates could reflect differences in data bases and the scope of interventions included in the estimates, rather than real differences in the incentives to use resources in different activities.

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[11] Australia, *Industry Commission Act 1989*, S 8 & S 45.

[12] Industries Assistance Commission, *Assistance to Manufacturing Industries: 1977-78 to 1982-83*, Information paper, Australian Government Publishing Service, Canberra, 1985; and Industries Assistance Commission, *Assistance to Agricultural and Manufacturing Industries*, Information paper, Australian Government Publishing Service, Canberra, 1987.

3.8.2 Coverage

In practice it is not possible to obtain the information required to include all forms of government intervention that could have a direct bearing on returns to land, labour and capital used in each activity. Attention is therefore usually focussed on interventions considered to have a major impact.

In Australia the ERA estimates incorporate a wide range of Commonwealth interventions. However, they do not cover all interventions that could be important for specific industries or sectors. Excluded currently, due to data limitations, are interventions such as anti-dumping procedures, pricing of infrastructure services and assistance provided by State and local governments. Sensitivity analyses indicate that these could have a significant effect on the measured assistance to some industries. While such assistance has not been included in the Industry Commission's regular economy-wide estimates, it has been included in some detailed industry specific measures for particular industries.

Research has shown that, for agriculture, the inclusion of State Government budgetary outlay would substantially increase the estimated levels of assistance.[13] For 1984-85, the latest year for which information is available, it is estimated that the inclusion of State Government budgetary outlays would increase the measured ERA for agriculture from 10 per cent to 19 per cent. No comparable analyses have been made for manufacturing. However, in view of the size of manufacturing industries and relevant budget outlays, State Government assistance is likely to be less important.

In general, the industry Commission has chosen to restrict coverage of forms of assistance for its annual estimates to those for which soundly-based estimates can be made on a continuing basis. Separate comment is made on those that have transitory effects or for which the estimation of the assistance effects is speculative.

3.8.3 Points of measurement

In Australia, given the detailed level at which estimates of assistance to agriculture and manufacturing are currently made and the data on which they are based, value added is measured by deducting intermediate input costs from the returns to outputs. For manufacturing, as far as practicable, returns to outputs are measured on an ex-factory basis. Similarly for agriculture, as far as practicable, returns are measured on an ex-farm basis. For mining some of the returns to mineral deposits are appropriated directly as royalties and those are reflected in industry output and value added estimates. Other mineral returns, however, are appropriated beyond the mine site. For example, some rail charges for black coal have been acknowledged to include a mineral return component.

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[13] Industries Assistance Commission, *State Government Assistance to Agriculture*, Australian Government Publishing Service, Canberra, April 1988.

In this case an attempt has been made to identify and measure such mineral returns and to adjust ex-mine and value added data accordingly.

On the input side, costs are measured on a cost to manufacturer, cost to farmer and cost to miner basis.

Many of the interventions that penalise and benefit industries do not operate directly at the factory, farm or mine level. Thus it is necessary to translate the effect of such interventions, into returns and costs at the factory, farm and mine.

3.8.4 Calculation of an ERA: A worked example

The relationship between the main components of the ERA and the sources of data is illustrated in Box 5 by a worked example based on the Australian Iron and Steel industry as it was in the mid 1980s.

Box 5: **A worked example: Australian iron and steel industry**

Calculation	*Value ($m)*	*Data source*
Value of output	5174.0	Sales and transfers out (adjusted for selling and distribution expenses) for the 3-digit ASIC (Australian Standard Industrial Classification) 'Basic iron and steel' industry from the manufacturing census conducted by the Australian Bureau of Statistics (ABS).
• Production subsidies	19.3	Subsidies paid to producers of goods comprising the 3-digit 'Basic iron and steel' industry. Data taken from government budget papers.
• Export incentives	1.6	Export incentives paid for market development and promotion to producers of 'Basic iron and steel'. Data from government budget papers and the Board responsible for administering the Schemes.
• Special labour adjustment	2.0	Payments made under special Government plan for restructuring the industry.
(1) Assisted value of output (AP)	5194.9	Value of output plus the value of subsidies and export incentives.
(2) Less inputs (AM)	3364.7	Materials and fuels used by 3-digit ASIC industry 'Basic iron and steel' from the manufacturing census conducted by the ABS.

Box 5: **A worked example: Australian iron and steel industry (cont'd)**

(3) Assisted Value Added (AVA)	1832.2	AP - AM = AVA
Output Assistance		
• Tariffs	406.2	The subsidy equivalent of tariffs derived from General tariff rates applying to competing imports of 'Basic iron and steel'. Requires the construction of a concordance between 'Basic iron and steel' product groups (used by the ABS to collect manufacturing census data) and the Customs tariff - the GSE for each product group is derived by subtracting from each group's value of output, its 'unassisted' value. The unassisted value is estimated by deflating each group's assisted value of output by its average nominal tariff rate. The GSE for the 'Basic iron and steel' industry is the summation of each product groups' GSE.
• Production subsidies	19.3	(from above)
• Export incentives	1.6	(from above)
(4) Gross subsidy Equivalent (GSE)	427.1	Subsidy equivalent of tariffs + Production subsidies + Export incentives.
(5) Unassisted Value of Output (UP)	4767.8	AP - GSE = UP

Nominal rate of assistance on output (NRA)
NRA = 100 * (4) / (5) = 9.0 per cent

Intermediate input assistance		
• Tariffs on materials	208.3	The TEM of tariffs derived from General tariff rates (adjusted for concessional tariff entry of imported inputs) applying to competing imports of material and fuel inputs used in the 'Basic iron and steel' industry. Requires the construction of a concordance between 'Basic iron and steel' material group (used by the ABS to collect manufacturing census data) and the Customs tariff. The TEM for each material group is derived by subtracting from each group's assisted value of materials and fuels used, its 'unassisted' value (estimated by deflating each group's assisted value by its average nominal tariff rate). The TEM for the 'Basic iron and steel' industry is the summation of each material group's TEM.

Box 5: **A worked example: Australian iron and steel industry (cont'd)**

(6)	Tax Equivalent on Intermediate Inputs (TEM)	208.3	
(7)	Unassisted value of Intermediate Inputs (UM)	3156.4	(2) -(6) AM - TEM = UM

Nominal rate of assistance on intermediate inputs (NRM)
NRM = 100 * (6) / (7) = 6.6 per cent

Value added assistance

•	special labour adjustment	2.0	Data from government budget papers.
(8)	Subsidy to value added (SVA)	2.0	
(9)	Unassisted Value Added (UVA)	1611.4	(5) - (7) UP - UM = UVA
(10)	Net Subsidy Equivalent (NSE)	218.8	(3) - (9) or (4) - (6) + (8) AVA - UVA or GSE - TEM + SVA

Effective rate of assistance (ERA)
ERA = 100* (9) / (8) = 14 per cent

4 THE INDUSTRY COMMISSION'S MANUFACTURING EFFECTIVE RATES MEASUREMENT SYSTEM

4.1 Introduction

In Australia monitoring assistance provided to manufacturing industries using the ERA framework was initiated by the Tariff Board in the mid-1960s. A time series of nominal and effective rates of assistance for manufacturing industries measured on a consistent Australian Standard Industrial Classification (ASIC) basis is available from 1968-69 (see Figure 1 and Table A1.1 in Attachment 1).

The emphasis in measuring assistance to manufacturing industries has been on the measurement of assistance provided by the Commonwealth Government and on consistency of treatment between industries within the sector. Initially measurement concentrated on tariff protection and associated measures of assistance. Over the years the forms of assistance included have expanded as new measures have been introduced and the relative importance of different forms of assistance have changed. Currently included in the manufacturing system are:

- tariffs
- quantitative import restrictions
- discriminatory sales taxes
- export incentive grants
- local content schemes
- By-law (or Commercial Tariff Concession Orders)
- discriminatory domestic pricing arrangements for agricultural commodities
- duty-drawback
- excise

A general discussion of the treatment of different forms of assistance is contained in Attachment 2. Systematic procedures used to include measures of tariff and certain non-tariff forms of assistance in the manufacturing effective rate system are discussed in Attachment 1.

Excluded from the estimates are measures that apply generally to activities in all sectors, such as income tax or that apply to all industries within the manufacturing sector, such as the deductability for tax purposes of certain expenditure on research and development. Other forms of assistance are excluded because they are particularly difficult to quantify, such as civil offsets and government purchasing preferences, or because of the lack of adequate data,

such as defence procurement. In addition, the impact of some have been considered to be too small to warrant devoting the resources necessary for their inclusion, such as government funding of industry extension services.

Also excluded currently are the tariff penalties on capital items and the assistance affects of anti-dumping actions.[14] Finally, no allowance has been made for changes in the prices currently paid for government provided services, such as electricity, that might result from a more competitive economic environment. With tariffs falling in Australia, there is increased emphasis on some of these alternative measures.

The manufacturing effective rates system is run on a Hitachi Data Systems (HDS) 6650 (formerly NAS 6650) mainframe operating under IBM's VM/CMS operating system. The estimates for the sector are updated once a year and published in the Commission's annual report. The assistance estimates are also used as an input into particular industry inquiries, such as the recent Commission inquiry into dairying.[15] In addition, the system has been used to project the effects of various tariff reduction programs on assistance to the manufacturing sector, such as for the May 1988 Economic Statement and for the March 1991 Industry Policy Statement.[16] Nominal rates calculated by the system are also used to form 'price shocks' in the Commission's general equilibrium modelling to measure, for example, the economy-wide effects of assistance changes.

4.2 Overview of the system

In designing the current manufacturing effective rate system, the main purpose was to produce a flexible and efficient computer-based system for measuring assistance to manufacturing industries. It was also important that the system could be added to with little difficulty as the coverage of forms of assistance changed and, once in place, could be easily accessed at outposted terminals by a number of users.

The assistance estimates are calculated at the 4-digit level of ASIC and those estimates are aggregated to the 3-digit and 2-digit levels of ASIC and for the sector as a whole. The flow chart below and accompanying notes provide an outline of the system and the processes involved. A more detailed description of the system is contained in Attachment 1.

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[14] The coverage of forms of assistance is broader in agriculture than for manufacturing, with the inclusion in the agricultural estimates of assistance to value adding factors (eg income tax concessions, research and development grants and concessional credit). These forms of assistance, however, tend to be less important for manufacturing industries. Tariff penalties on capital inputs are also included for agriculture (see discussion in section 3.7 on tradeable capital).

[15] Industry Commission, *Australian Dairy Industry*, Report No. 14, AGPS, Canberra, 1991

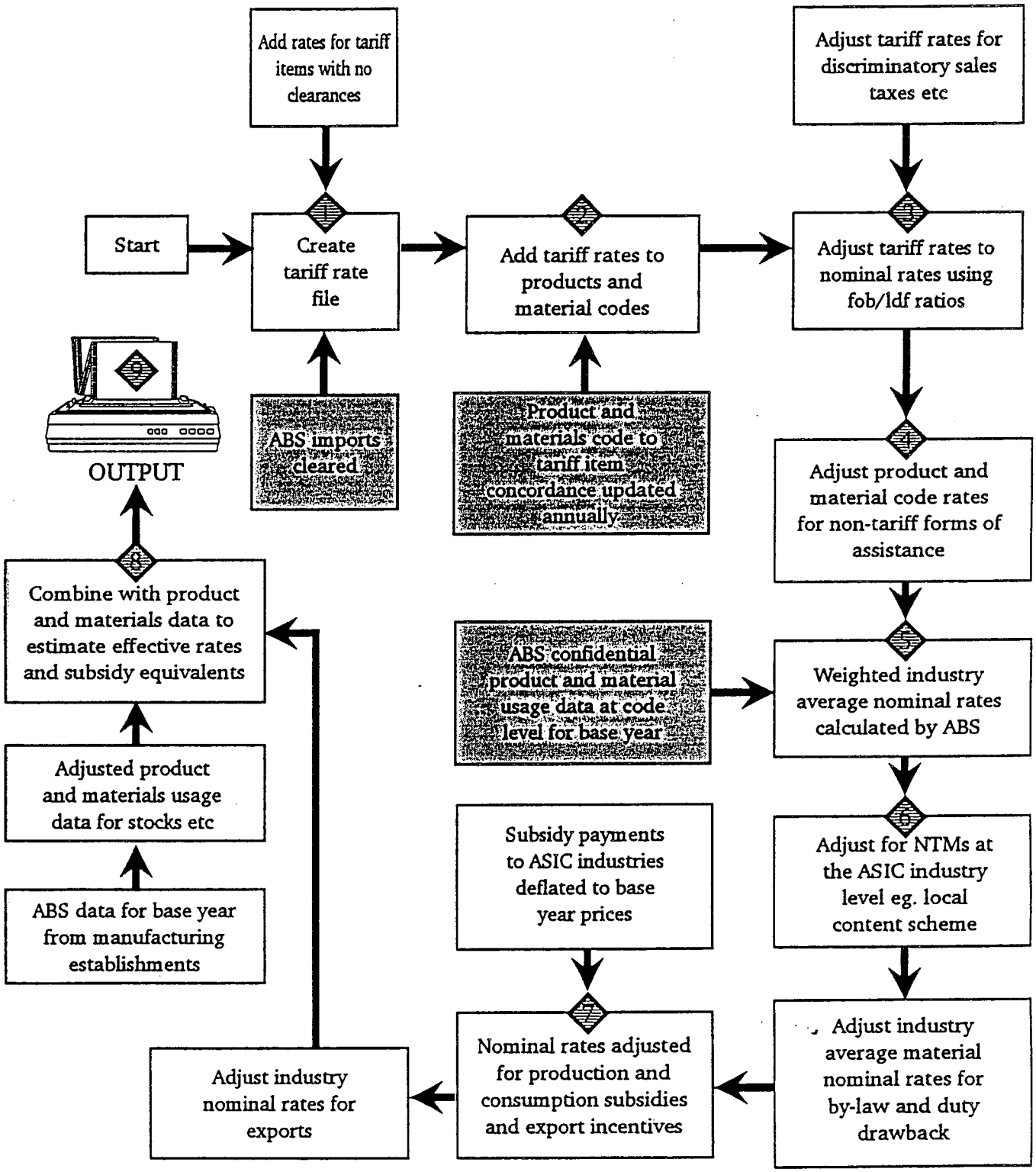
[16] Treasurer of the Commonwealth of Australia (P. J. Keating), *Economic Statement May 1988*, AGPS, Canberra, 1988; and Australia, Department of Prime Minister and Cabinet, *Building a Competitive Australia*, (op. cit.).

The system is based on a detailed census of manufacturing establishments from which is identified the articles produced by and materials used in each 4-digit ASIC industry. Reflecting the importance of tariff protection to manufacturing, and fundamental to the system, are two large concordances developed and maintained by the Commission. One relates each significant article produced by a 4-digit industry to the particular tariff item or items that the article would be classified to if imported. The other relates each significant material used by a 4-digit industry to the particular tariff item or items that the material would be classified to if imported. From the tariff rates applicable to each item are derived nominal rates of assistance for each article produced by and each material used in each 4-digit ASIC industry. These basic estimates of tariff protection are replaced, added to or modified when other forms of assistance apply. For example, where quotas apply, the basic tariff is replaced by the calculated tariff equivalent of the protection provided by the quotas. For some forms of assistance, such as production subsidies, it is more convenient to add the assistance provided at the industry level rather than the basic commodity level.

The nominal rate of assistance to the articles produced by and materials used in each 4-digit ASIC industry are derived from weighting together the individual product and individual material nominal rates. As much of the data on the production and usage of individual commodities at the 4-digit ASIC level is confidential to the ABS in Australia, this weighting together of individual product and material assistance is undertaken by the ABS for the Commission.

The weighting is on the basis of unassisted values. The individual weights used in each industry are derived from census values that have been deflated by the assistance provided in a base year. The base year is updated every four to five years when data from a new detailed census becomes available. As indicated above and in the flow chart, industry nominal rates calculated by the ABS for the Commission are subsequently modified for forms of assistance that are more convenient to include at the industry level.

ERA CALCULATION FLOWCHART



NOTES ON THE FLOW CHART

Step 1
Tariff rate file created from the Customs Schedule recording the General rates of duty for all tariff items operating throughout the year. The file records rate changes as well as 'deaths and births' of tariff items and the month of these changes. Duty rates on the tariff rate file exclude the excise component of the tariff for goods excisable if produced locally. Only the protective margin of the tariff is included. The total rate (base duty plus quota rents) is recorded for goods subject to import quotas. For rates containing a specific component, ad valorem rates are usually calculated from ABS import data by dividing duty paid on general sourced imports by their fob value.

Step 2
A concordance is constructed between significant output and material codes (used by ABS to collect manufacturing census data for ASIC industries), and the Customs schedule (used to set tariffs on competing imports). This involves a matching of ABS commodity code descriptions with the tariff item descriptions to ensure that significant items are included in the concordance. Weights (based on domestic production patterns for output and usage patterns for material codes rather than on the composition of imports) need to be assigned for most codes as more than one tariff item will usually be relevant. The concordance is continually updated using tariff histories.

