PRODUCTIVITY COMMISSION

Trade & Assistance Review 2001-02

Methodolgical Annex A

The Commission's Assistance Measurement System

Contents

Introduction

The *Productivity Commission Act 1998* defines government assistance to industry as:

> … any act that, directly or indirectly: (a) assists a person to carry on a business or activity, or confers a pecuniary benefit on; or (b) results in a pecuniary benefit accruing to, a person in respect of carrying on a business or activity.

Although assistance generally benefits the firms or industries that receive it, it comes at a cost to other sectors of the economy. For example, direct business subsidies increase returns to recipient firms and industries, but to fund subsidies governments must increase taxes and charges, cut back on other spending, or borrow additional funds. Similarly, while tariffs provide some price relief to domestic producers, they result in higher costs to local businesses (for their inputs) and higher prices for consumers, who then have less money to spend on other goods and services. On the other, in some cases particular types of industry assistance — most notably R&D funding — can deliver net community benefits.

Quantifying industry assistance enables governments to make better informed policy decisions, potentially allowing them to improve the allocation of a community's scare resources and, thus, improve community welfare.

The Commission calculates estimates of government assistance to industry in a range of contexts. To meet its statutory obligation to report annually on industry assistance, it publishes 'national' estimates of assistance each year in *Trade & Assistance Review*. These estimates cover Commonwealth budgetary and tariff assistance, together with assistance derived from nationally-significant agricultural marketing or pricing arrangements. On occasion, the Commission publishes estimates of State Government budgetary assistance to industry. The Commission also develops more detailed and tailored estimates for particular inquiries or studies — such as its recent review of automotive assistance (PC 2002a) and is its study of the effects of industrial activity in the Great Barrier Reef catchment on water quality in the reef (PC 2002b).

This annex discusses the Commission's assistance measurement system with particular focus on its approach for its national estimates, as published each year in *Trade & Assistance Review*.

1 An overview of the Commission's assistance measurement system

The Commission and its predecessors have published estimates of industry assistance since the early 1970s. The estimates initially were focussed on the main forms of import protection for the manufacturing sector and domestic marketing arrangements for agriculture. Over time, the Commission has expanded its coverage to include a broad array of assistance measures touching most sectors of the economy.

A key aspect of the Commission's assistance measurement system from its inception has been the use of the 'effective rate of assistance' (ERA) concept, and related measures, to gauge the extent to which the structure of assistance to industries affects the allocation of resources within the economy.

This section provides a basic introduction to the Commission's assistance measurement system and the meaning of ERA and related measures.

1.1 Coverage of assistance

Reflecting the broad definition of assistance in the *Productivity Commission Act 1998* (see above), an array of different mechanisms provide assistance to industry. These include tariffs, quotas, anti-dumping duties and regulatory restrictions on imported goods and services, as well as tax concessions and subsidies for domestic producers. Assistance also arises from the provision of underpriced services by government agencies and from government procurement policies.

For its annual estimates of industry assistance as published in *Trade & Assistance Review*, the Commission does not cover all forms of government support to industry. Rather, the Commission focuses on the main forms of government support to industry that *selectively* assist firms, activities or industries and that can be quantified given practical constraints in measurement and data availability.

The forms of assistance covered in the Commission's annual estimates are:

- Commonwealth budgetary assistance;
- tariff assistance; and
- agricultural pricing and regulatory assistance.

The coverage of assistance under each of these categories is described in detail in section 2.

Forms of assistance that are not covered in the Commission's annual ERA estimates include:

- *restrictions on trade in services* — the nature of these restrictions and the difficulties in establishing a 'benchmark price' for services means it is difficult to determine the level of assistance associated with these restrictions. The Commission has published specific studies of services barriers, and their price impacts, but does not incorporate these into its annual ERA estimates.
- *anti-dumping and countervailing actions* — lack of information means that the Commission does not include the assistance effect of these duties in its national ERA estimates, but monitors year-to-year usage.
- *state government assistance* — apart from nationally-significant agricultural pricing and regulatory assistance provided by State arrangements, the Commission does not include State government assistance as part of its annual ERA estimates. However, from time-to-time, the Commission has published broad estimates of the level of State government budgetary assistance to industry.[1]
- various *other* forms of assistance, including government purchasing preferences; the underpricing of infrastructure; capital depreciation subsidies and the impact of tariffs on capital items; certain drought relief and any assistance effect that may be associated with quarantine restrictions, and government programs affecting a range of service industries relating mainly to the provision of health and welfare, where funding predominantly benefits consumers and individual citizens.

1.2 Coverage of industries

The level of detail at which the Commission reports on assistance, and the focus of its estimates, have changed over time. The initial focus was on assistance to the traded goods sectors — manufacturing and agriculture — where the levels of assistance measured by the Commission were found to be high. Over time, assistance to these sectors has declined and they have become more internationally competitive. At the same time, as in other countries, services have increased in importance — services now

[1] The Industry Commission published such estimates for the years 1994-95, 1995-96 and 1996-97 as part of its 1996 public inquiry into *State, Territory and Local Government Assistance to Industry* (IC 1996). The Productivity Commission has published similar estimates for the years 2000-01 and 2001-02 in *Trade & Assistance Review 2001-02* (PC 2002c).

Table 1.1 **Industry groupings used for assistance evaluation purposes in *Trade & Assistance Review 2001-02***

Industry grouping	*ANZSIC codes*
Primary production	**A**
Dairy cattle farming	013
Grain, sheep and beef cattle farming	012
Horticulture and fruit growing	011
Other crop growing	016
Other livestock farming	015
Fisheries	04
Forestry	03
Other primary production [a]	02 & 014
Mining	**B**
Manufacturing	**C**
Food, beverages & tobacco	21
Textiles, clothing, footwear & leather	22
Wood & paper products	23
Printing, publishing & media	24
Petroleum, coal, chemical & assoc. products	25
Non-metallic mineral products	26
Metal product manufacturing	27
Motor vehicles & parts	281
Other transport equipment	282
Other machinery & equipment	283-286
Other manufacturing	29
Services	**D-Q**
Electricity, gas & water supply	D
Construction	E
Wholesale trade	F
Retail trade	G
Accommodation, cafes & restaurants	H
Transport & storage	I
Communication services	J
Finance & insurance	K
Property & business services	L
Government administration & defence	M
Education	N
Health & community services	O
Cultural & recreational services	P
Personal & other services	Q

a Other primary production includes *services to agriculture, hunting and trapping* and *poultry farming*.

account for around 80 per cent of employment and GDP in Australia. In recent years, the Commission has begun focussing more on the services sector, and has rationalised it estimates in relation to manufacturing and agriculture. This rationalisation has also allowed the Commission to combine more forms of assistance into its ERA estimates

— while tariff assistance can be disaggregated to a fine level of commodity detail, this is not possible for much budgetary assistance, which tends to be provided more at the industry or sectoral level than at the commodity level.

In *Trade & Assistance Review 2001-02*, the Commission has presented estimates of combined assistance for 37 'industry groupings' (table 1.1).

1.3 Assistance measures

The Commission has adopted several measures to help quantify and compare the diverse assistance arrangements which affect businesses in the different sectors of the economy, in particular in the agriculture and manufacturing sectors.

In brief, the basic measures are:

- the *gross subsidy equivalent (GSE)*, which is the dollar value of assistance to an industry's or activity's *outputs;*
- the *tax equivalent on materials (TEM)*, which is the dollar value of assistance to an industry's or activity's *inputs* — which penalises the industry/activity by raising its costs; and
- the *net subsidy equivalent (NSE)*, which is a measure of the dollar value of *net assistance* to an industry or activity's value added (and is equal to the GSE *plus* any assistance to value-adding factors, *less* the TEM).

Each of these measures is accompanied by a 'rate of assistance' measure, namely:

- the *nominal rate of assistance on output* is the GSE divided by the industry's value of production (measured in unassisted prices);
- the *nominal rate of assistance on inputs* is the TEM divided by the industry's value of materials (measured in unassisted prices); and
- the *effective rate of assistance (ERA)* is measured by the NSE divided by the industry's net output (measured in unassisted prices) or, more formally, its 'unassisted value added'.

These and other measures used by the Commission are explained in more detail in section 3.

In essence, these measures help to explain how the overall assistance structure affects the allocation of resources between different industries or activities within the economy, as well as how different types of assistance affect the incentives to produce and, to a lesser extent, to consume, certain commodities. Box 1.1 provides a simplified example of how assistance can affect the allocation or resources and

how, in turn, this can affect the value that the community obtains from its use of resources. Box 1.2 provides a further example of how the provision of assistance can affect the structure of industry and the nature of consumption within an economy.

Box 1.1 **Assistance and the allocation of resources — an illustration of red and green 'widgets'**

Government assistance to a particular industry (or activity) can make investing in the industry more remunerative than it would otherwise be. In turn, this can attract economic resources away from other industries into the assisted one.

– To illustrate with a *highly simplified* example, imagine that the expected returns on investment are 10 per cent in the 'red widget' industry, but only 8 per cent in the 'green widget' industry – say because consumers prefer red widgets to green ones and are thus willing to pay more for them. In these circumstances, people would be expected to invest in red widgets rather than green widgets for as long as the gap remains. However, if the government provides a subsidy for green widgets such that the total returns (including the subsidy) rise to 12 per cent, people will be expected to invest in green rather than red widgets. As well, some existing red widget producers will probably switch to producing green ones.