Step 3
Tariff rates (fob based) are converted to nominal rate (ldf based) equivalents using a file of vfd/cife ratios at the tariff item level supplied by ABS.

Step 4
Override duty rates at the commodity code level to take account of such factors as:

- discriminatory sales tax
- exported goods
- non-traded goods
- excisable materials (mainly petroleum products)
- certain agricultural pricing arrangements

Step 5
Because much of the data on the value of production and material usage at the code level is confidential under Australian law, nominal rates derived by the IC for each code are weighted annually by the ABS to derive average nominal rates at each industry (4-digit ASIC) level. To do this, floppy disks containing both nominal rates for product and material codes are sent to the ABS by the Commission. Weighted average nominal rates for products and materials at the ASIC industry level calculated by the ABS are returned to the IC.

Step 6
Some complex industry specific arrangements are more easily incorporated at the 4-digit ASIC industry level. For example, certain agricultural pricing arrangements (eg. dairying) and the assistance arrangements applying to motor vehicles are entered as overrides at this stage.

Step 7
Assistance afforded by current rates of production subsidies and export incentives is incorporated using fixed base year production patterns. Allowance is also made for concessional By-law imports and the value of duty-drawback.

Step 8
Data on value of production and materials used for each ASIC industry for the base year is taken from the ABS publication 'Manufacturing Establishments: Details of Operations by Industry Class, Australia'. 'Sales and transfers out' of an industry's production is considered to be the best measure of an industry's output for the purposes of the study. However, in order to relate this output to the value of materials used (and value added) of an industry, certain adjustments are necessary. Allowance is made, for example, for changes in the value of stocks of finished goods, for revenue derived from repair work, and for work done on commission.
For the value of materials used, the most appropriate statistic is considered to be: 'total usage of materials etc. electricity and fuels; and containers etc.' Again, some adjustments are made to the values published by the ABS; in particular, allowance has been made for changes in the values of work-in-progress and for the values of materials supplied on commission by other establishments.
Data on output and materials used by ASIC industries is only changed every 4 to 5 years when the base year used in the study is updated.

Step 9
Output of the system comprises nominal and effective rates, subsidy equivalents and consumer tax equivalents at the 4, 3 and 2-digit ASIC level, and for total manufacturing.

After including all forms of measured assistance, estimates of ERAs and associated measures are made at the 4-digit ASIC level. These are aggregated to the 3-digit and 2-digit ASIC level, and the total manufacturing sector as a whole. An example of the aggregating of assistance from the tariff item level to total manufacturing is given in Figure 3. As well as individual and average rates of assistance, median rates and standard deviations of the rates are also produced.

The manufacturing effective rate system has been designed to be flexible in terms of the coverage of forms of assistance. Firstly, the system can be run for any year with the inclusion or exclusion of any major form of assistance mentioned above, such as including or excluding quotas, production subsidies, By-law or duty drawback. This has been done so that the effects of individual forms of assistance can be easily analysed. Secondly, forms of assistance not listed above can readily be included in the existing system, whenever the assistance provided can be measured in terms of a rate or subsidy/tax equivalent value. Finally, items of expense such as types of fuels and electricity used as inputs, and revenue from advertising and repair and maintenance, have been separately identified from other material inputs and other output revenues so that at a future date any assistance applying to these items can be included.

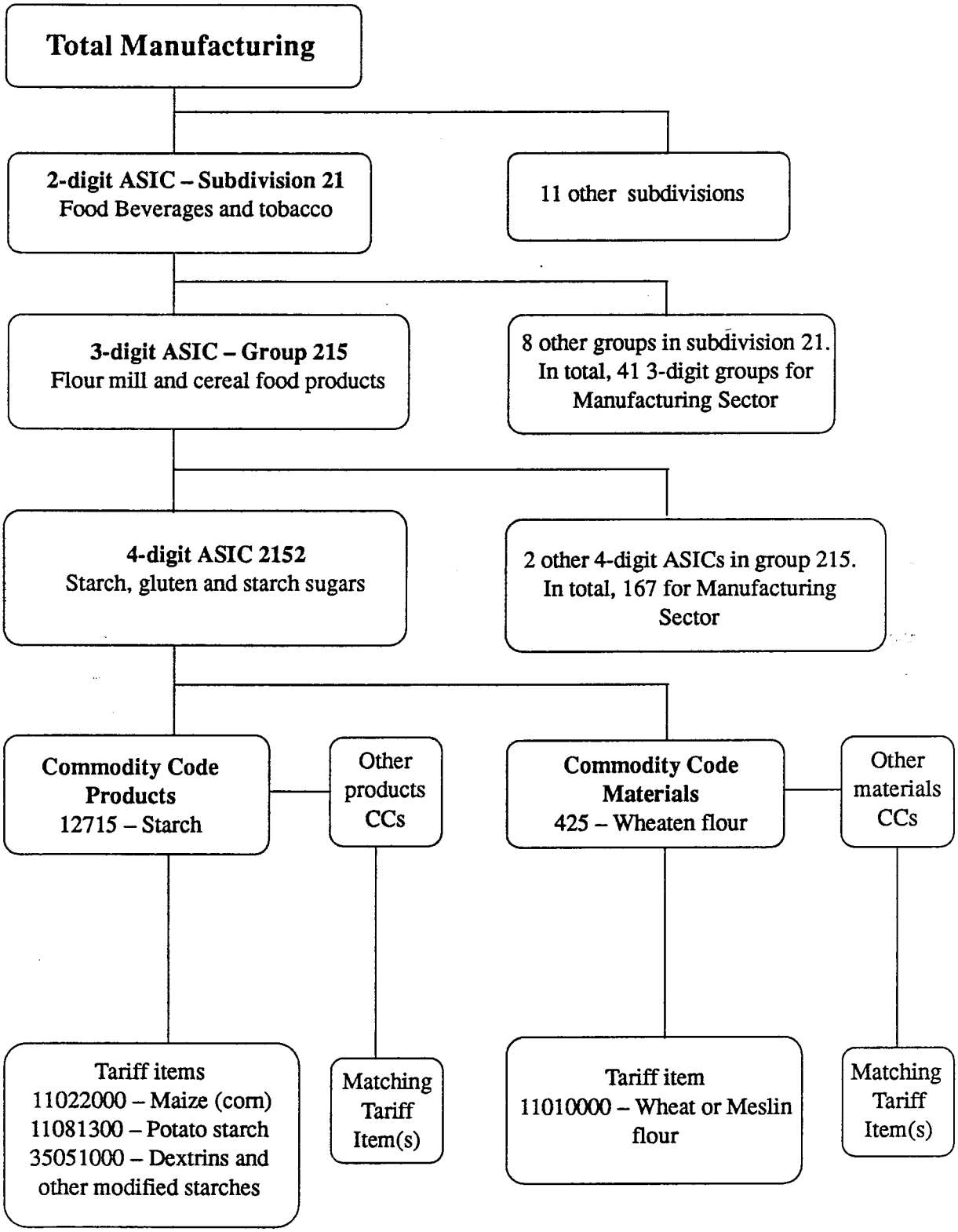
4.3 Human resources used in Australia

The Industry Commission has an Assistance Evaluation Branch, with a staff of about 15, which among other things undertakes research into the measurement and evaluation of assistance provided industries in support of the Commission's inquiry program and its general reporting role.

The team which currently estimates assistance for the manufacturing, agriculture and mining sectors for incorporation in the Commission's Annual Report, comprises the equivalent of five to six officers working full time. The team is also responsible for development and maintenance of those measurement systems, The regular updating of assistance estimates, for the Annual Report, typically takes only three to four months each year. Maintenance, special projects and other assistance related work, utilise the balance of these officers' time.

The annual estimates of manufacturing assistance are produced by the equivalent of three staff working full time for about three to four months of the year (ie 9 to 12 man months). This includes: collecting, manipulating and entering data; operating the system; ongoing documentation of procedures; and interpreting, presenting and writing up of results. For agriculture and mining the equivalent resource requirements are approximately 9 and 2 man months, respectively. The mining system is, however, dependent on input from the manufacturing system and data bases developed elsewhere in the Commission.

Figure 3
Aggregating Assistance in the Manufacturing System – an example



Additional resources from the branch are called upon for major development and updating work and special projects related to the measurement of effective rates of assistance. Major development work is being undertaken as part of the current rebasing of the Manufacturing System to 1989-90 production and material usage weights. For example, three officers are currently working part-time on constructing tariff item/commodity code concordances for the 1989-90 base year. It is anticipated that this part of the rebasing project will take about three man-months to complete.

The following are some recent examples of other special projects related to the measurement of effective rates of assistance:

- preparation of a Commission Information paper which provided an analysis of the impact of the March 1991 Industry Policy Statement; a working paper on Assistance to the Wool Industry and an ongoing study of State Government Assistance;
- contributions to Commission inquiries such as those into the Dairy and Sugar industries; and
- answering queries from the general public, government departments and other local and international organisations on our estimates for particular industries, effective rate theory, assistance methodology, and specific measurement techniques. This includes the preparation of papers and submissions similar to this one.

In addition to the Industry Commission staff employed on assistance measurement, the Australian Bureau of Statistics devotes some resources to processing the estimates as well as providing the base data. The Bureau generally has a policy of full cost recovery even for services provided to other government agencies. In the financial year 1990-91 the Commission paid the Bureau approximately $20 000 for services related to assistance measurement. Of this amount, approximately 75 per cent was for the acquisition of data. A large proportion of the remaining 25 per cent was for computer processing.

4.4 Concluding comments

The measurement procedure that the Industry Commission operates for the manufacturing sector has grown to some extent in an ad-hoc fashion over some two decades. It began as a manual system, based on tariff assistance which was automated initially using the then available technology. Changes since then, particularly the decline in the importance of tariffs, and the significant improvement in computing power, would allow the establishment of a simpler system than the one that currently exists. This would focus on the easier and more automatic inclusion of non-tariff forms of assistance, and would allow the annual update of the production and input data bases.

ATTACHMENT 1 DETAILS OF THE MANUFACTURING EFFECTIVE RATES SYSTEM

As indicated in Chapter 4, the system for measuring ERAs for manufacturing industries is based on the ABS's census of manufacturing establishments. Information from the census is used to derive a detailed sales and cost structure for each 4-digit ASIC industry. The articles produced by and materials used in each industry are classified by commodity codes.

Section A1.1 outlines how the assistance provided to commodities is measured. The most important form of assistance is tariff protection and fundamental to its measurement is the construction of concordances between the commodity codes (for each industry's articles produced and materials used) and individual items of the Customs Tariff. Details of how these concordances are constructed forms the first part of section A1.1.1. The rest of the section is concerned with the incorporation, at the commodity code level, of other forms of assistance. Also covered is: the choice of benchmark prices for measuring assistance; the inclusion of the effects of assistance to agricultural commodities and the marketing arrangements for petroleum products; and the treatment of non-traded intermediate inputs and tradeable capital.

Section A1.2 is concerned with the details of calculating nominal and effective rates at the 4-digit ASIC level, and the aggregation of those estimates to the 3-digit level, 2-digit level and for the sector as a whole. It covers adjusting the commodity-level estimates for measures of assistance that are more easily incorporated at the industry level and for exports. In addition are provided details of the methods used to derive assisted and unassisted values of outputs and materials, and estimates of the subsidy and tax equivalents of the nominal and effective rates.

The third section, A1.3, provides a brief description of the results from measuring assistance to manufacturing industries in Australia. It covers factors influencing the measures of assistance, trends in levels of assistance and the sources of change in the levels of assistance.

A1.1 Estimating nominal rates of assistance at the commodity code level

A1.1.1 Incorporating tariff assistance

a) constructing concordances

Fundamental to the incorporation of tariff assistance is the construction of concordances between the classification of commodities used by Customs for

tariff purposes (8-digit Harmonized tariff classification) and the commodity code classifications used by the ABS in its census of manufacturing to record data on articles produced and materials used. Two concordances are constructed; one for articles produced codes and one for materials used codes.

To limit the work involved, only significant commodity codes are included in the concordances. For products, codes have been included in decreasing order of share of sales and transfers out until the total value reached 90 per cent of the 4-digit industry's total. The inclusion of any further commodities has been conditional on their share of the total being greater than 2 per cent. A similar significance test has been applied to materials with the criteria being the share of total value of materials purchased or transferred in. Once a commodity code has been found to be significant for one ASIC, it was considered to be significant for all other industries to which it is classified regardless of its value in those ASICs.

The concordance was initially constructed by Commission officers who had substantial customs experience in matching the descriptions of the significant commodity codes with tariff classification descriptions from the Customs Tariff Schedule. For some commodity classifications a range of tariff items could have applied. In such cases the concordances were limited to what were thought to be the most significant. The construction of the products concordance was helped by the availability of a printout linking commodity codes to tariff items via the Australian Standard Commodity Classification (ASCC) and Australian Import Commodity Classification (AICC). This printout was based on a matching of separate ABS files, linking:

a) product codes with ASCC items;

b) ASCC items with AICC items; and

c) AICC items with tariff items.

Only in a limited number of cases, however, did the printout give one-to-one concordances. For the rest of the codes it gave a list of tariff items that could possibly, but not necessarily, apply.

The initial concordances for the current base year, 1983-84, were constructed as at 1 July 1983 and have been updated each year for tariff changes (see below). The initial concordances took some 15 man-months to complete. With the introduction of the Harmonized Tariff on 1 January 1988 it was necessary to convert the old 7-digit tariff classifications to the corresponding new 8-digit classifications. This was a major 'one-off' exercise which also took several man months to complete.

Where a commodity code is concorded with a number of tariff items, it is important that a decision on the relative weight given to each tariff item be based on domestic production patterns for output and domestic usage patterns for material inputs, rather than on the composition of imports. The assigning of relative tariff item weights for individual commodities is the area of the greatest potential source of error in deriving nominal rates of assistance to commodities.

The following are some practical 'rules of thumb' developed by the Commission, as well as some examples based on the Australian experience:

- Given the limited time to complete the job, it was decided that where there were only a few tariff items in the concordance and the applicable tariff rates were all within the range free to 5 per cent, the tariff items would be given equal weights, since even the largest divergence in weights would have had only a very small impact on the rate for the commodity.
- The smallest weight given to a tariff item in any industry in the initial concordance would be 10 per cent. Any tariff item thought to have a lower weight was deleted.
- A check was made to see if the commodity had been covered as part of a Commission inquiry report. This was helped by the records that had been maintained of each report's coverage by tariff classifications. Sometimes this was more useful for materials than products. For example, to determine what sort of plastic is used to make the outer case of car batteries, a report on storage batteries was of more help than a report on plastics since it is unlikely that, of the thousands of applications of different plastics, the report would specifically discuss their use in battery cases.
- Even where an inquiry report did not provide the information required, staff who had worked on the reference often had some idea of the relative importance of tariff items, even if only a "gut feeling". Other members of staff were consulted where they had specific industry knowledge from past work experience or even from interests/hobbies.
- A number of reference sources from the Commission's and other libraries were used to help define the goods under consideration. In some cases, these texts also gave us some insight into the goods' relative importance.
- The expertise of officers of various industry associations was also utilised on occasions.

Perhaps the best way to describe the weighting procedure, and some of the problems experienced, is to work through an example for both a material used in and an article produced by an industry. These examples are provided below.

Material example

Material code 'petrol engines' used in ASIC 3353, 'Refrigerators and Household appliances'.

The two major tariff items were thought to be:

TI 1 Internal combustion piston engines, air cooled spark ignition, having a power not exceeding 7.46 KW; and

TI 2 Other internal combustion piston engines, having a power not exceeding 25 KW.

Of all the primary activities of ASIC 3353, only lawnmowers would appear to be significant users of petrol engines. Hence, what had to be asked was what sort of petrol engines are used on lawnmowers manufactured in Australia.

On the basis of information in a Commission report titled 'Lawnmowers, certain engines and parts' it was concluded that all lawnmowers produced in Australia, for household use, incorporated engines with a power output of less than 7.46KW, and hence a weight of 100 per cent was assigned to TI 1. TI 2 was deleted from the concordance.

Whilst in the case above, the procedure was fairly straightforward and weights could be assigned with some confidence, the job was rarely this simple.

The first problem was that commodity descriptions rarely corresponded to descriptions in the Customs Tariff. In the example above, this presented no problem. However, when the material code description is as broad as, say, steel sheet, plate and strip, and is used in several different ASIC industries, it is very difficult to narrow the number of tariff items in the concordance down, since the tariff has separate classifications for sheet and plate, and strip. The tariff also further distinguishes between cold rolled or hot rolled, plated, coated, high carbon, high alloy etc steels.

Given time constraints, it was not practical to determine with any degree of accuracy the relative weights that should be applied to the various tariff items. Hence, in cases like these, the concordance was narrowed down to what were considered to be the most important tariff items and these were given equal weights.

In other cases, descriptions of commodities were so broad that almost a whole chapter of the tariff schedule could be included in the concordance. An example was 'inorganic industrial chemicals not elsewhere reported' for use in ASIC 2768 - 'Chemical products nec'. Since the primary activities within this ASIC are so diverse, ranging from boot polishes to concrete additives, almost any inorganic chemical in Chapter 28 of the Customs Tariff could have been included. In this particular case, the ABS had asked census respondents to specify the major inorganic chemicals that would be included under this category. In such cases, therefore, the ABS was also a potential source of additional information, since the various State offices had retained individual returns classified by ASIC. However, acquiring this sort of information is slow and expensive.

Product example

Product code - 'Bulbs, tubes, etc for electric light'. A significant output for ASIC 3357 - 'Electrical machinery and equipment nec'.

Based on the ABS concordance, three tariff items were suggested for this commodity code:

TI 1 Fluorescent discharge lamps,

TI 2 Filament lamps NSA; and

TI 3 Other (including infra-red and ultra-violet lamps; arc lamps)

The commodity was the subject of a recent reference to the Commission on Electric Lamps. From discussions with inquiry staff it was possible to determine the composition of domestic production. Whilst some lamps of the type that, if

imported, would have been classified to TI 3 were produced in Australia, it was felt that the total value of this production would account for less than 10 per cent of the total value of production of all Bulbs, tubes etc for electric light. Hence this item was deleted from the concordance. The final weights used for this commodity were TI 1, 40 per cent and TI 2, 60 per cent.

The commodity code above was covered by a recent reference. Often the information available from sources such as Commission reports is dated — some being up to ten years old. Nevertheless, where no other information is readily available, such dated information is considered better than uninformed estimates.

At present the Commission is rebasing its manufacturing system from the 1983-84 pattern of sales and purchases to the 1989-90 pattern — the latest year for which detailed data are available. As part of this process, work has begun on constructing new concordances for the 1989-90 base year for a new series. It is expected that these concordances will not take as long to construct as those for 1983-84 because the new commodity code descriptions used by the ABS in its census of manufacturing establishments more closely match the descriptions of goods in the Harmonized Tariff. Also with the reduction of tariff rates to more uniform levels for similar goods, the average commodity code nominal rates have become less sensitive to the relative weights assigned to individual tariff items. In the extreme case of all tariff items in the concordance for a particular commodity code having the same tariff rates, the relative weights assigned to each item will have no bearing on the average nominal rate for the commodity, except for where there are differences in vfd/cife ratios used to convert tariff rates to nominal rates. Such differences are usually quite minor.

b) other issues

In deriving assistance estimates, schedule tariff rates applying to General source countries are used. However, these may overstate levels of assistance where industries produce goods which are most closely substitutable with imports that enter at Preferential rates.

Where tariff rates are expressed in specific terms, the equivalent ad valorem rates are usually estimated by dividing the duty collected on imports from General (that is non-concessional) country sources by the corresponding fob value of imports.

Where the rate applicable to a particular tariff item has changed in any particular year, a weighted average is calculated for that year. To do this a tariff history file is maintained so that the concordances can be updated regularly.

Some tariffs may not be fully used (ie prices of domestically produced equivalents may not be raised by the same proportion as import prices). In such cases the assistance estimates may overstate the assistance used. This is particularly the case for major export industries and therefore tariff rates are set to zero for these industries (see below). Conversely, if there is partial usage of

tariffs on inputs, the assistance estimates could understate the net protection provided.

A1.1.2 Quantitative import restrictions

Quantitative import restrictions, in the form of tariff quotas and global quotas, became an important element of government assistance to Australian manufacturing industries from the mid-1970s. The main industries afforded quota assistance were clothing and footwear, passenger motor vehicles (PMV) and certain textiles industries. Quota assistance was removed for PMV in April 1988 and is scheduled to terminate for textiles, clothing and footwear (TCF) industries in March 1993. As discussed in Attachment 2, the Commission has relied on several separate measurement techniques to derive assistance estimates for quotas. For the current manufacturing estimates the quota tender sale premium method has been employed. This approach assumes that the premium bid at official tender sales equals the difference between the base tariff rate and the protective incidence of the quota. Financial year weighted average tender premiums are calculated and added to the base duty rates and this total rate is inserted on the tariff rate file.

A1.1.3 Excise taxes

Excise is treated differently for materials and products. Since excise taxes can only be levied on domestic production, tariffs on imports competing directly with locally produced goods subject to excise are considered to contain an equivalent excise component. This excise component is subtracted from the General tariff rate and only the protective component is recorded on the tariff rate file.

While this is appropriate for products, excise taxes levied on goods used as intermediate inputs penalise user industries by raising the cost of inputs in much the same way as tariffs on competing imports. Overrides are therefore necessary for tariff items in the materials concordance subject to excise. For these items, the excise component is added back and the total general rate is used. As the tariff rate for goods subject to excise is usually a specific rate, it is necessary to calculate an ad valorem equivalent for the total specific rate.

A1.1.4 Discriminatory sales taxes

In general, sales tax applies equally to imports and similar goods produced in Australia. In a few cases, however, the sales tax is only levied on the imported good thereby directly assisting domestic producers in a similar way to a tariff. Such discriminatory sales taxes are incorporated in the assistance estimates as tariff item overrides by adding them to the existing tariffs applying.

Sales taxes are levied on wholesale prices and not the fob price of the import as is the case for tariffs. Thus to calculate an equivalent tariff rate, the

discriminatory rate of the sales tax is adjusted upward to account for distribution costs to the wholesale level (see Attachment 2).

A1.1.5 Converting tariff rates and tariff rate equivalents to nominal rates

Tariffs in Australia are levied on the free-on-board (fob) price of imports. That is before insurance, freight and other importing costs are added. Tariff rates do not therefore show the extent to which protection has increased the landed price of imports and hence do not properly indicate the degree of nominal assistance afforded producers. Consequently tariff rates are deflated to a landed duty free (ldf) basis by multiplying each tariff rate by the vfd/cife ratio. The value for duty (vfd) is equivalent to the fob value whilst the cost, insurance, freight and exchange (cife) is taken to be approximately equivalent to the landed duty free value.

Nominal rates at the tariff item level are then calculated by multiplying the vfd/cife ratios by the tariff rate. Nominal rates for each commodity code are then calculated simply by summing the products of the tariff item weight and its respective nominal rate, ie it is a weighted average.

A1.1.6 Choice of benchmark prices

Measurement of assistance requires an assessment of the price at which products would sell for on the domestic market if the assistance arrangements were removed. For an internationally traded good, the domestic price of a perfect substitute produced domestically would be either import parity (the landed-duty-free price of the imported equivalent) or export parity (the free-on-rail export port value of the exported equivalent), depending on whether the good would be imported or exported if the assistance arrangements were removed.

In the case of the manufacturing sector, the assistance estimates are generally derived using import parity as the appropriate benchmark. This reflects the fact that the manufacturing sector is predominantly oriented towards import replacement so that in the absence of assistance, most manufactured goods would be sold in competition with imports. However, for many agricultural inputs and some outputs of the food processing industries, export parity is the more appropriate benchmark, since it is reasonable to expect these industries to continue exporting major proportions of their output if not assisted. Their exports are sold in world markets and domestic competition acts to ensure they do not receive any direct assistance through import protection measures such as tariffs.

For agricultural commodities, where domestic pricing schemes apply and significant quantities are exported, specific overrides are used to account for the assistance provided output and separate overrides for the taxing effect of the arrangements on user industries (see below). For other predominantly exported commodities, such as meat, nominal rates have been overridden at the

commodity code level, with a zero nominal rate, since any tariffs on imports would not have afforded any assistance to these commodities.

The measurement of assistance also involves the choice of an appropriate point in the production to consumption chain at which to measure assistance. For manufacturing, measurement has been made as far as possible on an ex-factory basis, the point most comparable to the landed-duty-free price of imported products.

A1.1.7 Effects of agricultural assistance arrangements

The Commission's manufacturing assistance estimates endeavour to take account of the extent to which assistance arrangements applying to agricultural commodities influence producer returns and material costs in the food processing industries and in the case of cotton, the cotton ginning industry. Compared to the manufacturing sector, tariffs provide a relatively small proportion of the total assistance afforded agriculture. Around 74 per cent of total agricultural output assistance in 1989-90 was provided by domestic marketing arrangements, usually undertaken by various statutory marketing authorities. To incorporate the effects of these agricultural arrangements, override rates, either at the commodity code or ASIC level, were substituted for the rates based on tariffs only.

Some of the assistance received by farmers is from arrangements that operate for the processed products. In these cases it is necessary to make some assessment as to how much of the assistance to processed products was received by the farming activity. While some of the assistance is likely to be shared with the processing activity, in general the simplifying assumption is made for special agricultural marketing arrangements that the assistance derived on processed products is fully reflected in the price to farmers with no net effect on the assistance to processing. This incorporates the reasonable assumption that the processing margin is insensitive to the level of assistance provided to the processed product. An exception to this simplifying assumption is made for sugar, where the assistance was apportioned between the growing and milling activities (two-thirds and one-third, respectively) on the basis of the cane payment formula used to determine the prices paid to growers for sugar cane.

A1.1.8 Petroleum products

There has been an ASIC override for the Petroleum Refining Industry for both outputs and materials to take account of the special pricing arrangements for petroleum products. However, there are some commodities affected by the arrangements that are used in other ASIC industries. For these materials a commodity code override rate that takes account of the assistance effects of the regulatory arrangements is used. The freeing up in recent years of regulatory arrangements effecting crude oil and petroleum products may make these overrides unnecessary in the new series.

A1.1.9 Non-traded intermediate inputs

Non-traded intermediate inputs are those goods and services which are produced and used exclusively in the domestic market. As discussed in Chapter 3, several different approaches have been developed in the theoretical literature for the treatment of non-traded inputs in effective rate measurement. The Commission's treatment of non-traded intermediate inputs has in large part been driven by the availability of data and the desire to keep it simple. The ABS's census of manufacturing establishments upon which the manufacturing system is based does not provide a complete accounting for the value of output in terms of intermediate input costs and value added. Rather inputs are recorded under selected items of expense. Value added is derived by the Commission identifying and deducting items of expense that are intermediate inputs from the value of sales and transfer out as adjusted for changes in stocks and outward freight. The result has been that there is a separate identification of non-traded material inputs such as electricity, but there is no separate identification from value added items of expense of non-traded non-material inputs such as accounting and advisory services. The Commission has treated non-traded intermediate inputs for which separate data are available like traded inputs and assigned a zero tariff to them. The balance of non-traded intermediate inputs have, by default, been treated as value added. Sensitivity analyses and the small share of non-traded materials in total material inputs used by manufacturing industries suggests that the alternative approaches would not produce significantly different effective rate estimates.

A1.1.10 Tradeable capital items

Much of the capital equipment used in industries would be tradeable. In theory, therefore, the effects of assistance to tradeable capital items should be included within the ERA framework. A very simple method of accounting for the taxing effect of tariffs on capital items is to estimate the additional depreciation allowance associated with the increased cost of capital items. In Australia this is the method used to include the effects of assistance to capital items in the agricultural sector estimates. However, the unavailability of the necessary data have precluded making such an adjustment in the manufacturing estimates. This exclusion is likely to overstate the estimates of assistance to industries that use a relatively large proportion of tradeable capital in production to which assistance imposes high costs on users.

A more complete method of accounting for the taxing affect of tariffs on capital items is to estimate the change such tariffs cause the user costs of capital of the items. The technique is outlined below in Attachment 2, section 7, where it is indicated that the Commission used the technique in its detailed study of assistance to coal mining. Sensitivity analyses with more aggregated and historic data bases of manufacturing have revealed that the omission of assistance to tradeable capital input made relatively small changes to estimated effective rates and had virtually no effect on the ranking of industries.

A1.2 Estimating nominal and effective rates of assistance for 4-digit ASIC manufacturing industries

This part of the effective rate system is concerned with:-

- Adjusting the estimates to include those forms of assistance which are best estimated at the ASIC industry class level.
- Determining what constitutes the aggregate value of output.
- Estimating the aggregate unassisted value of output.
- Estimating the consumer tax equivalent and subsidy equivalents.
- Determining what constitutes the aggregate value of materials.
- Estimating the unassisted value of materials.
- Estimating the tax equivalent of assistance to materials.
- Estimating average nominal and effective rates of assistance.

A1.2.1 Inclusion of forms of assistance at the ASIC level

The effective rate system allows for adjustments to be made to the nominal rates of assistance on both outputs and materials, as received back from ABS, at the ASIC industry class level.

The adjustments are necessary where the nature or complexity of the arrangements makes them difficult to incorporate at the commodity code level. The nominal rates of assistance are adjusted in an override file which is currently used for the following industries:-

(i) Motor vehicle industries - ASICs 3231, 3233 and 3234;
(ii) Dairying based industries - ASICs 2121 to 2125;
(iii) Petroleum refining - ASIC 2770
(iv) Cotton ginning ASIC 2341; and
(v) Wool scouring and top making ASIC 2342

As discussed above, some forms of assistance such as production subsidies and export incentives, are best incorporated as money values at the 4-digit ASIC level. Because the manufacturing system is base-year weighted, values of bountiable production and exports eligible for export incentives payments are held fixed at base year values in the same way that all other output and materials usage values are held constant. This is necessary to prevent changes in the measured rate of assistance occurring simply because the value of eligible exports or bountiable production has expanded or contracted.

If the Commission was redesigning its manufacturing system, consideration would be given to updating value of output data each year (or whenever available) rather than only when detailed material data was also available. For its Agricultural Assistance Measurement System the Commission assumes fixed materials to output ratios within a given series but uses the latest production data

to provide more up-to-date estimates. The current series for agriculture is based on average cost structures for the five years 1979-80 to 1983-84. For each activity for each year, a notional value of materials used is derived by applying the fixed average assisted materials to output proportions to current year local values of production from the ABS.

The rationale for the different approach for agriculture is based on the variability of output between years. Whilst there is less variability of manufacturing output, adopting a similar approach would make the system much simpler. For example, actual current year data on production subsidies and export incentives could be incorporated directly from the Budget papers rather than having to go through the rather complicated procedure outlined below.

A1.2.2 Export incentives

In the manufacturing assistance estimates export assistance has been derived from a base year allocation of export incentive payments. The initial allocation was based on information supplied by the Export Market Development Grants (EMDG) Board together with information on the major activities of recipient firms contained in various trade directories.

The listing of approved grants by claimant firm, supplied by the EMDG Board, gave no indication of the appropriate ASIC to which production was classified. A Commission officer spent months researching the principal activities of each recipient manufacturing firm and then assigning that firms grant to a particular ASIC.

Once the total value of incentive payments allocated to each 4-digit ASIC was calculated, that industries share of total export incentive payments was also calculated for the base year. This share was then held fixed for each year in the current series and applied to updated values of total export incentives.

The total dollar value of export incentives from the base year is only revised (apart from inflating to current year prices) if the rate of assistance provided by the various export assistance schemes changes. This prevents changes in measured assistance occurring simply because the value of eligible exports expands or contracts.

The dollar amount entered each year represents the total value of certain export subsidy payments to both manufacturing and agriculture in current year prices. The base year value in the system, includes not just EMDG payments but also export and trade promotion payments and Export Finance Insurance Corporation interest subsidies. The proportions of this total allocated to each industry remain constant from year to year, and are based on the allocation of EMDG payments in the base year. When the rate of payment, eligibility criteria, minimum/maximum grant thresholds etc for export assistance have not changed the dollar amount entered remains constant in base year dollars, ie the previous years dollar amount is simply inflated to current year prices using the Articles Produced by Manufacturing industries (APMI) price index for all manufacturing.

If the actual rate of payment, as distinct from the simple value of the grants, was to change, the appropriate dollar amount to be used would be derived as follows:

current year amount = previous years' amount x (a)

where: (a) = current year rate/previous year rate

A1.2.3 Production subsidies

The actual production subsidy (bounty) payment in the base year was obtained and it was assumed that this payment fully reflected production patterns in that year. For subsequent years the rate of bounty payments in the current year was compared with the rate in the base year. Where more than one rate applied for a given financial year, a time weighted average rate was estimated. Bounty assistance for any year could then be calculated to reflect base year production weights by the formula:

Dollar bounty (base year prices) = bounty payment (base year) x
[bounty rate (current year) / bounty rate (base year)]

Thus, as with export incentives, values after the base year do not represent actual payments but rather the payments which would have been made if (exports) production had remained at base year levels and composition.

Two other points should be noted. First, some bounty schemes may not have operated in the base year. For these schemes an estimate of bounty payment reflecting base year production weights and prices is obtained by:

- deflating the bounty payment in the scheme's first full year of operation to base year prices using the appropriate 4-digit APMI price index. The amount entered on the input file in the bounty field is in fact in current prices and the conversion to base year prices is done automatically as part of the effective rates processing;
- converting this figure to base year production weights by deflating it by the ratio of the value of production in the year the scheme first operated and the value of production in the base year. In practice it may be difficult to get data on bountiable production. In many cases therefore it will be necessary to make a simplifying assumption such as: the value of production has remained constant or has increased in the same proportion as production for the ASIC industry to which the bounty has been assigned; and
- in subsequent years this amount (reflecting base year values of production) derived above for the first year of a new bounty is simply multiplied by the ratio of current bounty rate/bounty rate in the first year of operation.