In specific instances, such assistance will lead to a more efficient allocation of resources between the various industries and activities within the economy. This will be the case if: normal commercial incentives fail to reflect the real benefits and costs that people and society more broadly get from producing or consuming the goods and services in question; and the assistance provided by the government sways incentives in the right direction.

– For example, if red widgets when used emit far more pollution than green widgets, and environmental laws are unable to make users of red widgets pay for, or clean up, their pollution, then government assistance which increases the proportion of green widgets consumed may improve community welfare.

However, in other cases, assistance to a particular business or activity will worsen the allocation of resources.

– If the only difference between red and green widgets is their colour then assistance to the green widget industry will make society worse off, given consumers' preference for red widgets.

Box 1.2 Production and consumption responses to assistance: an illustration of oranges and grapes

To understand how assistance can change production and consumption patterns, consider a *highly simplified* situation in which some farmers in an area grow grapes and some grow oranges, and returns in these two industries are about the same – say around a 4 per cent return on investment. All oranges and grapes grown in this economy are consumed in it too, with no imports or exports.

If a subsidy is provided to producers of oranges such that returns from oranges increase, say to 12 per cent, existing orange farmers will receive the full value of this windfall gain in the short-run.

However, over time, some grape farmers are likely to start switching to growing oranges (and existing orange farmers, or other investors, may bring more land into production). This will cause the supply of oranges to increase and, to clear their stock, producers will need to cut the price. As the price falls, consumers will start buying more oranges, but returns in the orange industry will fall too.

Meanwhile, in the grape industry, supply is declining putting upward pressure on the price. As the price increases, consumers cut back their purchases of grapes, but the returns to grape growing increase.

However, as long at the returns to orange production exceed the returns to grape growing, farmers have a continuing incentive to switch from grapes into oranges. This will go on until the returns in both industries are around the same – say at 9 per cent return on investment.

Another factor though is that, to finance the subsidy for orange producers, the government needs to raise extra revenue (through higher taxes or higher charges for services it provides), cut its spending, or incur a higher budget deficit or lower surplus. Say it raised more revenue through a tax on electricity (although either of the other options would have similar ultimate effects). This would increase orange and grape growers' power bills and further reduce, although only slightly, the returns in those industries. It would also reduce the returns to other industries which rely on electricity to produce their output, particularly energy-intensive industries. And because householders would have to pay slightly higher electricity bills, they would have slightly less left to spend on other goods and services.

With other industries facing slightly higher power bills and slightly lower demand for their products, some 'borderline' businesses in these industries may need to close or reduce their production (unless they are able to make offsetting gains in productivity).

Overall, the effect of providing assistance in this illustration is to cause more oranges to be produced, mainly at the expense of a cut in the production of grapes, and for production in other industries to fall slightly (without productivity improvements). Consumers finish up eating more fruit (but a different mix thereof) and consuming less of other products.

While in practice the world is far more complex than this highly simplified illustration, it nevertheless provides an indication of the nature of some of the effects that can flow from the provision of assistance to industry.

Notwithstanding the usefulness of the Commission's ERA and related measures, care is required when using them to draw inferences about the allocation of resources between different industries or activities. The key qualifications are that:

- the measurement methodology uses a 'static' framework, so the estimates do not take account of the responses of producers and consumers to the incentives created by the provision of assistance (such as those illustrated in box 1.2);
- nominal rates of assistance, unlike effective rates, do not take into account the *net* impacts of assistance on inputs and outputs; and
- the net subsidy equivalent simply measures the transfers of income to producers from consumers, taxpayers and intermediate suppliers — it does not indicate the 'welfare' costs to the community of assistance.

With the constraints of these qualifications, the Commission's annual estimates of government assistance to industry are intended principally to aid transparency and facilitate analysis. They do not of themselves indicate the policy merits, or the actual resource allocation effects, of different government assistance measures. The derivation and interpretation of these measures is discussed further in section 3.

2 Types of assistance

As noted earlier, the key forms of assistance covered in the Commission's annual assistance estimates are:

- Commonwealth budgetary assistance;
- tariff assistance; and
- agricultural pricing and regulatory assistance.

One goal when estimating these separate forms of assistance is to derive an estimate of the GSE and TEM associated with each, for subsequent inclusion in the Commission's ERA estimates of combined assistance.

However, the components of the different forms of assistance, and their effects and changes over time, are of interest in their own right. This is particularly the case in relation to budgetary assistance, which covers a range of different forms of assistance which can have diverse effects on economic incentives. Accordingly, as well as calculating an overall estimate of assistance, each year the Commission breaks down and describes these forms of assistance in some detail.

This section explains what is covered under each category and how the Commission goes about classifying and quantifying the assistance provided.

2.1 Budgetary assistance

Budgetary measures can provide industry assistance through government spending or through selective tax concessions to business.

Budgetary assistance takes an array of forms and is variously provided to producers in all sectors of the economy, particular firms or industries, or particular activities — such as investment, exporting and R&D — undertaken by firms in different industries.

In compiling its annual estimates of Commonwealth budgetary assistance, the Commission has adopted the practical approach of seeking to gauge only those budgetary measures which selectively benefit firms, industries, sectors, or activities. That is, its aim is to quantify those budgetary measures which provide benefits to

certain businesses but not to others. The estimates thus provide a guide to how the discriminatory nature of assistance provided through the budget alters incentives to use resources in different industries or activities.

Coverage

The Commission's annual estimates include a wide range of budgetary assistance, but do not seek to incorporate all budgetary measures which provide support for industry, for a range of practical as well as conceptual reasons. Included within the coverage is an array of budgetary measures which provide assistance to firms in all four sectors of the economy.

The various budgetary measures are listed in tables A.1 to A.5 of appendix A of *Trade & Assistance Review 2001-02*. These include industry-based bounties and subsidies, specific investment incentives, export development grants, and selective structural adjustment programs.

Budgetary assistance to the manufacturing sector predominantly comprises major industry-specific schemes and R&D support measures. Industry-specific budgetary assistance includes special tariff concession (such as those provided for PMV through the Automotive Competitiveness Investment Scheme), grants (for example, the TCF Strategic Investment Program and the Pharmaceutical Industry Investment Program) and bounties (such as to shipbuilding). R&D schemes include the R&D tax concession, targeted R&D grant schemes, and selected CSIRO and CRC research.

The programs assisting agriculture predominantly comprise sector-specific measures and R&D support. The sector-specific estimates include funding for farm landcare activities, income tax averaging and selective income support measures, as these measures are specifically available to agricultural activities but equivalents are not available in other sectors. Support for rural research mainly comprises funding of rural R&D corporations and CSIRO and CRC research.

The key measures included in the mining estimates are the development allowance, and research assistance delivered via CSIRO funding and the R&D tax concession.

The diverse nature of the services sector is reflected in the wide range of assistance measures afforded it. However, the estimates exclude government programs affecting a range of service industries relating mainly to the provision of health, welfare and education, where funding predominantly benefits consumers and individual citizens.

Support for business R&D, which assists firms across a range of industry groupings, is covered in the estimates. The schemes included are the R&D tax concession,

targeted R&D grant schemes, funding of rural R&D corporations, and CSIRO and CRC research on primary production, manufacturing, mining and service activities.

The Commission's estimates of budgetary assistance also include programs which are designed to encourage exporting activity by firms across different industry groupings. Covered in the estimates are outlays on export marketing and promotional services provided through Austrade's programs and export financing activities provided by the Export Finance and Insurance Corporation (EFIC) export credit facilities. Other budgetary programs which assists exporting include funding to the Australian Tourist Commission and other tourism programs that are aimed at promoting inbound tourism. Also included in the budgetary assistance estimates are duty concessions made available through the TRADEX and Duty Drawback provisions to assist exporters.

While the Commission's estimates cover a wide range of Commonwealth budgetary measures, they do not include the following:

- budgetary measures which are generally available to all firms – for example, reductions in company tax rates applying to all firms;
- outlays focussed on public administration, defence, health, education, the environment and the labour market;
- expenditures on infrastructure, except where they clearly apply to specific activities;
- budgetary assistance provided by State, Territory and local governments (appendix B of the *Trade & Assistance Review 2001-02*);
- certain drought relief payments, such as Exceptional Circumstances payments; and
- revenue forgone from accelerated depreciation provisions.[2]

As the coverage of budgetary assistance is confined to those budgetary measures which, among other things, are readily quantifiable, the estimates are likely to understate the overall level of Commonwealth budgetary assistance in Australia to some degree. The extent of this underestimation is likely to vary between sectors, industries and activities.

[2] Accelerated depreciation provisions allow assets to be written off over a period shorter than the effective economic life of the assets, the assistance impact of accelerated depreciation is equivalent to an interest-free loan, and can thus differ from the estimated revenue forgone. Accelerated depreciation arrangements have been important measures of assistance to capital intensive industries of manufacturing and mining. Some specific measures are also available to agricultural activities such as vineyards and horticulture. Estimating the assistance impact of accelerated depreciation is difficult due to limited data on the true economic life of capital assets.

Classifications

To provide some indication on the nature and extent of Commonwealth budgetary assistance, the Commission classifies budgetary assistance programs according to:

- the *form* of assistance;
- the *activity* it predominantly assists; and
- the *sector* and *industry grouping* to which it applies.