- Each year, even when bounty rates have not changed, the amount on the input file from the previous year needs to be inflated by the movement in the relevant APMI index.

Changes in the coverage of a bounty in a non-base year should also be taken into account. In Australia, for example, the computer bounty was extended from 1 July 1991 to cover printed circuit boards and the metal working machine tools and robots bounty was also extended from 1 July 1991 to cover equipment used in processing advanced materials, such as ceramics, carbon fibre and composite materials. Neither of these extension were actually taken into account for assistance projections in the current series.

A1.2.4 By-law, commercial tariff concessions and duty drawback

In Australia, Policy By-laws and Commercial Tariff Concessions allow concessional entry (usually duty free) for certain imports which are used as inputs for further production. A duty drawback scheme also operates to provide exporters with a rebate of import duty paid on imported inputs used in making goods which are subsequently exported.

It is difficult to construct a reliable pattern of the usage of concessions by each industry as no direct data is available. In the manufacturing system a complex procedure is used to estimate, at a 4-digit ASIC industry level, the savings in duty as a result of by-law, commercial tariff concessions and duty drawback. It is based on the difference between the average tariff rate applying to normal imported materials from general sources used by an industry and the average concessional rates where applicable, multiplied by the value of concessional imports in the base year. This saving in duty is deducted from the total tax on materials calculated for each industry based on General tariff rates.

Concessional rates are mainly relevant for estimating nominal rates of assistance on materials because the concessional entry usually applies where no goods serving similar functions are being produced in Australia (ie where there is no domestic production to assist). However, certain policy by-laws allow concessional entry to intermediate inputs that are produced locally. In Australia, for example, domestic production of certain textile yarns is assisted by a production bounty and nearly all imports of textile yarns enter duty free under a policy by-law. These arrangements were designed so as not to penalise user industries. The relevant rate used for assistance measurement is therefore the free concessional rate, rather than the General tariff rate.

A1.2.5 Allowing for the component of output that is exported

Average nominal rates of assistance on outputs at the 4-digit ASIC level are adjusted to take account of exports. Since exports, unlike domestic sales, compete at world prices and so are not assisted by tariffs and other import restrictions, the average nominal rates calculated for domestic sales are reduced according to the proportion of each industry's production exported (in terms of

unassisted value of output in the base year). For example, if the share of exports of an industry in unassisted terms was 20 per cent, and its average nominal rate on the domestic market resulting from import barriers was, say, 30 per cent, allowance for exports would reduce the average nominal rate to 24 per cent (ie. 0.3 x (1 - 0.2)). Where an industry's exports receive some export assistance, this is taken into account in estimating the nominal rate on the 'export component of output'.

A1.2.6 Aggregation of industry assistance

Nominal and effective rates of assistance to industry groups (3-digit ASIC); industry subdivisions (2-digit ASIC); and the total manufacturing sector, can be calculated using a weighted average of the estimates for individual 4-digit industries in the group/subdivision/sector. For average nominal rates, the weights used are the value of output or materials, net of assistance, for each industry in the base year. For effective rates, the weights were value added, net of assistance, in the base year.

A1.2.7 Deriving assisted and unassisted values of output

The total assisted value of output for each industry is calculated as follows:

$$AVO = SATO - VFC - SCM + VR + VAD + VFS + VWP + OCOM \quad (1)$$

where:

SATO	is value of sales and transfers out.
VFC	is value of outward freight and cartage.
SCM	is value of sales commission.
VR	is value of repair and service revenue.
VAD	is value of advertising revenue.
VFS	is value of change in stocks of finished goods.
VWP	is value of change in stocks of work-in-progress.
OCOM	is value of output adjustment due to work on commission.

The definition of the value of output as shown in equation (1) was determined after a number of discussions with ABS. The decision on the definition of the value of output was based on the concept that the value of output should reflect the value of the manufacture (or production) of goods and services within each manufacturing industry in the base year. The value of outward freight and cartage and sales commission attributable to sales on establishments' own behalf should therefore be excluded from the value of output. On the other hand since repair and service of goods and advertising are part of the output of certain industries, revenue received as a result are included in the value of output. Likewise since any change in the stocks of final goods or work-in-progress constitutes a change to the value of production within any industry then these items should also be added to the value of output. Additionally, any output

produced by an establishment within a manufacturing industry on commission, contributes to the value of output produced by that industry. The value of output as defined above is not strictly an assisted value of output because it does not include the value of non-price forms of assistance such as production subsidies and export incentives (see the worked example of an effective rate calculation in section 3.8.4). Rather it could be thought of as an observed ABS value of output.

In Australia a substantial proportion of goods produced by certain manufacturing industries is manufactured on commission for (and from materials owned and supplied by) other manufacturing industries or non-manufacturing enterprises. The ABS classifies materials and output according to the ASIC which purchases the materials and which sells the output and not to the manufacturing ASIC which uses the materials and produces the output. For industries doing commission work, output values in the manufacturing census only incorporate the revenue received for work done on a commission basis for establishments in other industries, rather than the full value of the work itself. The sales value of the output is included in the output of the sponsoring industry. Thus value added is exaggerated and the materials to output ratio underestimated in industries which sponsor commission work while the reverse is true for industries which actually perform the commission work. The Commission therefore adjusts the recorded output and materials used data upwards (OCOM) to take account of this additional output. In this way values that more closely reflect actual production can be derived.

All the factors which constitute the aggregate value of output do not receive the same levels of assistance. Thus, it is not a simple matter of deflating the assisted value of output, by the average nominal rate of assistance (for forms of assistance which influence prices), to estimate the unassisted value of output. Exports, for example, are sold at world prices and advertising is currently assumed to receive no assistance. Hence the unassisted value of output is given by:

$$UVO = [SATO - EXP - VFC - SCM + VR + VFS + VWP] \div (1 + NRO_i) + VAD \div (1 + NRA_i) + OCOM' + EXP \quad (2)$$

where

NRO_i is the average nominal rate of assistance on output, based only on forms of assistance which impact on prices, for each industry in the base year (i = base year). The nominal rate takes into account any override rates calculated at the ASIC level.

NRA_i is average nominal rate of assistance to advertising.

OCOM' is unassisted value of output produced on commission. This value is calculated by a rather complex sub-routine which is not discussed here.

EXP is base year value of exports.

A1.2.8 Deriving assisted and unassisted values of materials

The total assisted value of materials for each industry is calculated as follows:-

$$AVM = VMC + VRM + MVRE + VE + \Sigma VF_l + MCOM - VMS \quad (3)$$

where

VMC	is value of purchasers and transfers in of materials, containers, etc.
VRM	is value of repair and maintenance expenses.
MVRE	is value of motor vehicle running expenses.
VE	is value of usage of electricity.
VF_l	is value of usage of each type of fuel l (1 = type of fuel).
MCOM	is value of materials adjustment due to work on commission.
VMS	is change in stocks of materials.

The definition of the aggregate value of materials was also discussed with ABS. The definition above is based on the concept of the cost of materials, fuels and electricity used and of other running expenses made in the base year. Hence items such as repair and maintenance expenses and motor vehicle running expenses are included in the definition of the value of materials but the change in stocks of materials are subtracted. As well, materials used for work done on commission within an industry are included in the value of materials in that industry. In contrast to output, there is no difference between assisted and observed values of materials.

The various factors contributing to the aggregate value of materials, receive differing levels of assistance and so the formula for estimating the unassisted value of materials is not simple. The unassisted value of materials is estimated by:

$$UVM = [VMC \div (1 + NRM_i) + BYL_i + DRAW_i] + VRM \div (1 + NRR_i) + MVRE \div (1 + NRV_i) + VE \div (1 + NRE_i) + SUM\ VF_l \div (1 + NRF_{il}) + MCOM' - VMS \div (1 + DMA_i) \quad (4)$$

where

NRM_i	is the average nominal rate of assistance on materials after adjustments, as discussed above, for each industry in the base year (i = base year).
BYL_i	is the value of duty forgone as a result of by-law.
$DRAW_i$	is the value of duty repaid as a result of duty drawback on imported materials.

The reason BYLi and DRAWi are added to the deflated value of materials and containers is that NRMi is based on General tariff rates. BYLi and DRAWi

represent the calculated savings in the tax on materials from making allowance for concessional imports and duty drawback.

NRR_i	is nominal rate of assistance on repair and maintenance.
NRV_i	is nominal rate of assistance on motor vehicle running expenses.
NRE_i	is nominal rate of assistance on electricity usage for.
NRF_{il}	is nominal rate of assistance on fuel usage for each fuel l (l = type of fuel).
MCOM'	is unassisted value of materials used for work on commission.
DMA_i	is a weighted average of assistance on material inputs and fuels since only these items are likely to be stocked.

A1.2.9 Estimating subsidy and tax equivalents of rates of assistance

Nominal rates on output and effective rates of assistance can also be expressed in terms of subsidy equivalents, while nominal rates on materials can be expressed in terms of a tax equivalent on materials. These are a convenient means of measuring the dollar value of the transfers between consumers, producers, importers and taxpayers resulting from the assistance structure. Gross subsidy equivalent (GSE), net subsidy equivalent (NSE); and tax on materials (TEM) are estimated according to the formulae presented in Chapter 3.

The Consumer Tax Equivalent (CTE) measures the transfers of income from consumers to domestic producers, importers and the government through prices of goods (both domestic and imported) being increased by assistance. The CTE is each industry's GSE (adjusted in the way described below) plus the duty paid on imports of goods classifiable as being competitive with the output of that industry, plus an estimate of the quota rent arising from the increase in import prices due to the quota (where applicable). Since the CTE includes only the effects of assistance on prices of goods actually consumed during the period, the GSE used as the basis of the CTE calculation must be modified. The GSE includes forms of assistance on output that increase producers' returns without affecting price, and relates to all goods produced during the period (whether sold or not). However, the GSE used to derive the CTE is adjusted to a consumption base by allowing for stock changes during the period, and excludes non-price forms of assistance (eg. production subsidies). The CTE can be expressed as follows:

$$CTE = GSE^* + DUTY + QUOTA\ RENT \qquad (5)$$

where GSE^* = gross subsidy equivalent resulting from forms of assistance which directly affect the price of goods (eg

tariffs and quotas) consumed during the period, ie after allowing for stock changes.

DUTY = Customs duty collected from imports classifiable to each industry.

QUOTA RENT = estimate of the increase in the value of imports resulting from quotas.

For those ASIC industries producing excisable goods, the excise component of the tariff revenue is excluded for the purpose of estimating consumer tax equivalents.

The first task is to determine which imported final goods (and hence which tariff classifications in the products concordance) would be subject to excise if produced locally. These items will be a subset of the tariff items on the tariff rate file. Once these tariff items have been identified they are linked to 4-digit ASIC industries via the concordance between significant commodity codes and ASICs.

The excise component of tariff revenue is then calculated for each tariff item. The excise rate is generally considered to be the Papua New Guinea (PNG) rate and can be obtained from the Harmonized Tariff Schedule. The PNG rate is used because imports from that source pay no protective duty. Any duty applying to imports from PNG is simply the equivalent of the excise applying to the same goods produced domestically. Excise revenue is calculated by multiplying the quantity of general source imports for each tariff item by the excise rate. These excise revenues are then aggregated to obtain revenues per ASIC. Finally the revenue due to the protective component only of the tariff is calculated by subtracting excise revenue from total tariff revenue for each ASIC.

The CTE estimates presented in recent Commission annual reports represent the transfers from final consumers only. The exclusion of intermediate usage differs from some previous calculations which included the transfers from both final consumers and intermediate users due to assistance-induced price increases. The change was made to more closely align the Commission's use of the term consumer with that of the ABS.

A1.2.10 Disparities and medians

The ABS calculates for the Commission standard deviations between product and material codes for each 4-digit ASIC when weighting the commodity code nominal rates up to the ASIC level. The Commission then calculates standard deviations between 4-digit ASIC industries within each group, and subdivision and also within the sector as a whole.

In view of the skewed distribution of measured rates of assistance in Australia, median nominal and effective rates of assistance are also calculated for the manufacturing sector. Unassisted values of output and unassisted value added are used as weights to determine the 50th percentile.

A1.3 Description of sector average results for manufacturing

A1.3.1 Factors influencing measured assistance

Effective rates for the manufacturing sector are an average of the effective rate estimates for individual 4-digit ASIC industries, weighted by each industry's share of the sector's total value added (expressed in unassisted prices). Thus, changes over time in measured sector averages represent the combined effects of changes in the three components of the effective rate calculation. These are: changes in the level of assistance to the outputs and inputs of individual industries or production processes; changes in the structure of individual industries as measured by adjustments to their material to output ratios; and changes in the structural composition of sectors as reflected in changes in the share of value added accounted for by individual industries.

Measured assistance levels have also been influenced by changes over time in the methodology used to estimate effective rates. With each new series, the Commission has improved the coverage and measurement of certain forms of assistance and the treatment of certain items of outputs and materials. Changes in coverage were often necessary following the introduction of new forms of assistance, such as the introduction of import quotas during 1974 and 1975. The impact of these methodological changes are incorporated into the assistance estimates through changes in one or more of the components of the effective rate calculation outlined above.

In any discussion of longer term levels of assistance and the relative impact of individual factors on these levels, it is important to recognise the influence which government policy can have on the process and rate of structural adjustment. Most changes in the structure of particular industries or sectors occur in response to market forces which reflect changes in the long term patterns of demand and supply and the relative prices of individual goods, services and resources. However, government policies and, in particular the assistance arrangements afforded individual industries, influence the economic environment in which industries and firms operate. Therefore, government decisions on assistance policy may not only affect the way in which market-induced changes are absorbed through the economy, but also act to promote (or restrict) structural change within the economy.

A1.3.2 Changes in the level of assistance to manufacturing

The Commission has published four separate series of effective rates of assistance for manufacturing (see Table A1.1). These estimates are not comparable with the Tariff Board's estimate of 46 per cent for 1967-68 as significant differences existed in the coverage and classification of manufacturing statistics prior to the introduction of the ASIC classification by ABS in 1968-69.

TABLE A1.1: AVERAGE EFFECTIVE RATES OF ASSISTANCE FOR MANUFACTURING: 1968-69 TO 1990-91
(per cent)

	Series 1 (1971-72 base)	*Series 2 (1974-75 base)*	*Series 3 (1977-78 base)*	*Series 4 (1983-84 base)*
1968-69	36			
1969-70	36			
1970-71	36			
1971-72	35			
1972-73	35			
1973-74	27			
1974-75	28	27		
1975-76		28		
1976-77		27		
1977-78		26	23	
1978-79			24	
1979-80			23	
1980-81			23	
1981-82			25	
1982-83			25	21
1983-84				22
1984-85				22
1985-86				20
1986-87				19
1987-88				19
1988-89				17
1989-90				16
1990-91				15

Source: Commission estimates.

In each series, production patterns and materials to output ratios observed in a base year have been applied to the assistance estimates for all years included in the series. The base years — 1971-72, 1974-75, 1977-78 and 1983-84 — were those for which disaggregated materials usage data were available from the ABS.

The use of fixed weights within each series focuses attention on changes in the relative incentives afforded industries by the Government. Generally, observed changes in the average effective rate for manufacturing within each series reflects only the direct impact of changes over time in the level of assistance afforded individual industries. Excluded are the effects of changes in production or resource flows which are induced by these changes in assistance or other factors such as improvements in technology or changes in consumer tastes.

Within the constraints of the effective rate model, the impact of changes in the structure or technological composition of the sector are incorporated into each new series of estimates via the revised production weights and materials to output ratios. The accuracy of effective rate estimates within a particular series depends upon the extent to which the production weights over the series have changed from the base year. As patterns of manufacturing production would have changed during the years covered by each series, the estimates for all years other than the base year in each series should be regarded as only general indicators of the assistance levels received by the manufacturing sector.

Table 1 indicates that there has been a substantial decline in the measured effective rate for manufacturing between 1968-69 and 1990-91. Given the methodology used to derive these estimates, there are two aspects to this decline in the effective rate. These are the changes in measured assistance within each series of estimates which reflect the direct impact of particular government decisions, and the changes in measured assistance between series which reflect the impact of changes in the structure of individual industries and in the composition of the sector.

With the exception of the most recent 1983-84 base year series and the substantial fall in the effective rate in 1973-74, there has been relatively little movement in the average effective rate for manufacturing within each series of estimates. The major fall in assistance between 1972-73 and 1973-74 was due to the 25 per cent tariff cut in July 1973. The significant falls in assistance occurring in the current series are due mainly to government decisions on Industry Commission inquiry reports and the Government's general program of tariff reductions (announced in the May 1988 Economic Statement) which commenced in 1988.

Movements in assistance levels between series have tended to be more significant than changes within each series, reflecting the influence of changing production weights in determining measured assistance. For example, the use of 1977-78 production weights instead of 1974-75 production weights reduced the measured sector average for 1977-78 by 3 percentage points and the use of 1983-84 production weights instead of 1977-78 reduced the sector average for 1982-83 by 4 percentage points. However, the movements between series also reflect changes in materials to output ratios and changes in the methodology used to measure assistance.

A1.3.3 Sources of change

Sector composition

Within the manufacturing sector, the influence of the assistance afforded individual industries on the sector average effective rate is determined by each industry's relative share of unassisted value added. Changes in industry shares of unassisted value added can arise from two general sources, namely:

- changes in the physical size of each industry, as domestic resources flow into or out of the industry, thus changing their relative share of assisted value added; and
- changes in the levels of assistance afforded outputs of and materials used in each industry. These assistance levels are used to express each industry's outputs and material inputs and hence value added at world (unassisted) prices rather than local (assisted) prices.

An indication of the impact of these factors on the levels of measured assistance to manufacturing may be obtained from Table A1.2.

Table A1.2 summarises the relative contributions of individual manufacturing subdivisions to total value added in both assisted and unassisted prices for 1971-72, 1974-75, 1977-78 and 1983-84, the base years for each series of estimates. The data indicate that structural adjustment within manufacturing in response to both changing market conditions and the longer term effects of changes in government assistance policies has been on-going and has influenced sector levels of measured assistance.

For example, of the 13 percentage point decline in the average between 1971-72 and 1983-84, 7 percentage points can be associated with changes in the relative shares of unassisted value added of individual industries. Of this 7 percentage points, about 4 percentage points was the result of changes in the relative physical size of industries as reflected in their assisted value added shares. The balance reflects the effect of measuring each industry's contribution to total value added in unassisted rather than assisted prices. Significantly, between 1971-72 and 1983-84, the contribution of the highly protected Textiles, Clothing and Footwear, and Motor vehicles and parts industries to the sector average was halved when measured in unassisted terms (from 14 to 7 per cent) but declined by less than a quarter when measured in assisted terms (from 17 to 14 per cent).

Similar analyses could be made using the base year weightings of any two series. However, when making and interpreting such analyses of changes in the contribution of individual industries to the sector average effective rate, it should be remembered that improvements in the treatment and coverage of measures of assistance between series also will have influenced the results obtained.

TABLE A1.2: EFFECTIVE RATES OF ASSISTANCE (ERA) AND RELATIVE WEIGHTINGS BASED ON ASSISTED VALUE ADDED (AVA) AND UNASSISTED VALUE ADDED (UVA) FOR ASIC SUBDIVISIONS: 1971-72, 1974-75, 1977-78 AND 1983-84
(per cent)

ASIC *Sub-Division*	*Description*	*Measure*	*Base Year* 1971-72	1974-75	1977-78	1983-84
21-22	Food, Beverages and Tobacco	ERA	19	21	10	6
		AVA	20	19	20	20
		UVA	22	20	23	23
23	Textiles	ERA	45	39	47	69
		AVA	4	3	3	3
		UVA	4	3	3	2
24	Clothing and Footwear	ERA	86	87	141	227
		AVA	6	5	5	5
		UVA	4	3	3	2
25	Wood, Wood Products and Furniture	ERA	23	18	18	18
		AVA	5	6	6	6
		UVA	6	6	6	6
26	Paper, Paper Products, Printing and Publishing	ERA	52	31	24	16
		AVA	8	7	7	10
		UVA	6	7	7	10
27	Chemical, Petroleum and Coal Products	ERA	32	23	19	12
		AVA	7	8	9	10
		UVA	8	8	9	11
28	Non-metallic Mineral Products	ERA	14	11	5	4
		AVA	6	6	6	5
		UVA	7	7	7	6
29	Basic Metal Products	ERA	29	16	10	10
		AVA	11	13	10	9
		UVA	11	14	11	10
31	Fabricated Metal Products	ERA	58	39	30	25
		AVA	9	8	9	8
		UVA	7	8	8	8
32	Transport Equipment	ERA	50	45	48	65
		AVA	9	8	7	9
		UVA	8	7	6	7
	323 Motor vehicles and parts	(ERA	49	54	73	129)
		(AVA	7	6	5	6)
		(UVA	6	5	4	3)
33	Other Machinery and Equipment	ERA	44	24	20	22
		AVA	12	12	12	11
		UVA	11	13	13	11
34	Miscellaneous Manufacturing	ERA	32	27	30	26
		AVA	5	6	6	5
		UVA	5	6	5	5
	Manufacturing	ERA	35	27	23	22
		AVA	100	100	100	100
		UVA	100	100	100	100
	Materials as a proportion of output		58	61	59	65

The improved treatment of advertising revenue and commission work in the current series of assistance estimates largely accounts for the increase in the shares of value added attributed to the Paper, Paper Products, Printing and Publishing; and Chemical, Petroleum and Coal Products industry subdivisions in 1983-84. These methodological changes also affected the measured effective rate for these (and other) industries by reducing their derived nominal rates on outputs. As a result, while the relative contributions to value added of such industries have been understated in previous series of estimates, their measured assistance levels may have been overstated in these series. Consequently, care should be exercised when comparing estimates between series.

Structure of individual industries

The value added of industries is likely to vary over time as industries develop and adjust to changes in the economic environment. Such changes in materials to output ratios can also influence the level of measured effective assistance at both the industry and sector level. The data indicate that, in unassisted terms, materials constituted a similar proportion of output (around 60 per cent) in the base years of the first three series of estimates, but a higher proportion (65 per cent) in the current series.

This increase in the proportion of materials to output for 1983-84 would have increased the measured sector average. If the proportion had remained at 60 per cent in 1983-84, the measured effective rate for manufacturing in that year would have been 2 percentage points lower. However, as this increase was largely due to improvements in the methodology and materials usage data for the current series of estimates, conclusions from such movements have to be qualified.

This discussion indicates that caution must be exercised when comparing levels of manufacturing assistance over time, particularly between different series of estimates. At the sector level, methodological changes between series have had a significant impact on both the extent of the observed change in measured assistance and on the apparent contributions of particular factors to these changes.

ATTACHMENT 2 THE TREATMENT OF MAJOR FORMS OF ASSISTANCE

Estimates of assistance in Australia cover a wide range of Commonwealth interventions. Major forms of assistance included are tariffs, quantitative import restrictions, production subsidies, local content schemes, domestic pricing arrangements for agricultural commodities and input subsidies (eg fertilisers). Estimates exclude a number of forms of assistance which, overall, are of little significance in Australia but could be important to some industries. Excluded are measures such as anti-dumping procedures, government purchasing preferences, and assistance provided by state and local governments.

The coverage of forms of assistance is broader in agriculture than for manufacturing with the inclusion in the agricultural estimates of assistance to value-adding factors (for example, income tax concessions and concessional credit). These forms of assistance, however, are much less important for manufacturing industries, and their inclusion would make little difference to the manufacturing results for Australia at the cost of significant additional effort.

Forms of assistance are included in effective rate measurement in essentially two ways. First, by estimating the per unit change in the returns to the output of the industry. Second, by estimating a lump sum equivalent of the assistance provided, which is added to the gross subsidy equivalent for the industry as a whole.

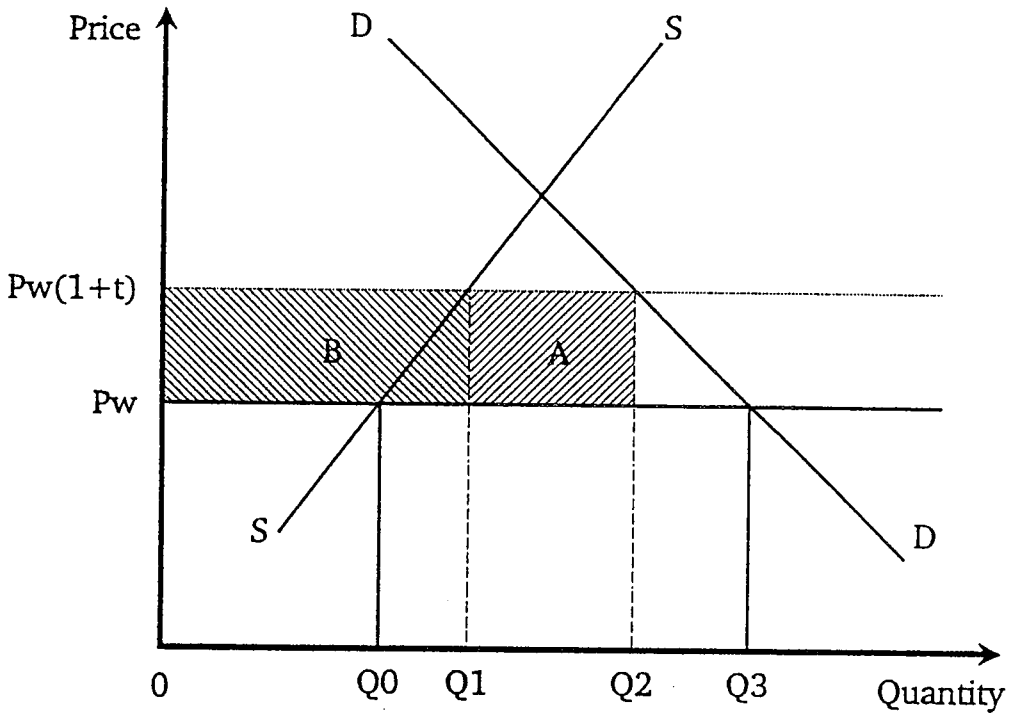
The specification of the major forms of assistance are presented below.

A2.1 Tariffs

Figure A2.1 below presents the partial equilibrium market diagram for an import competing domestic industry which underlies the basic analysis of assistance measures for inclusion in the nominal rate of assistance on outputs. DD represents domestic demand for the product in question. SS is the domestic supply schedule. Implicit in this schedule is the assumption that additional domestic supply can only be obtained by offering a higher price. Pw is the world price (border price) of perfectly substitutable competing imports. Import supply (Pw) is depicted as perfectly elastic under the simplifying assumption that local demand does not influence the world price. This is called the 'small country assumption' and is a reasonable presumption for a country such

as Australia. Because this diagram is depicting an import competing product, Pw is the cife import price.[1] The rate of tariff is 't' levied on the cife import price.[2]

Figure A2.1 : Tariff



The consequence of the tariff is that the price of the imported product is higher than it would be in free trade. In response to the higher price, domestic production expands, from 0-Q0 to 0-Q1. Imports contract from Q0-Q3 to Q1-Q2. Total demand has contracted from 0-Q3 to 0-Q2.

The domestic price is higher than the border price of imports by the extent of the tariff. The domestic price is equivalent to the duty paid price of the import, that is, Pw(1+t).

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1 Cife stands for cost, insurance, freight and exchange. It represents the price of imports arrived, but not unloaded at the importing country's border.

2 Tariffs in most countries are levied on the cife import price. However, in Australia, tariffs are levied on the free on board (fob) import price. For conversion to nominal rates, Australia uses the cost, insurance freight and exchange (cife) import price as its benchmark for nominal rates, both derived from tariffs and from price comparisons. This is because the cife price is more closely equivalent to the domestic ex-factory price.

The shaded area marked A represents the tariff revenue accruing to government, while the shaded area marked B represents the gross subsidy equivalent.

Estimates of prices of imports and domestic products are not, in practice, sought when measuring the nominal rate of assistance provided by a tariff. It is assumed that the observed value of domestic production fully reflects the price increase allowed by the tariff. The unassisted value of domestic production is estimated by deflating the observed (assisted) value of production by the rate of tariff 't'. In the absence of other forms of assistance, the rate of tariff is the nominal rate of assistance to output.

Thus; $UP = AP \div (1+t)$

where:

- UP = unassisted value of production.
- AP = assisted value of production.
- t = the ad valorem rate of tariff. The rate of tariff is expressed as a decimal, that is, a tariff of 20 per cent translates into t = 0.2. In this situation, 't' is the decimal equivalent to the nominal rate of assistance on output (NRA).

Ad-valorem tariffs

The tariff depicted in Figure A2.1 above is presented in terms of an ad-valorem rate. That is, as a percentage of the cife price of the import. Because the cife price is the border price used to estimate the assistance provided an import competing product, the tariff rate is also the nominal rate of assistance.

In Australia, the tariff is levied on the free on board (fob) import price.[3] In this situation, the fob tariff rate is adjusted to express it in cife terms before inclusion in the nominal rate of assistance. This is done by deflating the fob tariff rate by the ratio of the value for duty price (vfd) and the cife price of the import. The vfd price is used because it is more readily available, and in almost all cases, the vfd price is equivalent to the fob price.

$$NRA = t \times vfd/cife$$

Experience in Australia shows that, for most manufactured imports, the vfd/cife ratio has been in the range 0.8 to 0.95.

3 The free on board (fob) price is the price of imports loaded in the exporting country but does not include the cost of insurance and freight to the importing country.

Specific tariff rates

Where tariff rates are set in specific terms, such as dollars per kilogram, the nominal rate is taken as the ad-valorem equivalent of the specific rate. This is determined by dividing the specific duty by the average cife import price.

Preferential tariff rates

Australia provides preferential (lower) tariff rates for goods sourced from developing countries, and some near neighbours in the Pacific. Since nominal rates attempt to measure the extent to which domestic prices have been raised relative to the situation of unrestricted trade, the choice of tariff rate is dependant upon where imports are expected to be sourced from after the removal of tariffs. If the existing tariff preferences are only trade diverting, (that is, they alter the source of imports rather than the total level) they do not alter the assistance environment faced by local producers. In these cases, the non-concessional duty rate is likely to be the most appropriate indicator of assistance levels. This is because, if assistance were to be removed, imports would be cheapest from the non-concessional source and it is against such imports that the local industry is being protected. However, if concessional tariffs are trade creating, (that is, they increase the overall level of imports) the protective incidence of the tariff will be less than that implied by the non-concessional rate of duty.

In estimating its annual sector nominal rates of assistance, the Industry Commission has used concessional tariff rates only when imports are overwhelmingly from the concessional source. For individual industries, this rule of thumb may not be sufficient, and knowledge of individual industries can allow adjustments in more detailed industry estimates.

Excise taxes

Excise taxes are levied on domestic production. However, the Australian tariff includes an excise component, either explicitly or implicitly. In this situation, because the excise is not discriminatory between domestic and imported products, the excise component of the tariff needs to be removed to leave only the protective component for inclusion in the nominal rate of assistance on output.

In Australia, the excise tariff is separately identified and covers certain alcoholic, tobacco and petroleum products.

The inclusion of excise taxes levied on the usage of intermediate inputs is discussed in Section A2.8.

Duty drawback

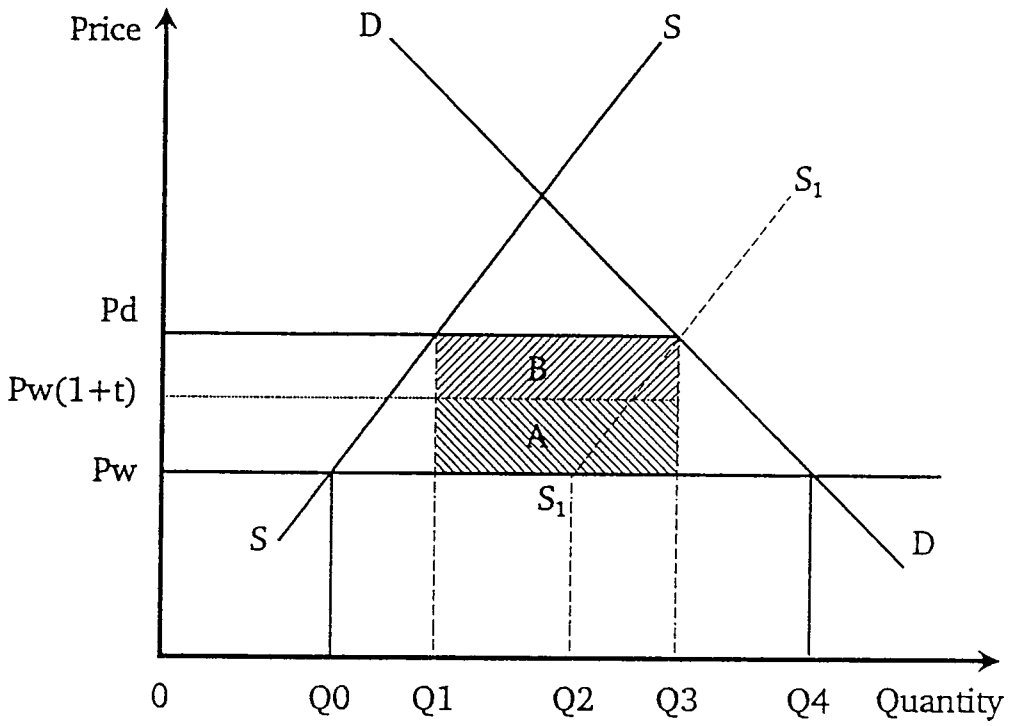
A duty drawback scheme is where exporters receive a rebate of import duty on imported raw materials used in making up goods which are subsequently exported. If the duty drawback scheme were to cover all possible inputs, it would mean that export activities would suffer no cost penalty on inputs as a result of the tariff system. Exporters would be able to buy all inputs at free trade or border prices. In practice, however, duty drawback schemes are rarely so comprehensive and some inputs will not be covered.