Forms of assistance

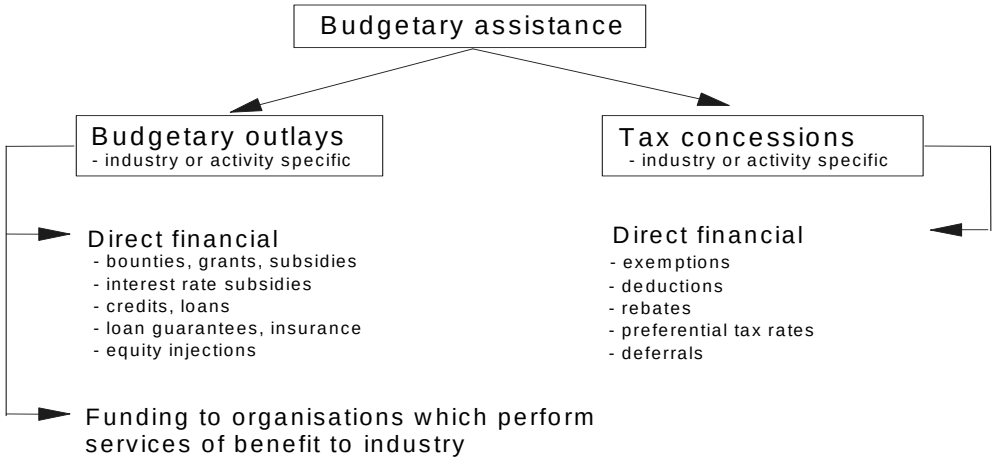
In classifying the 'forms' of budgetary assistance, total budgetary assistance is categorised into *budgetary outlays* and *tax expenditures* (or *'concessions')*, which are further distinguished by the type of benefits provided (figure 2.1).

In relation to 'budgetary outlays', a distinction is made between:

- *direct financial assistance* — which broadly comprises bounties, grants and subsidies; interest rate subsidies, loans, credits and guarantees; and government equity participation; and
- *funding of intermediary institutions which perform activities of benefit to industry* — for example, funding of CSIRO and CRC research programs, Austrade's International Business Services and the Australian Tourist Commission. Provision of services raise producers' returns in ways similar to direct financial assistance.

'Tax expenditures' provide financial benefits to industry through tax exemptions, deductions, rebates, preferential tax rates and tax deferrals. For example, tax exemptions allow income to be excluded from the tax base. Tax deductions, such as the R&D tax concession, allow certain expenditures to be eligible for deductions which normally would not be allowed in the tax system. Preferential tax rates involve the application of a lower tax rate for particular industries. The deferral of tax over a number of years also constitutes a form of assistance. Accelerated depreciation provisions are examples of tax deferrals.

Figure 2.1 **Forms of budgetary assistance**



Activities assisted

Budgetary assistance is often designed to encourage particular activities undertaken by firms across industries and/or sectors, while some assistance measures are industry-specific. To provide an indication of the distribution of assistance amongst activities, the Commission classifies Commonwealth budgetary assistance as belonging to one of seven categories[3]:

- industry-specific assistance — schemes which are designed to encourage production in particular industries, such as the PMV Automotive Competitiveness Investment Scheme and the TCF Strategic Investment Program;
- general export measures — programs which target particular stages of exporting activities, such as the Export Market Development Grants scheme;
- general investment measures — schemes which encourage certain types of investment, such as the development allowance;
- general R&D measures — schemes which support business research, such as the R&D tax concession and funding of rural R&D corporations;
- sectoral assistance — programs which are specific to a particular sector, such as agriculture, to facilitate adjustment or provide income support; or
- other measures — schemes, such as regional assistance programs, that do not fall within any of the above categories.

3 The Commission altered the basis on which it classifies assistance by activity for *Trade & Asisstance Review 2001-02*. Among other things, previously industry-specific export facilitation schemes had been included in the Commission's estimates of 'export' assistance, whereas now they would be classified as 'industry specific assistance'. The category 'general export measures' refers to measures that apply to exporting activity across a number of industries.

Caution is required in interpreting these estimates because particular industry-specific programs may be designed to encourage more than one type of activity. In these cases, the Commission has allocated the program's total funding as industry-specific without further categorising the activities. A further qualification is that the extent to which an activity that appears to be targeted by a program actually benefits from the assistance is not always clear. This reflects a lack of information on the operation of certain schemes and their economic effects.

Sectoral and industry incidence

As well as reporting assistance by form and activities, the Commission also estimates the incidence of budgetary assistance by benefiting industries. Prior to 1999, the incidence of assistance was reported using a four-sector classification of the economy. In 2000, the industry classification was broadened to include 27 industry groupings. Under this system, primary production and mining remained as single categories, while manufacturing and services were subdivided into 11 and 14 industry groupings, respectively. This disaggregation was first completed for the *Trade & Assistance Review 1999-2000* and a detailed description of the methodology used was included in a *Methodological Annex* (PC 2000b). For *Trade & Assistance Review 2001-02*, the Commission has expanded its industry classification to include 10 new primary production groupings. The new allocation provides significantly more detail than the previous classification. The methodology used to disaggregate the estimates for primary production is included in *Methodological Annex B* (PC 2002d).

In allocating assistance to industry groupings, the Commission examines each program individually. Programs that assist only a single industry, such as the Sugar Industries Program or the Grape and Wine R&D Corporation, are allocated directly to that industry (*other crop growing* and *horticulture*, respectively). However, many programs assist multiple industries — for example, income tax averaging provisions. The Commission uses a variety of methods in determining to what extent each industry benefits from these programs.

- Where the Commission can obtain sufficiently detailed data for a program, it has used this data to distribute the program's funding among the benefiting industries. For example, the Commission obtains four digit ANZSIC claims data for the Export Market Development Grants scheme which is sufficiently detailed to determine the degree to which each industry grouping benefits from the program.
- For programs that provide grants to industry and where the Commission has details on the individual grants, it uses this information to assign each grant to a particular industry. For example, the (Department of) Agriculture, Fisheries and

Forestry Australia publishes details for grant recipients under the Farm Innovation Program. These details are used by the Commission to determine which industries benefit from the program.

- Where the Commission cannot obtain data to indicate which industries benefited from a particular program, the assistance given under that program has been left unallocated.

In most cases, the Commission has obtained sufficient data to allocate assistance to the 35 industry groupings — around only 15 per cent of budgetary assistance has been placed in an 'unallocated' category.

Quantification

The assistance impact of most budgetary measures can be readily quantified by the budgetary outlays and tax revenue forgone provided to industry in a particular year. In compiling estimates, data are drawn from Commonwealth Budget Papers, annual reports of government departments and agencies, the Treasury's Tax Expenditure Statement and Australian Taxation Office (ATO) taxation statistics.

The estimates incorporate only the government contribution to programs' funds. This approach is applied consistently to all programs, including those (such as rural R&D corporations) which are funded jointly by industry and governments.

Some aspects of the Commission's quantification of budgetary assistance may overstate the benefits received under certain programs or tax expenditures, although the extent to which this occurs is likely to be small relative to the overall level of estimated budgetary assistance. This may occur where recipients of the funds are not minimising costs. In such cases, part of the payment may be a genuine production subsidy while part is an income transfer. For example, total outlays are reported for non-business organisations that undertake activities of benefit to industry, but this will overstate the benefits to the extent that the activities are not delivered efficiently. Also, under Australia's tax imputation system, the value of tax concessions can be reduced to some degree as such concessions reduce company tax liabilities. That said, the costing of tax expenditures is understood to provide some allowance for such factors. Issues in costing tax expenditures are discussed in more detail in the Treasury's Tax Expenditure Statement (Treasury 2002).

2.2 Tariff assistance

Tariffs have a number of direct effects on the returns received by Australian producers. Tariffs on imported goods increase the price at which those goods can be

sold on the Australian market, and thus allow domestic producers of similar products to increase their prices. On the other hand, tariffs also increase the price of goods that are used as inputs by Australian producers and thus penalise some Australian producers. This 'penalty' is reduced if tariff concessions are available to Australian users.

Australia's tariffs on imported goods are set by the Commonwealth government and a record of individual tariff levels is maintained in the Australia Customs Tariff Schedule. Australian tariffs are levied on the value of imports in the foreign port, as opposed to the landed value of imports. Tariffs on all imports have been reduced significantly since the early 1970s. As a result, with the exception of goods within the *textiles, clothing & footwear* (TCF) and *motor vehicles & parts* (MVP) industries, and of some cheeses, all general tariffs applied to imports are now 5 per cent or less.

The main forms of tariff concessions and duty exemptions include the following.

- *Duty exemptions for selected countries*. Imports from certain sources, such as New Zealand, Papua New Guinea, the Forum Islands and some developing countries, are given duty free status. This duty free entry is generally granted either to countries with a cost structure similar to Australia or to compensate for a trade disadvantage not typical of most countries exporting to Australia. The main effect of these arrangements is therefore likely to be to divert some trade to these sources, rather than to lower the price of imports (after duty).
- *Tariff concessional arrangements*, such as the Tariff Concession System (TCS), Project and other policy by-laws, the Automotive Competitiveness and Investment Scheme (ACIS), the Duty drawback scheme, the TCF imports credits scheme and TRADEX. These schemes typically lower the 'operative' tariff rate from the general rate to either zero or a concessional rate; and
- *Duty exemptions for government imports*. Certain government imports enter duty free, such imports are usually for defence purposes and general government use.