In its effect on the domestic market, the duty drawback scheme acts as an export subsidy. It will raise the domestic price of the final product above the world price by the amount of import duty saved. This is because producers will only be willing to sell on the domestic market if they get a premium above the world export price equal to the rebate which they would have to forgo if they produced for the domestic market rather than for export. In practice, however, this particular effect of duty drawback is minor and is not included in Australia's assistance estimates.

A2.2 Quantitative import restrictions

Quantitative import restrictions (QRs) are where imports are restricted, not by tariffs, but by direct quantitative control. This may take the form of a limit on the quantity of imports that may occur, or it may be a limit on the total value of imports. The effect of a volume import restriction on prices and thus on estimates of nominal rates of assistance is depicted in Figure A2.2.

Figure A2.2 : Quantitative Import Restrictions



In Figure A2.2, at the world price 'Pw' local supplies would be 0- Q0 and imports Q0-Q4. For the moment the tariff is ignored. An initial quota of Q0-Q2 is set, leaving a shortage on the domestic market of Q2-Q4 at the initial import price. As a result of this shortage, prices on the domestic market are bid up until an equilibrium is reached at price Pd. This equilibrium is made up of increased domestic production — from 0-Q0 to 0-Q1 and reduced total demand — from 0-Q4 to 0-Q3. Imports are Q1-Q3 which is equal to the original quota of Q0-Q2.

The shortage of imports created by the QR generates a higher return from importing. This is called the quota rent. Imports can be sourced at world prices and sold at the higher domestic price. In the absence of a tariff, the quota rent enjoyed by those importers lucky enough to be allocated scarce imports is the shaded areas A and B. If there were a tariff, then part of the quota rent would be appropriated by government as tariff revenue — the shaded area A. Note that the tariff is not additional to the quota in terms of protective incidence. The quota overrides the tariff which simply serves to reduce the quota rent for the quota holders.

Measuring the effect of quantitative import restrictions

In Australia, quantitative import restrictions have been used extensively to protect the textiles, clothing, footwear and passenger motor vehicle industries. The measurement of the nominal rate (tariff) equivalents of QRs has been done by two means. First, the direct measurement of the price differences between locally produced products and equivalent imported products. Second, by including the value of quota when put out to tender by the Government. At the time that direct price comparisons were made, and before the introduction of tender sales by Government, estimates also involved gathering data on prices for quota in the extensive unofficial market that had developed.

Price comparisons

When estimating nominal assistance from direct price comparisons it is assumed that the observed differences in domestic and border prices reflect the assistance provided by the trade restrictions and that the price differentials also incorporate the assistance provided by any tariff on the import of these goods. Practical aspects of making price comparisons include:

- Ensuring that the individual products for which comparisons are made are representative of the main items of local production. Typically, a number of comparisons will be made for representative products from within a particular category of domestic production, and the average of these comparisons will be used as the nominal rate of assistance for that category of domestic production.
- Ensuring that the products being compared are as near to identical as possible.

- Ensuring that the prices used refer to the same point of sale and include the same ancillary services or conditions of sale.
- Attempting to put a price value on any differences that exist, so that crude price comparisons can be adjusted. In the Australian experience with the textiles, clothing and footwear industries, it was observed that buyers generally required that imported products be 10 to 15 per cent cheaper than the price of local equivalents before they would consider importing, even if all other 'physical' characteristics were the same. This was to cover a range of uncertainties associated with importing, and because of the ease of contacting local suppliers if difficulties arose. Observed price differences were discounted by this margin when estimating nominal rates.

When making price comparisons for import competing products, the prices used were the domestic manufacturer's ex-factory price (that is, the price to wholesalers including profit but excluding selling and distribution costs) and the cife price of the imported product.

Alternatively, a comparison could be made of the free into store price of the imported product and the delivered (into store) price of the locally produced product. However, price comparisons at levels other than at the ex-factory level, such as at the into store, wholesale or retail level, present problems. This is because it is not possible to be sure how much of the observed price differences reflect differences in the distribution chain and because of the need to adjust for government taxes and charges in the distribution system.

In Australia, confirmation of the value of QRs was obtained by gathering data on the extensive unofficial market that had developed for the transfer of the use of QRs between importers. A few major 'quota brokers' had developed who were familiar with the 'going rate' for particular types of quota. As most prices were in terms of dollars per unit of imports, the data was treated as a specific tariff and converted to an ad-valorem equivalent on the basis of average import prices. Data on the sale value of quotas were available in two forms. The first, and most useful figure, was the cost of 'hiring' the use of the quota for one year — the 'one-year price'. The second was the price of the purchase of the right to the quota for the remainder of the expected quota life, that is, 'permanent sale'. If data on the latter was the only one available, an estimate of its annual equivalent would be necessary based on an estimate of the appropriate discount rate. Appropriate discount rates could be estimated from situations where both the one-year price and the permanent-sale price were available.

A problem exists where products are locally produced but, as a result of stringent import barriers, such as embargoes, there are no imports of competing products. This was the case until recently for raw and refined sugar which were prohibited imports into Australia. In such cases however, local wholesalers may be aware of the price at which

they could import a competitive product if imports were possible. Alternatively, cife prices into neighbouring countries may provide an indication of the potential border price.

Price comparisons present an additional problem not faced when measuring assistance provided by a tariff system. Unless changed, an ad valorem tariff provides a constant level of assistance over time. This is not the case where assistance is provided by way of quantitative import restrictions. The level of assistance will change from year to year as a result of a variety of factors including: exchange rate changes; changes in the world price; changes in the level of local competitiveness or demand; and changes in the level of the QR itself. This is particularly a problem in the agricultural sector where significant year to year changes in the world price are a common feature of the market. The market for manufactures are more stable. However, in estimating assistance for the quota protected manufacturing industries in Australia, the Industry Commission has found the changes were sufficiently large to justify annual updating of the estimated tariff equivalents of the QRs, and the separate reporting to government of changes in the value of quotas.

Sale value of quota

Nominal rate estimates for the textiles, clothing and footwear industries since 1980-81 have been based mainly on the clearing premium bids for quota at the official quota sales held annually. Bids were in terms of an additional tariff rate, in ad-valorem terms, that the bidder was willing to pay, in addition to the base tariff already existing. The technique assumes that the successful premium bid in each quota category represents the difference between the base tariff rate and the tariff rate that would be required to give the same volume of imports in the absence of quotas.

The average nominal rate of assistance was derived using the formula:

$$NRA = (TPB + BD) \times vfd/cife$$

where:

NRA	=	nominal rate of assistance on output
TPB	=	tender premium bid at sale
BD	=	base duty rate
vfd/cife	=	the ratio of vfd and cife prices of competing imports.

Measurement of assistance to local producers of passenger motor vehicles were similarly based on tender premiums up until the QRs were removed in April 1988.

While it is possible to give broad guidelines for the method of estimating assistance provided by QRs, there are likely to be differences depending on particular

circumstances or depending on particular aspects of legislation or procedures. These can only be analysed on a case-by-case basis to determine whether the particular situation would result in different estimates or need significant qualifications of the results. For example, the auctioning of textile, clothing and footwear quotas in Australia had a number of characteristics that influenced the reliability of results.[4]

Voluntary export restraints (VERs)

As a result of bilateral trade negotiations, exports of a particular commodity are sometimes restricted by the exporting country to a specified level, in value or volume terms. In principal, the effects of a VER are the same as that of direct quantitative import restrictions. However, VERs provide an incentive for the producers supplying the restricted imports to appropriate the quota rent in the form of higher supply prices. Thus, import parity or border prices are higher than they would otherwise be. This means that price comparisons between cife import prices and domestic prices would understate the level of protection provided.

VERs have not been a significant feature of the Australian trading environment and estimates of assistance have not been attempted. To obtain reasonable results, data on export prices into third markets (unaffected by VERs) would need to be gathered for comparison with prices of domestic production. An alternative source for estimates of the value of VERs could be the transfer prices for export entitlements that exist in some major exporting countries.

A2.3 Production subsidies

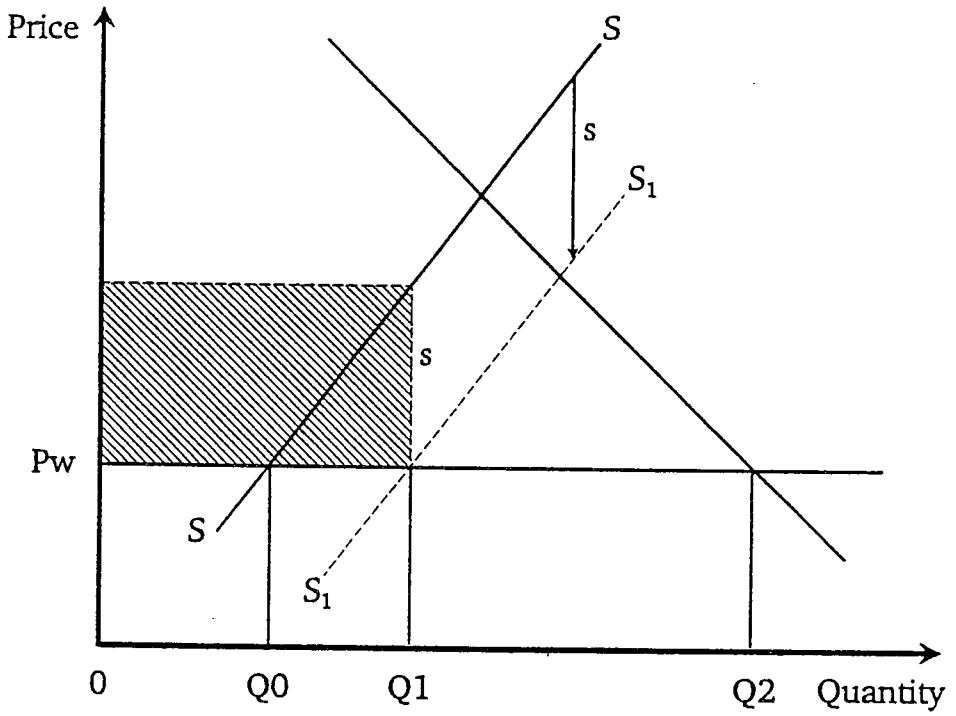
In Figure A2.3, a production subsidy is depicted as a shift in the domestic supply schedule — from S to S1, that is, by a reduction in the costs of domestic production. The degree of the shift being the level of subsidy per unit of output 's'. The subsidy allows local suppliers to increase their market share, from 0-Q0 to 0-Q1. At Q1, local producers can sell at the import parity price while their underlying cost structure remains higher to the extent of the subsidy. The total cost of the subsidy is the shaded area in Figure A2.3. The subsidy has the same effect for local producers as a tariff, with the total value of the subsidy being equivalent to the gross subsidy equivalent. However, the subsidy does not increase the cost to consumers who continue to purchase goods, both locally produced and imported, at the world price Pw.

The nominal rate is measured as the total value of subsidy divided by the observed value of production. In this situation, (unlike the tariff case), and in the absence of other forms of assistance, the observed value of production is also the unassisted value of

4 For a discussion of this issue in detail see: Industries Assistance Commission, *Assistance to Manufacturing Industries, 1977-78 to 1982-83*, Australian Government Publishing Service, Canberra, 1985, Appendix 2.

production. The assisted value of production is estimated by adding the value of bounty assistance to the observed value of production.

Figure A2.3 : Production Subsidy



Bounties paid on the production of import-competing goods can be designed to be conditional so that assistance accrues primarily to the producer of materials used as inputs to the production process. The incidence of the benefits of the bounty will depend on the forms of bounty provided for in legislation.

Production bounties paid on the basis of local value added can provide substantial assistance to component suppliers through the manufacturer paying higher input prices. To the extent that the benefits of the bounty are appropriated by input suppliers, the effective assistance afforded the production process will be reduced, while the manufacturer's nominal assistance will remain unaltered. In Australia, bounties based on value added and/or with local content provisions have included those for agricultural tractors, injection moulding equipment and metal working machine tools.

The methodology for measuring assistance where local content requirements apply is explained in more detail in Section A2.10 where the treatment of the local content scheme for passenger motor vehicles is discussed.

Input subsidies

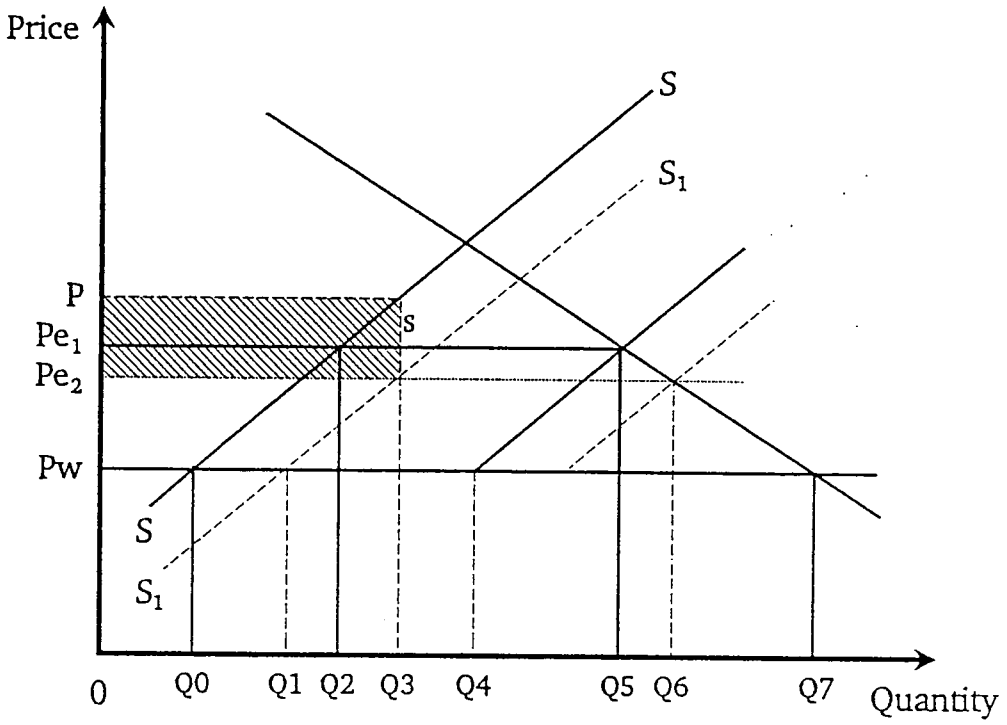
In the past, fertilizer subsidies have been provided in Australia. At one time these were paid on the purchase of fertilizer irrespective of the source of the input.

In the perfect competition model outlined for nominal rate estimates, no assistance is received by the domestic supplier of fertilizer as the subsidy is available on both imported and domestically sourced materials. The input cost of users, however, are reduced. The observed value of fertilizer input costs represent the assisted value of materials, while the unassisted value is estimated by adding the total value of subsidy to the observed value of fertilizer costs. The input subsidy is included in effective rate estimates as a negative tax on materials.

A2.4 Quantitative import restrictions with a production subsidy

The discussion in Section A2.2 concluded that assistance provided by QRs and tariffs are not additive. The situation is different with subsidies to an industry already assisted by QRs. In Figure A2.4 below, at the world price Pw local production is 0-Q0 with imports of Q0-Q7. An initial import quota of Q0-Q4 becomes (in the absence of any subsidy) Q2-Q5 at the equilibrium price of Pe_1. Local supply is 0-Q2. The introduction of a production subsidy is depicted by a shift in the domestic supply schedule from SS to S1S1. As a consequence, local production increases from 0-Q2 to 0-Q3 at the lower equilibrium price of Pe_2. The shaded area is the total amount of subsidy paid.

Figure A2.4 : Quantitative Import Restrictions with a Production Subsidy



Importantly, unlike the situation depicted in Figure A2.3, the introduction of a subsidy where import quotas already exist results in a decrease in the price paid by the user. In this situation the nominal rate on materials for a user of this product would be the observed price disadvantage (Pe_2-Pw)/Pw while the nominal rate on the production of the product would be the observed price disadvantage plus the per unit value of the subsidy.

The essential methodological issue is that the assistance provided by QRs and subsidies are additive, while assistance provided by QRs and tariffs are not.

A2.5 Export subsidy and export tax

All previous figures have been drawn for import competing industries where the appropriate border price is the import parity (cife) price. For an exporting industry, the world price which determines the level of production is the export parity price.

The underlying model assumes that an export industry's costs are geared to the export parity price and that, in the absence of intervention in the market by government, domestic competition would result in the export price being available to local buyers.

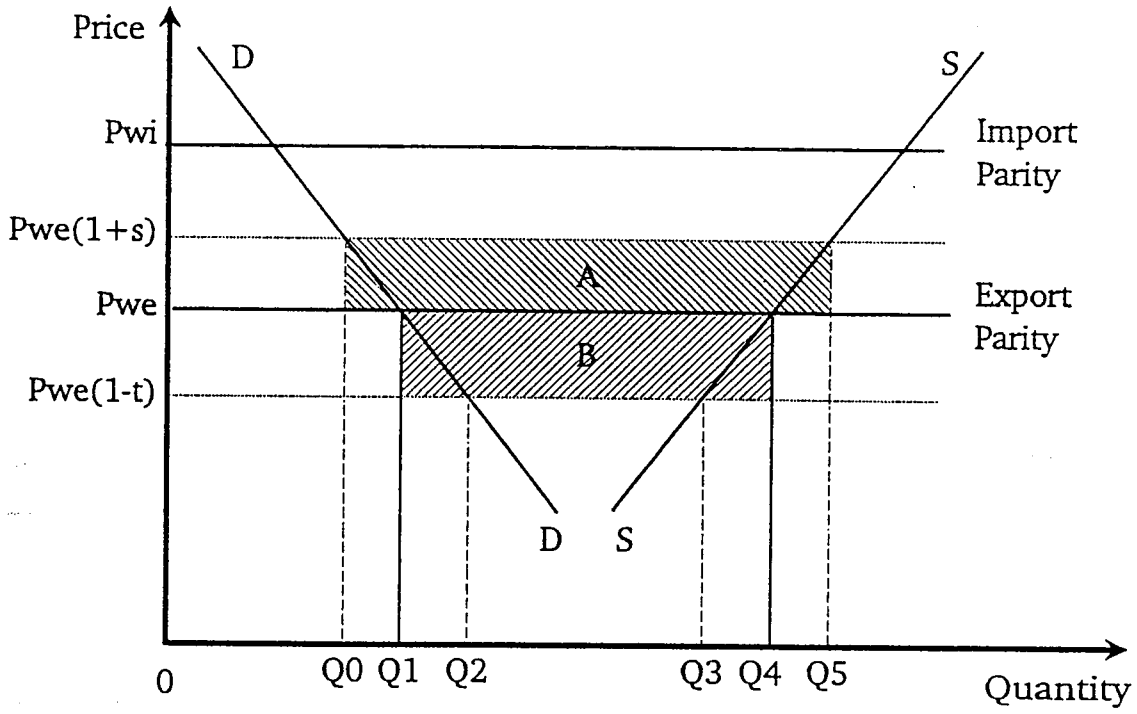
There are two direct ways that government can intervene in the marketing of export industries. These are through providing export subsidies or through imposing export taxes. Both of these are presented diagrammatically in Figure A2.5 below.

In Figure A2.5, in the absence of any export subsidy or tax, the price in the domestic market would be the export parity price (Pwe) with 0-Q1 supplied to the local market and Q1-Q4 exported.

Export subsidies

The introduction of an export subsidy 's' increases the returns on the export market to Pwe(1+s). This is depicted as an upward shift in the export parity price. Because returns on the export market are increased, prices on the domestic market will also need to increase otherwise all production would be exported. The domestic price also increases to Pwe(1+s). Domestic demand contracts to 0-Q0 and exports expand to Q0-Q5. This implies that an export subsidy extends assistance to all production both exported and that sold domestically. Unlike the subsidy on domestic production, the level of the export subsidy is included in the tax on material costs of domestic users because of the influence on domestic prices. The cost of the export subsidy is the shaded area A.

Figure A2.5 : Export Subsidy and Tax



Export subsidies have been a negligible form of assistance in Australia, and the information was rarely available categorised by industry. Data on the provision of direct export assistance under Australia's export assistance programs has only been available on the basis of the individual firm. The inclusion of this information into industry average nominal rates involved allocating firms which received export grants to industries on the basis of the firms predominant activity. The value of subsidy was assumed to relate to the principal activity and was thus allocated to the relevant industry. The value of subsidy was added to the industry's value of production to add to the estimate of the assisted value of that industries output. Because of the negligible nature of export subsidies in Australia, their effect on domestic prices indicated by the theoretical analysis has not been estimated or included in results.

Export taxes

The introduction of an export tax 't' is depicted by a reduction in export returns to Pwe(1-t). The domestic price also declines as supply is diverted away from exports onto the initially higher priced domestic market. The export tax thus acts as a subsidy to the domestic users of the product by increasing supply and reducing the price on the domestic market. The revenue derived from the export tax is the shaded area B.

The only industry in Australia which has been subject to an export tax was coal. Coal export duties were first introduced by the Commonwealth Government in 1975. The rationale put forward by Government for the imposition of the tax was that a proportion of the super normal profits earned by coal producers after the first oil shock should be channelled to the community. Initially, the duty was payable on all export coal and the value of the duty depending on the quality of the coal. The export tax was subsequently modified, making its incidence more selective in terms of individual high-profit mines, and more recently has been removed.

The selective nature of the duty allows the Government to impose the duty on mines it considers can bear the burden of the tax. If the Government makes accurate predictions, production decisions may not be altered and it can be argued that the tax should not be included in assistance estimates.

The Industry Commission's estimates cover only the period of the selective application of the tax and it has not included in the estimates of assistance to coal mining.

A2.6 Discriminatory sales taxes

As long as sales taxes are levied equally on locally produced and imported products, they do not enter calculations of the nominal rate of assistance on output. Discriminatory sales taxes, that is, with different rates on local and imported products, are rare in Australia. Where they have occurred, the difference in the rates, usually higher on the imported product, is treated as an additional tariff and included in the nominal rate of assistance on output. Because sales taxes are levied on wholesale prices, which also include any tariffs paid, the sales tax margin to be included in the nominal rate was converted to a tariff rate equivalent for inclusion in assistance estimates using the following formula:

Tariff rate equivalent of the sales tax = $(1+t) \times 1.2 \times$ sales tax rate

Where: t = tariff rate

The multiplier 1.2 is used because the Australian Customs Service estimates wholesale prices for sales tax purposes by inflating the unlanded duty paid price of the imported product by a standard 20 per cent.

Thus, if the tariff rate is 10 per cent and the sales tax rate on imports (above that applying to the local product) is 20 per cent, the tariff rate equivalent of the sales tax is 26.4 per cent; that is (1 + 0.1) x 1.2 x 0.2 = 0.264.

The total nominal rate is equal to the tariff rate equivalent of the sales tax plus the tariff rate. In the example above, 0.1 + 0.264 = 0.364 or 36.4 per cent.

The treatment of sales taxes on inputs into the production process is outlined in Section A2.8.

A2.7 Tax concessions

The inclusion of taxation concessions in assistance estimates only became a significant issue when estimates were extended to cover agriculture, mining and minerals processing industries.

The assistance implications of taxation arrangements for mining fall into two categories. First, the eligibility for deduction of certain types of capital expenditure not deductible in other industries may confer benefits to mining. Second, special provisions for accelerated depreciation compared to economic depreciation. Accelerated depreciation benefits the industry by reducing the tax liability in early years at the expense of higher tax in later years. This is equivalent to an interest free loan to the investor. The benefit of the interest free loan is measured by the imputed interest payments which would normally be associated with the loan. The size of these interest payments depends on the market rate of interest. The benefit of the tax deferral is greater for longer life assets as the effective interest free loan increases with the life of the asset.

The ideal benchmark is the economic depreciation which would be a measure of the fall in the market value of the capital assets due to their physical deterioration or obsolescence in each period. Though the benchmark can be defined, data limitations do not allow its estimation. As an alternative, the data on the projected lives of assets derived from a modelling exercise for a sample mine were used. It was assumed that the assets depreciated on a straight line basis over their actual lives.

The analysis compared the cost of using capital under the taxation provisions for depreciation and their cost of using capital if the assets were depreciated over their actual rather than taxation lives.

The technique used was to estimate the user cost of capital under the two situations. The user cost of capital is a summary statistic for the implicit rental price firms pay for the use of capital. The Industry Commission has used this technique for determining the relative effects of various government interventions such a tariffs and accelerated depreciation provisions on the cost of capital used in coal mining.

The formulas used were:

The actual user cost of capital faced by the company

$$P^K = \Sigma[1 \div (1-u)](V)[r+(1 \div n)]\{1-u[1 \div rt(1-e^{-rt})]\}$$

Where u = marginal rate of tax
V = price of the asset
r = real discount rate
n = economic life of the asset
t = taxation life of the asset

The user cost of capital with tariffs on capital items can be expressed as:

$$P^{Kdf} = \Sigma[1 \div (1-u)][V \div (1+df)][r+(1 \div n)]\{1-u[1 \div rt(1-e^{-rt})]\}$$

where df = the nominal tariff rate in capital assets.

The user cost of capital if actual economic lives of assets are used rather than taxation lives:

$$P^{Ked} = \Sigma[1 \div (1-u)](V)[r+(1 \div n)]\{1-u[(1 \div rn)(1-e^{-rn})]\}$$

The effect of tariffs on capital assets can then be derived as:

Tariff penalty = $P^K - P^{Kdf}$

The effect of accelerated depreciation provisions can be derived as:

Taxation subsidy = $P^K - P^{Ked}$

An analysis using an estimate of the tax concession compared to the actual life of the asset was possible because, in the particular case, data on the likely actual life was available. However, as effective rates are aimed at comparing industries within an economy it could be argued that the difference to be measured is the assistance offered by concessional depreciation rates compared to the standard rate in the tax schedule. This simpler alternative would focus the estimates of assistance on those industries for which concessional rates were available and would avoid the difficulty of estimating economic lives. There would be little error in this simpler alternative if standard rates were a good proxy for economic depreciation.

A2.8 Excise taxes on intermediate inputs

Excise taxes on intermediate inputs penalise user industries by raising the cost of inputs in much the same was as tariffs on competing imports.[5] The assistance to producers of excisable commodities is not affected by these arrangement since excise taxes apply to imports (as part of the tariff duty) as well as for locally produced goods.

Within Australia, the most important excisable products are refined petroleum products. In the agricultural sector, a diesel excise rebate operates, which largely removes the penalty incurred by farmers on their major petroleum input. As a consequence, agricultural estimates are derived on the simplifying assumption that farmers incur no penalty on petroleum inputs. In manufacturing, the inclusion of excise taxes on intermediate inputs as a penalty to users has an insignificant effect on the sector average. However, estimates for industries which are heavy users, such as certain minerals processing industries, are significantly reduced if the taxing effect of excise on inputs is included in estimates.

In principal, the same situation applies for sales taxes levied on inputs into the production process. However, there are extensive exemptions of sales taxes when goods are used as inputs into the production process. In addition, the industries which are generally not eligible for exemptions are service industries for which estimates of effective rates of assistance are not made.

A2.9 Domestic pricing arrangements for agricultural commodities

Domestic pricing arrangements for major agricultural export industries have been the principal form of assistance for agriculture in Australia. These arrangements are two-price schemes which essentially involve the exercise of price discrimination between the domestic and export markets and the payment of a pooled price to producers.[6] This usually involves the setting of higher domestic prices than export prices.

The implementation of this system usually rests with a statutory marketing authority for the particular product with the right to compulsorily acquire and act as the sole selling agent on both the domestic and export markets. The authorities usually operate under a charter to maximise the returns to growers and to do so, increase the domestic price, usually to a level equivalent to the import parity price of potential imports, including any tariff assistance if applicable.

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5 Industries Assistance Commission, *Certain Petroleum Products - Taxation Measures*, Report No. 397, AGPS, Canberra, 1986, Appendix K.

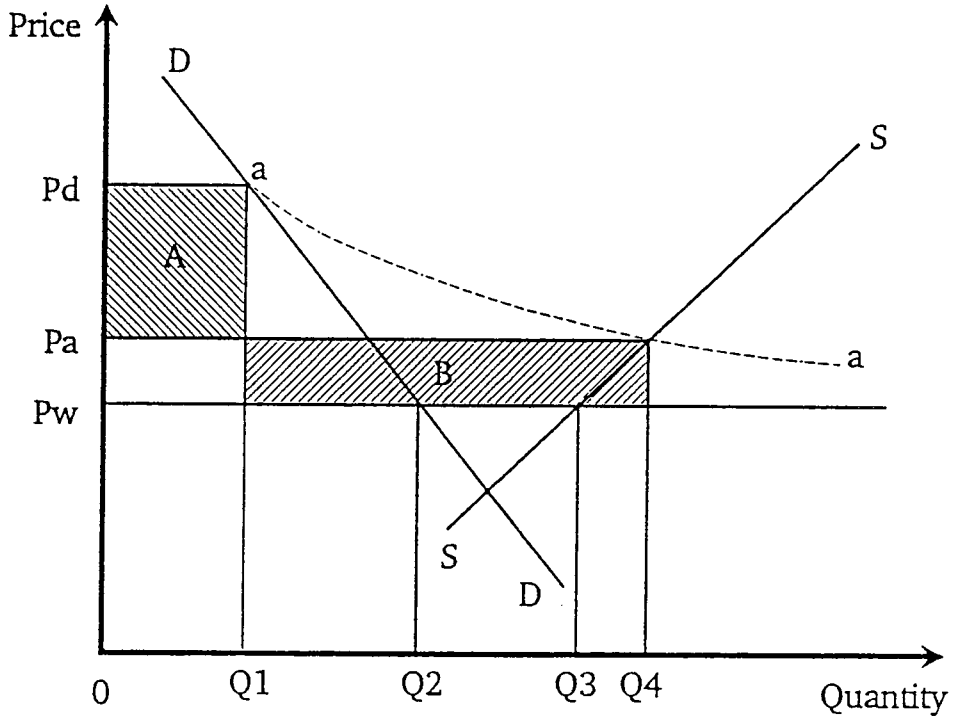
6 Industries Assistance Commission, *Assistance to Australian Agriculture*, Australian Government Publishing Service, Canberra, 1983, Appendix 4.

In most cases, returns from domestic and export sales were pooled and payments to growers were an average of the domestic and export prices, although this is not always the case. In the Australian sugar industry, until recently, returns from the domestic market (and other premium markets) were paid separately and were not dependant on the total level of output. This avoided the dissipation of the 'surplus' from the domestic market 'subsidising' additional production that is exported which is inherent in an average return system.

Figure A2.6 presents diagrammatically the situation of domestic price support and the pooling of returns.

In Figure A2.6, Pw represents the export parity price, DD domestic demand and SS domestic supply. In a competitive market, both the export and domestic price would be Pw, with 0-Q2 supplied to the domestic market and Q2-Q3 exported. With a monopoly domestic supplier, the domestic price can be increased to Pd, equivalent to (at its maximum) the price of potential imports including any tariff. Domestic demand would contract to 0-Q1. Under a price pooling and averaging system, the average price would be Pa. The line aa represents the locus of points where, at any given quantity of exports the average price results in the additional returns from the domestic market being offset by the increase in average returns over the export price for exports. In Figure A2.6, the two shaded areas A and B are equal. By increasing the effective price observed by producers, the pooling arrangement increases exports from Q1-Q3 to Q1-Q4.

Figure A2.6 : Domestic Pricing Arrangements for Agricultural Products



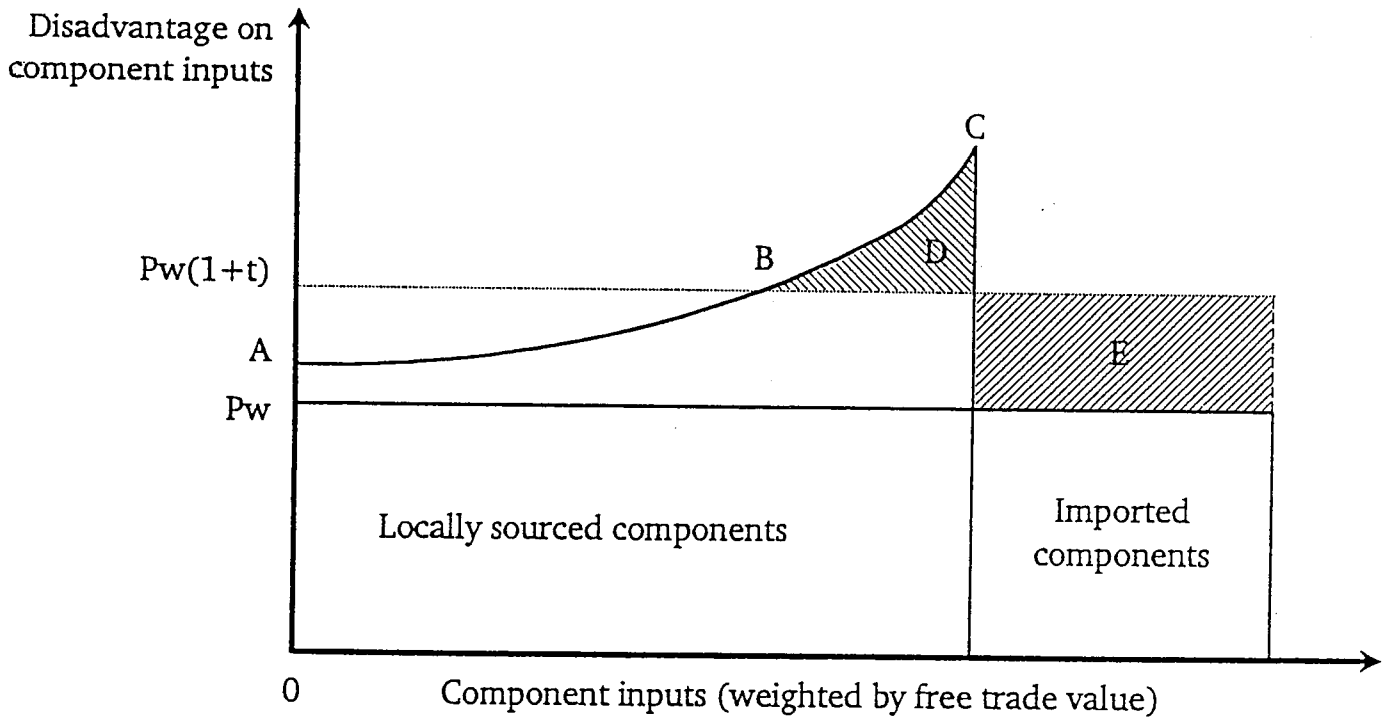
The additional amount paid by domestic consumers for a commodity above the comparable export price is called the producer transfer, and is included in the gross subsidy equivalent of assistance for the agricultural industry.