The Commission's estimates of tariff assistance for output and input goods are derived in two main steps. These involve:

- using the Commission's TIDES[4] model to provide estimates of the 'price impacts' of tariffs (and quotas)[5] for both output and input goods; and
- combining these results with ABS Input-Output data to derive NSE estimates of tariff assistance.

4 Tariff and Import Database and Estimating System (TIDES).

5 To simplify the operations of TIDES, all quotas have been converted to an ad valorem basis.

Calculating price impacts using TIDES

TIDES uses information from the Australian Customs tariff schedules and ABS merchandise trade imports to estimate the price impacts of tariffs and quotas for both domestic and imported goods.

As a first step, it derives an estimate of 'imputed duty' for each import item — that is, the duty payable for each tariff item, given its value of imports and operative tariff rate. To take into account the effects of tariff concessions and duty exemptions on imported goods, TIDES separates the import data into three distinct groups and then estimates imputed duty separately for each group. These groups include:

- *general* entry items. General entry items comprise imported goods that are subject to the general tariff rate and do not receive any form of tariff concession or duty exemption. For this group, imputed duty is calculated as the import value for duty[6] multiplied by the annual average tariff rate for each tariff item;
- *government* entry items. Government entry items comprise goods imported by the government such as defence goods and goods for general government use. Goods subject to government entry enter duty free. Imputed duty for this group is therefore set equal to zero; and
- *concessional* entry items. Concessional entry items comprise imported goods whose general tariff rate is amended to reflect concessional entry. For this group, the calculation of imputed duty is similar to that for *general* entry items except that the tariff rate has been adjusted to reflect the tariff concession.

TIDES then concords its estimates of imputed duty, together with the landed value of imports, by tariff item to the ABS Input-Output Product Classification (IOPC). This procedure is largely carried out using a concordance provided by the ABS linking 6-digit tariff items with IOPC (1996-97) items.

At the IOPC classification level, TIDES then derives estimates of the price impacts of tariffs and quotas for both output and input goods. The price impacts of tariffs and quotas are defined as the imputed duty divided by the landed value of imports:

- for output goods, only data from the *general* entry group is used to estimate the price impacts of tariffs and quotas. *Government* and *concessional* entry items are excluded; and
- for input goods, only data from *general* and *concessional* entry groups are used to calculate the price impacts of tariffs and quotas. Goods subject to *government* entry are excluded. The use of *general* and *concessional* entry items is deemed to represent the average mix of goods used as inputs by industry.

6 The free-on-board (fob) value of imports.

Estimating subsidy and tax equivalents using ABS Input-Output data

The price impacts of tariffs and quotas are then combined with ABS Input-Output data to derive estimates of border assistance for both output and input goods.

For output goods, the price impacts of tariffs (and quotas) are combined with ABS Input-Output domestic production data to estimate the dollar value of output tariff assistance — the Gross Subsidy Equivalent (GSE).

For inputs, the price impact of tariffs (and quotas) are combined with ABS Input-Output intermediate usage data to derive estimates of input tariff assistance — the Tax Equivalent on Materials (TEM). The TEM imposes a penalty, or negative assistance, on producers who use imported inputs, or their domestic equivalent, that are subject to the price rising effects of tariffs.

These estimates are derived by the ABS using confidential Input-Output data, together with data from the Commission's TIDES model. The GSE and TEM estimates are derived at the detailed IOPC classification level (about 1000 items) and then aggregated to the 106 industry ABS Input-Output Industry Group (IOIG) classification. The ABS then returns these results to the Commission for further analysis.

The GSE and TEM estimates are then combined to derive an estimate of net tariff assistance, or the Net Subsidy Equivalent (NSE). The NSE is calculated as the GSE less the TEM. The NSE estimates are calculated at the 106 industry ABS IOIG classification and then further aggregated to the Commission's ANZSIC-based 'Industry Grouping' classification system used to present assistance estimates in the *Trade & Assistance Review*.

2.3 Agricultural pricing and regulatory arrangements

The Commission's estimates of assistance derived from agricultural pricing and regulatory arrangements historically have dominated total measured assistance to the agricultural sector. While many assistance schemes have been discontinued since the 1980s, as recently as 1997, the Commission's estimates incorporated statutory marketing arrangements for dairy, sugar, rice, and eggs, a local content scheme for tobacco leaf, and loan guarantees for the borrowing by the wheat and wool boards. More recently, pricing and regulatory support have been the preserve of the dairy and rice industries, although these too have been wound down significantly.

Dairy pricing and regulatory assistance

Prior to 2000-01, the dairy industry received assistance largely from a combination of State government price and regulatory controls, which maintained high prices for drinking milk, and Commonwealth Market Support Payments for milk used in manufacturing — for processing into products such as butter, cheese, milk powder and ice cream. These arrangements provided dairy farmers with assistance of around $450 million in 1999-2000.

These arrangements were terminated as part of the deregulation of the dairy industry in July 2000. As part of the deregulation process, the Commonwealth Government introduced new arrangements to provide payments to dairy farmers — the Dairy Industry Adjustment Package (DIAP). These payments will amount to around $1.8 billion over the 8 year life of the package.

The cost of the package is funded by an 11 cents per litre levy on retail sales of drinking milk, to remain until at least 2008. Further details of the adjustment package and milk levy were provided in *Trade & Assistance Review 2001-02*.

The package includes a number of sub-programs. These include:

- the Dairy Structural Adjustment Program ($1.63 billion);
- the Supplementary Dairy Assistance Program ($139 million);
- the Dairy Exit Program ($30 million); and
- the Dairy Regional Assistance Program ($65 million).

While assistance is defined in very broad terms in the *Productivity Commission Act 1998*, not all of the funding of the DIAP neatly falls within the bounds of the Commission's assistance measurement framework. For example, the *Dairy Exit Program* (DEP) confers assistance to dairy farmers who leave the industry. The Commission's assistance estimates, however, are confined to those currently engaged in production. The DEP therefore falls outside of the Commission's criteria for assessing assistance and as such has been excluded from the Commission's estimates.

The *Dairy Regional Adjustment Program* (DRAP) provides financial benefits to manufacturing activities on a project-by-project basis. As the Commission's assistance measurement approach is based on the initial benefiting incidence of assistance, the DRAP has not been incorporated into the agricultural (or dairy) assistance estimates.

The *Dairy Structural Adjustment Package* (DSAP) and the *Supplementary Dairy Assistance Program* (SDAP) directly provide financial assistance to farmers who

remain in dairy farming activities. Payments from the DSAP and SDAP programs therefore have been included in the Commission's assistance estimates.

The DSAP and SDAP programs, however, also provide assistance to farmers who exit the industry in any relevant year. There is no requirement that those who qualify for, and receive, DSAP and SDAP payments remain in dairy farming activities. As the Commission's assistance measurement system is confined to those currently engaged in production, the Commission's estimates only record as assistance DSAP and SDAP payments to farmers who remain in dairy farming activities.

Although an imperfect indicator of DSAP and SDAP recipients leaving the industry, the fall in dairy-farmer numbers since 1999-2000 has been used to scale the payments to reflect those funding recipients that have exited the industry. It is assumed that the average DSAP and SDAP payment is the same for those farmers remaining in the industry and for those who leave, and that the number of new farmers entering the industry is negligible.

To reflect the different mix of production, and DSAP/SDAP payments, for market and manufacturing milk, estimates of assistance (scaled DSAP and SDAP payments) have been derived at the State level. State estimates of farm numbers are available from the Australian Dairy Corporation (ADC), while DSAP and SDAP payments have been pro-rated to the individual states based on their DSAP and SDAP payment rights (up to the end of June 2002) as published in the Dairy Adjustment Authority (DAA) annual report 2001-2002.[7]

In addition to measuring assistance, the classification of assistance from the new assistance arrangements into output, input and assistance to value adding factors has

[7] There is also scope to further adjust assistance received from the DSAP and SDAP programs according to the number of farmers electing to take an exit payment in any particular year. Under the DIAP, farmers are only entitled to receive the net amount of any payments from the DSAP/SDAP and dairy exit programs. For example, a farmer who initially has a DSAP payment right of $30,000, and subsequently elects to take an exit payment of $45,000, is only entitled to receive the net of both payments, or $45,000. If the farmer has already received $5000 in DSAP payments, then the exit payment is reduced by $5000 and all future DSAP payments are cancelled. This implies that when a farmer elects to take an exit payment, the average DSAP payment between those who remain in the industry and those who leave is not equal. That is, a greater proportion of DSAP payments are directed towards those remaining in the industry as opposed to those who leave.

This adjustment, however, has not been made to the Commission's estimates for two main reasons. Firstly, the maximum dollar amounts involved are relatively small — $2.3 million and $2.7 million in 2000-01 and 2001-02, respectively — and, secondly, the amount of DSAP and SDAP payments re-directed to those remaining in the industry is unclear from the available information.

changed relative to the previous arrangements. Payments from the DSAP and SDAP programs increase the incomes of those who own the factors of production in dairy farming activities. Unlike previous arrangements, the new package does not contain direct output requirements. Funding from the new programs has therefore been classified as assistance to value adding factors in the Commission's assistance measurement system, while assistance derived from the previous arrangements were classified as assistance to outputs. The impact of this classification change is to reduce the nominal rate of assistance for the dairy industry, but to leave effective rates unchanged, relative to the previous treatment.

Overall, assistance provided by the DIAP is significantly lower than the previous arrangements. Assistance from the DIAP was estimated to be around $180 million in 2000-01, while the previous arrangements are estimated to have provided around $450 million in 1999-2000. The level climbed to around $250 million in 2001-02, primarily reflecting SDAP payments, but is expected to decrease again in 2002-03.

As well as reducing the total quantum of assistance, the new arrangements also removed the (price) distinction between market and manufacturing milk at the farm gate level, although payments from the new arrangements continue to reflect the previous distribution of assistance. The Commission has not published separate assistance estimates for market and manufacturing milk, since production and subsidy payments are no longer linked.

Rice pricing and regulatory assistance

The rice industry is centred in the Riverina in New South Wales and is assisted through statutory marketing arrangements which allow the NSW Rice Growers Co-operative to vest and market all rice grown in the state. This enables the domestic price of rice to be maintained at higher levels than would prevail under more competitive conditions.

In measuring assistance to the rice industry, it is assumed that the NSW Rice Growers Co-operative is able to increase domestic prices to import parity levels. Information on import parity price levels for the rice industry is derived from ABS merchandise trade import data. An estimate of assistance is then derived by multiplying the amount by which domestic prices increase (import parity less export parity) by domestic rice production. In 2001-02, assistance provided from the rice industry's statutory marketing arrangements was estimated to be $6.6 million.

3 Combined assistance estimates: derivation and interpretation

The Commission publishes a range of measures to highlight aspects of the assistance structure and its effects. These various measures are set out in box 3.1. This section explains how the key measures are derived and their interpretation.

3.1 Combined GSE, TEM and NSE estimates

The Commission first separates its dollar value estimates of assistance from budgetary measures, tariffs and agricultural pricing and regulatory arrangements into three categories:

- output assistance;
- input assistance; and
- assistance to value-adding factors.

These are aggregated to provide combined estimates of output assistance (the GSE), input assistance (the TEM) and net assistance (the NSE) for each industry grouping. The Commission also adjusts these items to reflect overlap in its different estimates — in particular, the inclusion of tariff concessions in both its tariff and budgetary assistance estimates.

Because the Commission's budgetary assistance estimates are calculated in current dollars while estimates of tariff assistance are based on ABS Input-Output data for 1996-97, the latter are revalued to current dollars using ABS data on Gross Value Added at current prices. Periodic revisions to ABS data can affect the Commission's assistance estimates, although such revisions are not expected to significantly affect year-to-year comparisons.

Estimates of the GSEs, TEMs and NSEs for combined assistance for the years 1997-98 to 2001-02 are provided in appendix A of this annex.

Box 3.1 Definitions of assistance measures

The **gross subsidy equivalent** is an estimate of the change in producers' gross returns from assistance. It is the notional amount of money, or subsidy, necessary to provide an activity with a level of assistance equivalent to the nominal rate of assistance on its output.

The **nominal rate of assistance on outputs** is the percentage change in gross returns per unit of output relative to the (hypothetical) situation of no assistance. The nominal rate measures the extent to which consumers pay higher prices and taxpayers pay subsidies to support local output.

The **standard deviation in the nominal rate of assistance on outputs** measures the dispersion of the nominal rates of output assistance for the different industries in a sector around a 'group' average nominal rate — normally the sectoral average. It is an indicator of the potential for distortions in production and consumption patterns within the group of industries resulting from the output assistance provided to the group.

The **tax equivalent on materials** is an estimate of the net change to user industries' input costs due to government assistance. It is the notional amount of money user industries pay for intermediate inputs to provide the producers of those inputs with a level of assistance equivalent to the nominal rate of assistance on materials.

The **nominal rate of assistance on materials** (intermediate inputs) is the percentage change in the prices paid for materials used in the production process due to government intervention.

The **net subsidy equivalent** is an estimate of the change in returns to an activity's value added due to assistance. It is the notional amount of money, or subsidy, necessary to provide a level of assistance equivalent to the effective rate of assistance. It is equal to the gross subsidy equivalent plus any assistance to inputs or value-adding factors, less the tax equivalent on materials used in the production process.

The **effective rate of assistance** is the percentage change in returns per unit of output to an activity's value-adding factors due to the assistance structure. The effective rate measures net assistance, by taking into account the costs and benefits to the activity of government intervention on inputs, direct assistance to value-adding factors and output assistance.

The **standard deviation in the effective rate** measures the dispersion of the effective rates of assistance for the different industries in a sector around the sectoral average effective rate. It is an indicator of the potential for distortions in resource allocation within the sector resulting from the overall assistance structure.

The **consumer tax equivalent** is the transfer from final consumers due to the price-raising effects of assistance. It is the sum of the gross subsidy equivalent of assistance, which measures the higher prices paid for domestically produced goods, and the effect of border assistance on the price of imports purchased by final consumers.

3.2 Calculation of nominal and effective rates of assistance

The combined GSEs, TEMs and NSEs are then used, together with ABS input-output data, to estimate nominal and effective rates of assistance for each industry grouping.

The *nominal rate of assistance on outputs* is calculated as output assistance, or the GSE, divided by *the 'unassisted' value of output* (UVO). The UVO is equal to the *'assisted' value of output* (AVO) less the GSE. Some forms of assistance (such as tariffs, import quotas and, in some years, domestic pricing arrangements) increase producers' returns by raising prices (called the price distortion) while other forms of assistance (such as production bounties) raise producers' returns without increasing prices paid by user industries. The nominal rate of assistance on outputs, therefore, measures the extent to which consumers pay higher prices and taxpayers pay subsidies and bounties in support of local output.

The *nominal rate of assistance on 'materials'* (NRM) is a measure of the extent to which prices paid for materials (intermediate inputs) used in the production process change due to government intervention. For example, tariffs on intermediate inputs penalise user industries by raising prices, while consumption subsidies benefit user industries through lowering prices. Unlike the nominal rate of assistance on outputs, the nominal rate on inputs excludes those forms of assistance (eg production bounties) which benefit the production of intermediate inputs without affecting prices paid by user industries. The NRM is defined as input assistance, or the TEM, divided by the *'unassisted' value of materials* — which is derived in a similar manner to the AVO.

The *effective rate of assistance* (ERA) is a measure of net industry assistance. It measures net assistance to an activity's value-adding activities, by taking into account not only output assistance and direct assistance to value-adding factors (eg subsidised interest charges and income tax concessions), but also the penalties (eg from tariffs and excise taxes) and benefits (eg from input subsidies) of government intervention on inputs. The ERA is calculated as the NSE divided by the UVA, expressed as a percentage.

The calculation of ERA and related measures is based on a number of assumptions which are discussed in detail in Commission's 1995 paper *Assistance to agricultural and manufacturing industries* (IC 1995).

3.3 Interpretation of effective rates

The ERA provides a single indicator of the net incentive effect of the many different forms of assistance. Benefits of ERA as an indicator are that it:

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

The ERA 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 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. (Corden 1966)

The key thing to note is that effective rates apply to activities, rather than 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 used. By taking into account both these effects, effective rates measure the net assistance provided by tariffs (and other measures).

Comparisons of levels of effective assistance between activities are a relatively simple means of measuring the extent to which the relative incentives to use resources in particular activities (as measured by the net returns to value-adding factors) have been changed by government intervention.

Notwithstanding their advantages as indicators of the distortionary effects of government intervention, caution is required when drawing inferences about the allocation of resources from such comparisons of effective rates between different activities and across sectors. In making such comparisons, the following points particularly need to be recognised.

- Comparisons of effective rates provide information in a 'static' framework, so the estimates do not take account of the responses of producers and consumers to the incentives created by the provision of assistance (see box 2.1). An evaluation of the impact of such variations in the incentives environment, on the allocation of the community's resources, goes well beyond the scope of the effective rate measure. Impact analyses require account to be taken of the manner in which assistance alters production and consumption decisions. (These effects would more properly be taken into account using computable general equilibrium model, such as the MONASH model developed by the Centre for Policy Studies). For example, some forms of assistance involve limitations on levels of output and/or entry to particular activities. In these cases, regulation and control of an activity may mean that, although there are substantial income transfers to incumbent producers, the extent to which assistance enables the activity to expand is limited.
- The Commission's measures of assistance to agriculture and manufacturing do not incorporate all forms of intervention which discriminate between industries and sectors.
- Both agriculture and manufacturing now have a large proportion of output which is relatively lightly assisted and a small proportion of output which is highly assisted, although assistance to these areas (for example, TCF, MVP and dairy) is declining and/or is scheduled to decline. Consequently, simple comparisons of sectoral levels of assistance should be avoided as they hide far greater differences in assistance levels between activities in each sector. These differences are likely to be more important sources of loss in community welfare.
- While mining, fisheries and, to a lesser extent, forestry record low effective rates, the forms of assistance covered in the 'combined' estimates play a relatively minor role in these industries relative to other government measures. Specifically, for the mining industry, environmental regulation, prescribed royalty levels and accelerated depreciation provisions are important, and native title legislation can also affect land access and tenure. The key government measures affecting forestry and fisheries relate to resource management issues, such as the pricing of forests and the use of quotas to control harvesting rates to protect the resource stock. The assistance implications of these measures, whether positive or negative, are not captured in the Commission's estimates.