In some cases, the domestic pricing arrangements involve the setting of domestic prices by formula and, because of the variability of world agricultural prices, domestic prices can be lower than export returns. In those years, the domestic pricing arrangements provide assistance to the users of the agricultural product and act as a negative gross subsidy to domestic producers.

A2.10 Local content scheme

Until very recently a local content scheme has operated for the Australian passenger motor vehicle industry. In simple terms, if a local manufacturer reached a local content level of 85 per cent, the remaining imported components could be imported duty free. In determining whether to comply with the scheme, producers faced a trade off between the value of the concessional imports and the additional cost of sourcing components locally.[7] This trade off is illustrated in snap-shot form in Figure A2.7.

Figure A2.7 : Cost and Benefit of Local Content Compliance for Vehicle Assembler



7 Industries Assistance Commission, Working Paper, *Local Content Schemes: A Technical Analysis*, Industries Assistance Commission, Canberra, July 1984.

In Figure A2.7, the line segment AC shows the disadvantages on the various components sourced locally under the content scheme. The line has been drawn on the basis that components are ranked from the most competitive on the left to the least competitive on the right. For the purpose of measuring local content, the value of locally produced component production is equal to the area under the disadvantage curve. If 't' is the tariff on imported components (drawn on the simplifying assumption that only one tariff rate applies to all imported components) the duty saved by adhering to the content requirement is equal to the shaded area E. Compliance with the content scheme involves additional cost equal the shaded area D. Compliance will continue so long as area D is less than area E.

In reality, local producers complied with the scheme when estimates of the cost showed that the cost of compliance was more than twice the duty saved. Continuation of manufacturers in the scheme reflected the political reality that withdrawal would mean changes to the rules governing local production.

Measures of assistance provided by the local content scheme involved the estimation of price comparisons between local and potentially importable components, that is, the empirical measurement of the curve AC. This allowed the estimation of nominal rates of assistance for individual components and of an average for all domestically sourced components. The average (net of the savings from concessional entry for the remaining imported inputs) became the nominal rate of assistance on materials for local vehicle manufacturers. Assistance to the output of domestic vehicle manufacturers was estimated from price comparisons between local and imported vehicles as imports were subject to quantitative import restrictions.

A2.11 Export facilitation

A later addition to the Australian local content scheme was the introduction of the export facilitation program. In its simplest form, vehicle manufacturers could earn the right to import additional components duty free if they exported an equal value of vehicles or components. Producers would export those components which Australia was the most competitive at producing and import those component where the local costs was highest compared to alternative imports.

The effect on assistance was two fold. First, the average nominal rate on materials into vehicle assembly would decline as the least competitive components were replaced by imports. Second, an implicit subsidy was provided to exports. It is the extent of this subsidy which is the most difficult to estimate as it does not appear in any price that can be readily identified. The local producer would export the component at the ruling world price, with the subsidy apparent in the producers cost structure. However, this cost structure is not publicly available. Once the least competitive components are replaced by imports, it is not possible to measure the cost saving and thus the maximum

potential available to subsidise exports. Besides, the level of subsidy has proved to be considerably less than the cost savings that result from the program. In the Australian case, the information on the extent of subsidy was only available by directly requesting this from the local vehicle manufacturers.[8]

A summary of the current industry plan for the passenger motor vehicle industry and the assistance it provides to Australian production is contained in the Industry Commission's latest annual report.[9]

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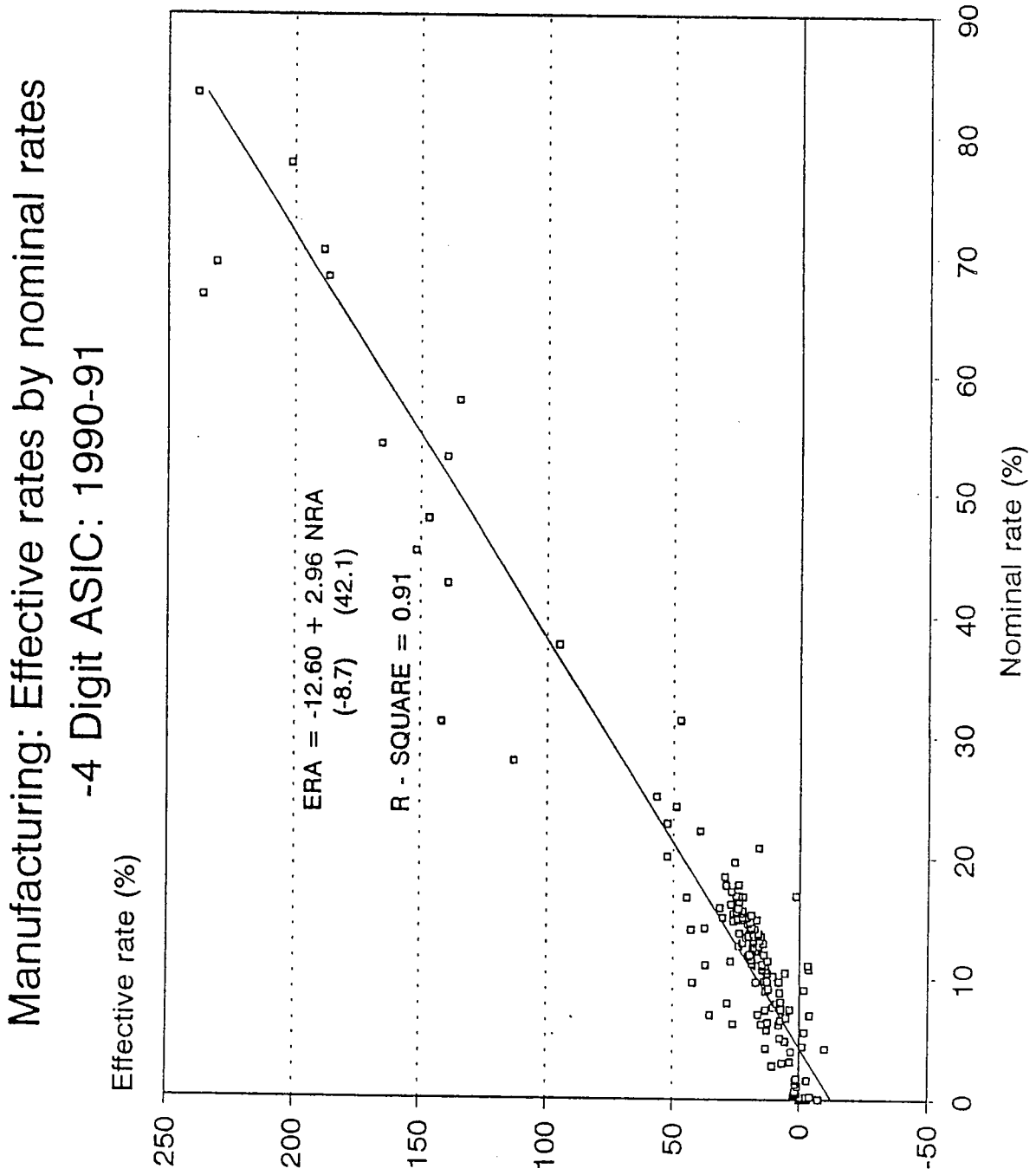
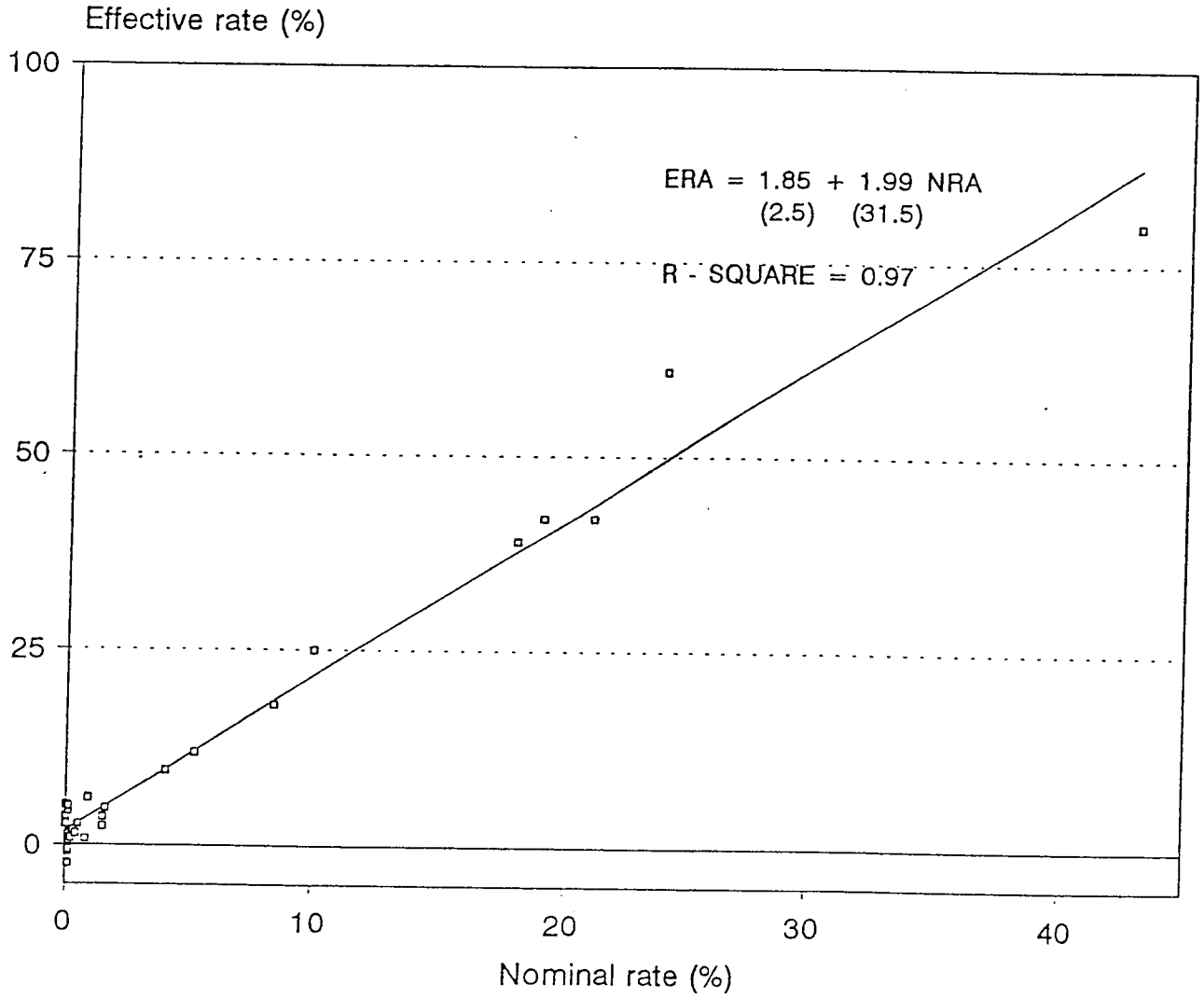
8 Industries Assistance Commission, *Annual Report 1981-82*, Australian Government Publishing Service, 1982, Appendix 1.5.

9 Industry Commission, *Annual Report 1990-91*, Australian Government Publishing Service, Canberra, 1991, pp 123-28.

ATTACHMENT 3 CORRELATIONS BETWEEN ESTIMATES OF NOMINAL AND EFFECTIVE RATES OF ASSISTANCE IN AUSTRALIA



Agriculture: Effective rates by nominal rates -commodity: 1989-90



ATTACHMENT 4 ALTERNATIVE FORMULAE FOR THE EFFECTIVE RATE OF ASSISTANCE

In Section 3.1 the ERA is defined as:

ERA	=	(NSE/UVA) * 100
where NSE	=	net subsidy equivalent
UVA	=	unassisted value added

In the literature, the ERA has been defined as follows:

g	=	(df - X.dm) / (1 - X)
where g	=	ERA
df	=	NRA, the nominal rate of assistance on outputs
dm	=	NRM, the nominal rate of assistance on materials
X	=	UM/UP = materials to output ratio
UP	=	unassisted value of output
UM	=	unassisted value of materials

As shown below these two formulae are equivalent.

Ignoring direct assistance to value added factors, net assistance is assistance to outputs less assistance to intermediate inputs, ie

NSE	=	GSE - TEM
where GSE	=	AP - UP
	=	UP (1 + df) - UP
AP	=	assisted value of output
and TEM	=	AM - UM
	=	UM (1 + dm) - UM
AM	=	assisted value of materials

giving NSE = UP.df - UM.dm

which when divided by UP yields

NSE/UP = df - X.dm

The unassisted value added

UVA = UP - UM

which when divided by UP yields

UVA/UP = 1 - X

Thus giving ERA = NSE/UVA = (df - X.dm) / (1 - X) = g

An advantage of expressing the ERA as a formula in terms of nominal rates is that the following relations can be shown between nominal and effective rates:

If df = dm, then g = df = dm

If df > dm, then g > df > dm

If df < dm, then g < df < dm

If df = X.dm, then g = 0

If df < X.dm, then g < 0

ATTACHMENT 5 RELATIONSHIPS BETWEEN ERA MEASURES AND PRODUCER SUBSIDY EQUIVALENTS

The effective rate has much in common with the producer subsidy equivalent (PSE) measure that has been used for many years by the OECD for its studies of the agricultural policies of member countries. Both use a static partial-equilibrium framework to measure assistance. The major differences relate to the forms of assistance included and the divisor used for determining the rate of assistance.

The similarities between coverage of interventions by assistance measure for gross subsidy equivalents, producer subsidy equivalents and net subsidy equivalents are given in Table A5.1.

Table A5.1: **Coverage of intervention measure by assistance measure**

Form of intervention	**Gross subsidy equivalent**	**Producer subsidy equivalent**	**Net subsidy equivalent**
Assistance to outputs			
. tariffs	x	x	x
. import quotas	x	x	x
. export duties	x	x	x
. export subsidies	x	x	x
. domestic pricing scheme	x	x	x
. production subsidies	x	x	x
Assistance to intermediate inputs			
. input subsidies		x	x
. research/extension funding		x	x
. excise concessions		(x)[a]	
. commodity taxes			x
. quotas			x
. tariffs			x
Assistance to value added			
. concessional credit		x	x
. income tax concessions		x	x
. adjustment assistance		x	x

[a] A concession that reduces the price of fuel to its world parity price is treated as a form of assistance.

The PSE is defined as the income subsidy needed to compensate producers for the removal of assistance provided through designated programs of agricultural support. Application of PSEs has focussed on agricultural support measures and to date has not included the taxing effects of assistance to intermediate inputs produced by other sectors of the economy. Also exceptions from general policies have been included as providing assistance irrespective of whether the exception makes an intermediate input available at world trade prices, as occurs with the exemption from fuel excise for fuel used in agricultural production in Australia.

The producer subsidy equivalent is converted to a rate of assistance by dividing the gross (ie assisted) value of output. This can give an incorrect ranking of relative resource use efficiency when attempting to compare industries as is shown in Table A5.2 with a simple numerical example.

Table A5.2: **Ranking of two industries by nominal rate of assistance, producer subsidy equivalent rate and effective rate of assistance**

			Industry	
			A	B
Assisted value of output	a	($)	140	140
Assistance to output	b	($)	40	40
Unassisted value of output	c = a - b	($)	100	100
Nominal rate of assistance	d = (b/c)*100	(%)	40	40
Assisted value of intermediate inputs	e	($)	96	48
Unassisted value of intermediate inputs	f	($)	80	40
Tax equivalent on intermediate inputs	g = e - f	($)	16	8
Producer subsidy equivalent	h = b - g	($)	24	32
Producer subsidy equivalent rate	i = (h/a)*100	(%)	17	23
Assisted value added	j = a - e	($)	44	92
Unassisted value added	k = c - f	($)	20	60
Net subsidy equivalent	l = j - k	($)	24	32
Effective rate of assistance	m = (l/k)*100	(%)	120	53

The three measures each indicate different rankings of the assistance provided to the two industries; and hence of their relative efficiency of resource use:

- nominal rate of assistance - A same as B
- producer subsidy equivalent rate - B greater than A
- effective rate of assistance - A greater than B

The most appropriate and correct is the effective rate, which indicates that industry A is less efficient in its use of resources, per unit of value added, than industry B.

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