4 Recent changes to the Commission's assistance measurement system

For *Trade & Assistance Review 2001-02*, the Commission has made a number of adjustments to its effective rates model and methodology to update its estimates and improve their comparability across sectors and to streamline their estimation. These modifications include:

- rationalising the classification of assistance to agriculture;
- rebasing the manufacturing and mining estimates to the latest 'input-output' data available from the ABS;
- switching the agriculture estimates to the same ABS input-output data source as manufacturing and mining;
- aligning the definition of value-added attributed to each sector for assistance purposes across sectors; and
- expanding the coverage of Commonwealth budgetary assistance in the estimates.

This section outlines the changes made and their effects on the Commission's assistance estimates.

4.1 Agricultural classifications

In past years, the Commission calculated ERA for agriculture for 25 commodities[8] (eg market and manufacturing milk), rather than on the basis of activities undertaken by an industry (eg dairy farming), as it does for other sectors.

For *Trade & Assistance Review 2001-02* and following years, the Commission has rationalised its agriculture estimates, by adopting an 'industry grouping' classification. The six agricultural industry groupings are:

- horticulture and fruit growing;

8 The 25 commodities are: tobacco, sheep meat, wool, beef, eggs, poultry, pig meat, wheat, barley, oats, maize, sorghum, apples and pears, citrus, deciduous canning fruits, bananas, vegetables, sugar, cotton, dried vine fruit, market milk, manufacturing milk, oilseeds, wine grapes and rice.

- grain, sheep and beef cattle farming;
- dairy cattle farming;
- other crop growing;
- other livestock farming; and
- other primary production.[9]

The Commission has reported assistance for the first five of these six industry groupings (as well as at the 25 commodity level) in the past.

The change facilitates the adoption of other changes to the Commission's estimates, such as expanding the coverage of budgetary assistance and benchmarking the estimates to a single ABS input-output data source (see below).

4.2 Input-output data

In the past for its agriculture estimates, the Commission used a combination of ABARE farm survey and ABS agricultural finance survey and commodities data to derive measures of inputs and outputs by commodity. The use of these sources differed among commodities for reasons of data availability. They also have an incomplete coverage of agricultural production (around 85 per cent).

For the manufacturing sector prior to 2000, the Commission used data from the ABS manufacturing census. These data had a number of limitations for assistance estimation, including an incomplete accounting of industry outputs and inputs by product.

In part to overcome the limitation of these sector- and activity-specific data sources, the Commission has opted to benchmark its assistance estimates on ABS input-output data from the Australian National Accounts. For manufacturing, this change took effect for *Trade & Assistance Review 1999-2000* (see PC 2000, appendix B). For *Trade & Assistance Review 2001-02*, the Commission has adopted ABS input-output data for all of its annual assistance estimates. This change facilitates greater comparability between the agriculture, manufacturing and other estimates. It also provides for a consistent data source within the agricultural system, with a broader coverage of agricultural production activities than previously possible.

9 The Commission's new industry grouping classification for the primary production sector, of which agriculture is the main part, also comprises the groupings of *fisheries* and *forestry*. The *other primary production* grouping includes *poultry farming* as well as *services to agriculture, hunting and trapping*.

4.3 Cost-structure base years

The calculation of ERA requires data on industry inputs, or 'cost structures', to assess the impact of interventions on industries and to determine a 'materials to output' ratio.

In the case of manufacturing, the Commission updates its cost-structure data periodically, leading to a number of 'series' of estimates. The manufacturing ERA estimates published in *Trade & Assistance Review 1999-2000* and *Trade & Assistance Review 2000-01* were based on input-output cost-structure data for 1994-95. For *Trade & Assistance Review 2001-02*, the Commission has adopted 1996-97 as the base year for the series (although the ABS data have been adjusted to incorporate the Commission's preferred treatment of margins[10]).

In the case of agriculture, there can be significant year-to-year volatility in cost-structures, due to the effects of drought and changes in world commodity prices (although this is less of a problem at the industry grouping level than at the commodity level). In the past, the Commission has used an average cost-structure calculated over a five or ten year period. For *Trade & Assistance Review 2001-02*, the Commission has adopted a cost-structure for agriculture based on the average of four years input-output data: 1992-93, 1993-94, 1994-95 and 1996-97.[11]

4.4 Delineation of 'value added'

Non-traded inputs

One issue that arises in determining value added for assistance measurement purposes is the treatment of 'service' inputs. Traditionally service inputs have been equated with non-traded inputs (called *non-traded non-material* (NTNM) inputs). In the assistance evaluation work published in *Trade & Assistance Review*, they comprise all domestically-produced service inputs (including 'overhead expenses' such as accounting and advertising services) other than electricity, water and gas.[12]

The appropriate treatment of NTNM inputs (and non-traded inputs generally) has been the subject of some debate and different methods have been suggested. One

[10] For this update, the Commission used a modified ABS 1996-7 IO table to address certain data inconsistencies and to incorporate the Commission's preferred SNA68 treatment of transport margins.

[11] The first ABS IO table was prepared for 1962-63. Since the mid-1980s, the ABS has prepared IO tables for 1986-97, 1989-90, 1992-93, 1993-94, 1994-95 and 1996-97.

[12] Electricity, gas and water are classified as traded in merchandise trade statistics.

model — termed after its originator — is the 'Corden method'. It includes those inputs with the value added of the processing activity, based on the simplifying assumption that such inputs (eg accounting services) are primarily produced by value adding factors (eg the accountants). An alternative model — the 'Balassa method' — treats those items as 'traded' inputs under the assumption that they are supplied at constant costs, in order to produce estimates of effective rates for the processing activity alone. However, within the constraints of the effective rate model, there is no way to perfectly capture the effects of non-traded inputs or to estimate effective rates for the processing activity alone.

In the past, the Commission has used different approaches in calculating its manufacturing and agriculture estimates. The manufacturing definition included several NTNM inputs, whereas the agricultural definition excluded such items. Thus, the Commission's manufacturing definition, while having elements of both methods, most closely resembled the Corden approach. The agricultural definition had been based on the Balassa method. The past treatment of NTNM inputs in the Commission's assistance measures is discussed in detail in Commission's 1995 paper *Assistance to agricultural and manufacturing industries* (IC 1995, pp. 52–54).

To improve the comparability of its estimates across sectors, for *Trade & Assistance Review 2001-02,* the Commission has adopted the Corden-based method, as previously used in its manufacturing series, for all traded goods sectors. (The Commission does not estimate assistance for the services sector using the effective rates framework.) While improving comparability, this change does not overcome all the difficulties involved in classifying and treating non-material inputs in an ERA model. For example, under this approach, business services are treated as 'non-traded', even though they are increasingly traded.

Treatment of capital

Another difference between the previous manufacturing and agricultural estimates was the agriculture system's treatment of capital inputs. As depreciation data are available from the ABARE Farm Survey, the agricultural system traditionally included depreciation as 'materials' in deriving a measure of value added net of depreciation. The manufacturing system excluded those items. Thus it adopted a gross measure of value added; that is, a measure inclusive of depreciation. Treating depreciation as materials in the agriculture estimates also allowed inclusion of the assistance arrangements which affect the cost of using capital, such as tariffs on capital items and accelerated depreciation, into effective rates — although this

approach also raised its own problems.[13] The past treatment of capital inputs in the Commission's assistance measures is discussed in detail in Commission's 1995 paper *Assistance to agricultural and manufacturing industries* (IC 1995, pp. 54–55).

While there are theoretical merits of the approach formerly adopted for the agricultural sector, the measured assistance effects of arrangements which affect the user cost of capital are not very large relative to other factors. Thus, to facilitate the integration of estimates for *Trade & Assistance Review 2001-02*, the Commission aligned its treatment of capital in its agriculture estimates with that used for manufacturing.

4.5 Budgetary assistance

In the past, the budgetary assistance included in the Commission's agriculture estimates was around half of the budgetary assistance to agriculture identified in the Commission's separate estimates of budgetary assistance to industry. The omissions largely reflected difficulties in identifying the incidence of budgetary programs at the 25 agricultural commodity level.

In addition, apart from the effects of tariff concessions (which can be classified as tariff or budgetary assistance), the Commission's most recent series of manufacturing estimates did not include budgetary assistance at all.

Over the past few years, the Commission has developed a methodology to allocate its budgetary assistance estimates to the same industry groupings for which it calculates tariff and other assistance (see section 2.1). Commencing with *Trade & Assistance Review 2001-02*, the Commission has included this assistance in its ERA estimates.

4.6 Effects on estimates

Table 4.1 provides ERA estimates for 1999-2000 for manufacturing and agriculture using the previous and revised approaches. For most industry groupings, the changes have minimal effects on estimated ERA. In the case of the manufacturing estimates, the new series results in slightly higher estimates than the previous 'tariff assistance only' ERA. In the case of agriculture, the changes reduce the sectors'

[13] While capital equipment (eg tractors) are usually regarded as traded, other capital items, such as physical structures and buildings, are not considered as such. Because of difficulty in separating out these items, the depreciation used in the agricultural system included both kinds of capital inputs.

Table 4.1 **ERAs for agriculture and manufacturing, 1999-2000** (per cent)

Industry grouping	*Previous system (as published in TAR 2000-01)*	*New system (as published in TAR 2001-02)* [a]
Manufacturing		
Food, beverages and tobacco	4.5	4.9
Textiles, clothing, footwear and leather	25.6	27.2
Wood & paper products	5.5	6.1
Printing, publishing & recorded media	0.9	1.0
Petroleum, coal, chemical & associated products	3.9	6.1
Non-metallic mineral products	2.7	3.5
Basic Metal products	3.0	4.6
Fabricated Metal products	4.7	5.8
Motor vehicles & parts	14.9	15.6
Other transport equipment	-0.6	2.9
Other machinery & equipment	2.2	2.4
Other manufacturing	4.7	8.1
Agriculture		
Grain, Sheep and Grain Beef Cattle Farming	1.5	2.0
Dairy Cattle Farming	52.1	30.8
Horticulture and Fruit Farming	3.5	2.1
Other Crop Growing	3.4	2.3
Other Livestock Farming	2.2	1.9

estimated average ERA slightly. Because most agriculture industries (other than dairy) have very low ERA in absolute terms, the changes have very little impact in percentage point terms. The ERA for dairy declines materially on account of significant change in the value-added base. However, in relative terms, the ERA remains several times higher than the sectoral average (although dairy assistance fell in 2000 following deregulation — see section 4.1 of *Trade & Assistance Review 2001-02*).

Adoption of the changes means that the ERA estimates published in *Trade & Assistance Review 2001-02* are not directly comparable with the estimates previously published by the Commission. The Commission has back-cast estimates

using the new approach to 1997-98[14] (see appendix A), to create some overlap between past series and the new series of ERA to facilitate comparison. As the changes made primarily affect the level rather than changes in assistance, the new methodology introduced in *Trade & Assistance Review 2001-02* is not expected to significantly effect estimated trends in assistance over time.

[14] Additional back-casting is precluded by the non-availability of disaggregated budgetary assistance estimates, particularly for agriculture.

A Revised assistance estimates, 1997-98 to 2001-02

Table A.1 **Combined[a] nominal rate of assistance on outputs[b], selected industry groupings, 1997-98 to 2001-02**

per cent

Industry grouping	*1997-98*	*1998-99*	*1999-00*	*2000-01*	*2001-02*
Primary production[c]	**2.0**	**1.6**	**1.4**	**0.2**	**0.2**
Dairy cattle farming	19.9	16.8	16.2	0.0	0.0
Grain, sheep and beef cattle farming	0.6	0.6	0.2	0.2	0.1
Horticulture and fruit growing	1.2	0.6	0.6	0.7	0.7
Other crop growing	0.2	0.1	0.0	0.0	0.0
Other livestock farming	0.2	0.4	0.3	0.1	0.0
Fisheries	0.0	0.0	0.0	0.0	0.0
Forestry	0.6	0.7	0.4	0.4	0.4
Other primary production[d]	0.0	0.0	0.0	0.0	0.0
Mining[c]	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Manufacturing[c]	**3.3**	**3.2**	**3.0**	**2.8**	**2.8**
Food, beverages & tobacco	2.1	2.1	2.1	2.2	2.2
Textiles, clothing, footwear & leather	13.4	12.5	11.5	10.5	10.5
Wood & paper products	3.7	3.7	3.8	3.7	3.7
Printing, publishing & media	1.4	1.4	1.4	1.4	1.4
Petroleum, coal, chemical & assoc. products	2.5	2.5	2.4	2.1	2.2
Non-metallic mineral products	1.8	1.8	1.8	1.8	1.8
Metal product manufacturing	2.5	2.5	2.5	2.5	2.5
Motor vehicles & parts	7.5	6.9	6.4	6.1	6.1
Other transport equipment	1.2	1.4	1.2	1.2	1.1
Other machinery & equipment	2.8	2.8	2.3	2.2	2.2
Other manufacturing	3.6	3.6	3.6	3.6	3.6

a 'Combined assistance' comprises budgetary, tariff and agricultural pricing and regulatory assistance. The estimates have been adjusted to take account of programs included in both tariff and budgetary assistance. **b** The estimates are derived using ABS Industry Gross Value Added at current prices data. This information is subject to periodic revision by the ABS. **c** Sectoral estimates also include assistance to the sector that has not been allocated to specific industry groupings. **d** Other primary production includes *services to agriculture, hunting and trapping* and *poultry farming*.

Source: Commission estimates.

Table A.2 **Combined[a] nominal rate of assistance on materials[b], selected industry groupings, 1997-98 to 2001-02**

per cent

Industry grouping	*1997-98*	*1998-99*	*1999-00*	*2000-01*	*2001-02*
Primary production[c]	**0.5**	**0.5**	**0.4**	**0.5**	**0.5**
Dairy cattle farming	0.4	0.4	0.4	0.4	0.4
Grain, sheep and beef cattle farming	0.4	0.4	0.4	0.4	0.4
Horticulture and fruit growing	0.6	0.6	0.6	0.6	0.6
Other crop growing	0.6	0.6	0.6	0.6	0.6
Other livestock farming	0.5	0.5	0.5	0.4	0.4
Fisheries	1.8	1.7	1.7	1.6	1.6
Forestry	1.9	1.9	1.9	1.8	1.8
Other primary production[d]	0.3	0.3	0.3	0.3	0.3
Mining[c]	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**
Manufacturing[c]	**2.0**	**1.9**	**1.9**	**1.8**	**1.8**
Food, beverages & tobacco	1.2	1.1	1.1	1.1	1.1
Textiles, clothing, footwear & leather	4.8	4.5	4.2	3.8	3.8
Wood & paper products	2.6	2.6	2.6	2.5	2.5
Printing, publishing & media	1.6	1.6	1.5	1.3	1.3
Petroleum, coal, chemical & assoc. products	1.1	1.1	1.1	1.1	1.1
Non-metallic mineral products	1.1	1.1	1.1	1.0	1.0
Metal product manufacturing	1.8	1.7	1.7	1.7	1.7
Motor vehicles & parts	3.3	3.2	3.1	3.1	3.1
Other transport equipment	3.0	3.1	3.0	3.0	3.0
Other machinery & equipment	2.9	2.9	2.8	2.6	2.6
Other manufacturing	3.6	3.6	3.5	3.5	3.5

a 'Combined assistance' comprises budgetary, tariff and agricultural pricing and regulatory assistance. The estimates have been adjusted to take account of programs included in both tariff and budgetary assistance. **b** The estimates are derived using ABS Industry Gross Value Added at current prices data. This information is subject to periodic revision by the ABS. **c** Sectoral estimates also include assistance to the sector that has not been allocated to specific industry groupings. **d** Other primary production includes *services to agriculture, hunting and trapping* and *poultry farming*.

Source: Commission estimates.

Table A.3 **Combined[a] effective rate of assistance[b], selected industry groupings, 1997-98 to 2001-02**

per cent

Industry grouping	*1997-98*	*1998-99*	*1999-00*	*2000-01*	*2001-02*
Primary production[c]	**5.8**	**5.1**	**4.2**	**3.0**	**2.8**
Dairy cattle farming	37.8	32.2	30.8	13.1	15.7
Grain, sheep and beef cattle farming	3.1	2.8	2.0	1.7	1.5
Horticulture and fruit growing	3.0	2.3	2.1	2.3	2.3
Other crop growing	2.5	2.3	2.3	3.4	2.4
Other livestock farming	1.9	2.4	1.9	1.3	1.1
Fisheries	2.7	2.6	2.7	2.3	2.1
Forestry	5.3	8.4	4.0	2.8	4.0
Other primary production[d]	0.3	0.3	0.2	0.2	0.2
Mining[c]	**0.5**	**0.4**	**0.3**	**0.1**	**0.1**
Manufacturing[c]	**5.2**	**5.1**	**4.8**	**4.6**	**4.6**
Food, beverages & tobacco	3.4	3.3	3.3	3.7	3.7
Textiles, clothing, footwear & leather	25.8	24.0	22.0	20.5	25.1
Wood & paper products	4.7	4.7	4.9	4.8	4.9
Printing, publishing & media	1.4	1.4	1.4	1.5	1.5
Petroleum, coal, chemical & assoc. products	5.0	5.0	5.1	4.4	4.3
Non-metallic mineral products	2.5	2.7	2.4	2.5	2.5
Metal product manufacturing	4.0	4.4	4.3	4.2	4.1
Motor vehicles & parts	14.0	13.1	11.8	11.2	11.2
Other transport equipment	-0.2	0.0	3.1	3.2	2.8
Other machinery & equipment	3.5	4.0	3.3	2.9	3.0
Other manufacturing	4.0	4.1	4.1	4.3	4.2

a 'Combined assistance' comprises budgetary, tariff and agricultural pricing and regulatory assistance. The estimates have been adjusted to take account of programs included in both tariff and budgetary assistance. **b** The estimates are derived using ABS Industry Gross Value Added at current prices data. This information is subject to periodic revision by the ABS. **c** Sectoral estimates also include assistance to the sector that has not been allocated to specific industry groupings. **d** Other primary production includes *services to agriculture, hunting and trapping* and *poultry farming*.

Source: Commission estimates.

Table A.4 **Combined[a] measured assistance to outputs[b], selected industry groupings, 1997-98 to 2001-02**

$million

Industry grouping	*1997-98*	*1998-99*	*1999-00*	*2000-01*	*2001-02*
Primary production[c]	**660.7**	**570.6**	**539.8**	**88.6**	**86.1**
Dairy cattle farming	494.7	437.7	448.6	0.0	0.1
Grain, sheep and beef cattle farming	82.4	77.2	30.0	31.8	27.2
Horticulture and fruit growing	59.1	34.6	34.7	38.6	44.6
Other crop growing	7.9	3.9	0.5	0.9	1.4
Other livestock farming	2.7	5.4	4.8	1.1	0.8
Fisheries	0.7	0.4	0.9	0.7	1.2
Forestry	6.9	7.4	4.5	5.1	5.8
Other primary production[d]	0.3	0.0	0.7	0.3	0.7
Mining[c]	**2.7**	**3.7**	**4.0**	**4.6**	**4.6**
Manufacturing[c]	**7145.4**	**6849.5**	**6566.8**	**6735.0**	**6901.1**
Food, beverages & tobacco	1072.5	1097.1	1125.7	1165.9	1193.8
Textiles, clothing, footwear & leather	1342.0	1263.1	1072.4	922.1	786.6
Wood & paper products	393.6	406.4	444.3	508.0	526.5
Printing, publishing & media	212.0	217.1	233.0	272.2	279.8
Petroleum, coal and chemical products	953.7	881.0	859.9	967.1	1018.4
Non-metallic mineral products	152.0	167.8	184.1	186.8	185.7
Metal product manufacturing	939.4	891.7	857.4	895.9	960.9
Motor vehicles & parts	1168.9	1038.0	989.1	965.3	1025.0
Other transport equipment	59.3	64.3	57.3	56.3	57.9
Other machinery & equipment	583.1	554.8	471.9	512.9	532.4
Other manufacturing	235.0	247.1	243.5	247.5	301.4
Services[c]	**290.8**	**297.4**	**293.6**	**299.0**	**312.2**
Electricity, gas & water supply	1.0	3.0	2.8	10.0	13.8
Construction	5.1	5.2	5.4	5.0	4.7
Wholesale trade	30.9	34.0	33.4	34.0	35.1
Retail trade	22.0	25.0	23.8	23.7	23.9
Accommodation, cafes & restaurants	28.0	32.0	33.2	37.0	39.1
Transport & storage	48.0	52.0	50.4	46.1	46.6
Communication services	10.8	11.1	11.5	12.9	12.3
Finance & insurance	1.0	1.0	1.0	0.4	1.0
Property & business services	22.0	23.0	23.6	23.6	25.7
Government administration & defence	0.0	0.0	0.0	0.0	0.0
Education	12.0	12.0	9.7	9.8	9.5
Health & community services	1.0	1.0	0.8	0.4	0.5
Cultural & recreational services	107.0	96.0	95.8	93.8	97.7
Personal & other services	1.0	1.0	1.0	1.1	1.2

a 'Combined assistance' comprises budgetary, tariff and agricultural pricing and regulatory assistance. The estimates have been adjusted to take account of programs included in both tariff and budgetary assistance. **b** The estimates are derived using ABS Industry Gross Value Added at current prices data. This information is subject to periodic revision by the ABS. **c** Sectoral estimates also include assistance to the sector that has not been allocated to specific industry groupings. **d** Other primary production includes *services to agriculture, hunting and trapping* and *poultry farming*. *Source:* Commission estimates.

Table A.5 **Combined[a] measured assistance to inputs[b], selected industry groupings, 1997-98 to 2001-02**

$million

Industry grouping	*1997-98*	*1998-99*	*1999-00*	*2000-01*	*2001-02*
Primary production[c]	**60.7**	**60.9**	**54.2**	**72.9**	**86.8**
Dairy cattle farming	4.0	4.1	4.3	4.4	5.0
Grain, sheep and beef cattle farming	14.8	15.7	17.9	18.9	21.9
Horticulture and fruit growing	9.7	10.2	10.4	10.8	12.3
Other crop growing	6.8	7.2	7.3	7.6	8.7
Other livestock farming	2.2	2.3	2.6	2.7	3.1
Fisheries	18.6	18.3	17.9	20.6	23.1
Forestry	8.6	8.8	8.8	10.2	11.4
Other primary production[d]	6.0	6.2	6.8	7.2	8.2
Mining[c]	**133.2**	**130.7**	**142.7**	**177.6**	**178.7**
Manufacturing[c]	**2216.1**	**2137.1**	**2102.0**	**2170.1**	**2247.0**
Food, beverages & tobacco	319.6	308.6	313.7	294.6	301.0
Textiles, clothing, footwear & leather	275.4	258.9	222.1	192.9	164.3
Wood & paper products	116.2	121.4	129.9	148.6	152.9
Printing, publishing & media	80.5	85.2	85.4	89.2	91.5
Petroleum, coal and chemical products	247.0	231.3	237.9	288.2	296.5
Non-metallic mineral products	34.5	38.6	42.1	42.6	42.3
Metal product manufacturing	360.3	340.4	324.4	336.7	361.5
Motor vehicles & parts	300.4	280.3	284.9	287.9	305.9
Other transport equipment	77.2	75.2	76.7	77.5	82.3
Other machinery & equipment	301.2	288.8	278.7	307.8	319.8
Other manufacturing	104.0	108.3	106.1	104.0	128.9
Services[c]	**2007.8**	**2122.3**	**2222.1**	**2149.2**	**2335.0**
Electricity, gas & water supply	46.5	48.2	49.2	51.1	53.3
Construction	603.2	651.3	716.2	624.1	713.8
Wholesale trade	142.1	152.1	156.8	162.5	177.7
Retail trade	178.0	185.1	191.6	184.8	202.0
Accommodation, cafes & restaurants	173.2	185.8	196.8	198.7	204.6
Transport & storage	154.6	165.7	165.7	170.0	177.2
Communication services	78.7	79.2	73.6	69.0	69.7
Finance & insurance	34.3	35.5	40.3	43.4	48.1
Property & business services	218.8	232.5	242.3	247.3	254.2
Government administration & defence	161.2	167.5	164.6	167.5	184.8
Education	36.2	36.8	37.4	39.6	43.0
Health & community services	79.5	77.7	77.0	79.7	86.2
Cultural & recreational services	50.1	51.3	52.1	54.0	57.2
Personal & other services	51.4	53.7	58.6	57.4	63.2

a 'Combined assistance' comprises budgetary, tariff and agricultural pricing and regulatory assistance. The estimates have been adjusted to take account of programs included in both tariff and budgetary assistance. **b** The estimates are derived using ABS Industry Gross Value Added at current prices data. This information is subject to periodic revision by the ABS. **c** Sectoral estimates also include assistance to the sector that has not been allocated to specific industry groupings. **d** Other primary production includes *services to agriculture, hunting and trapping* and *poultry farming*. *Source:* Commission estimates.

Table A.6 **Combined[a] measured net subsidy equivalent[b], selected industry groupings, 1997-98 to 2001-02**

$million

Industry grouping	*1997-98*	*1998-99*	*1999-00*	*2000-01*	*2001-02*
Primary production[c]	**1250.5**	**1143.7**	**1069.8**	**800.9**	**873.8**
Dairy cattle farming	525.9	469.3	479.8	211.8	286.0
Grain, sheep and beef cattle farming	291.4	279.3	233.1	218.6	224.6
Horticulture and fruit growing	106.6	83.5	80.0	90.0	103.9
Other crop growing	57.4	54.7	58.0	86.9	71.2
Other livestock farming	14.6	19.4	17.2	12.4	11.7
Fisheries	35.5	35.0	36.1	35.8	37.5
Forestry	33.3	54.0	25.9	21.6	34.8
Other primary production[d]	7.1	8.0	4.2	6.2	6.3
Mining[c]	**159.5**	**131.0**	**106.5**	**46.1**	**35.2**
Manufacturing[c]	**5455.3**	**5327.3**	**5171.1**	**5305.2**	**5497.6**
Food, beverages & tobacco	822.9	838.5	867.0	930.0	949.9
Textiles, clothing, footwear & leather	1105.7	1045.2	884.3	774.2	806.0
Wood & paper products	286.4	293.0	332.3	377.4	391.5
Printing, publishing & media	135.5	136.0	151.3	185.5	191.3
Petroleum, coal and chemical products	795.7	739.6	771.6	835.9	836.5
Non-metallic mineral products	131.5	158.2	150.7	160.4	161.5
Metal product manufacturing	674.1	704.3	657.8	679.9	713.4
Motor vehicles & parts	897.5	808.8	746.3	726.5	768.7
Other transport equipment	-4.9	0.1	69.3	73.4	67.2
Other machinery & equipment	357.9	396.0	335.7	347.4	368.0
Other manufacturing	143.0	157.7	154.4	163.8	196.9
Services[c]	**-1218.0**	**-1311.9**	**-1260.5**	**-1256.1**	**-1414.7**
Electricity, gas & water supply	36.5	42.8	35.1	45.1	28.5
Construction	-553.1	-605.1	-675.0	-584.5	-672.0
Wholesale trade	-96.2	-104.1	-86.5	-96.5	-111.9
Retail trade	-146.0	-145.1	-146.2	-143.8	-170.0
Accommodation, cafes & restaurants	-144.2	-152.8	-156.1	-155.8	-159.4
Transport & storage	-10.6	-18.7	-17.5	-61.3	-89.0
Communication services	-20.8	-8.0	23.8	18.9	19.8
Finance & insurance	68.7	47.5	66.1	62.8	54.4
Property & business services	-142.8	-143.5	-126.4	-123.8	-102.6
Government administration & defence	-160.2	-163.5	-163.6	-166.5	-184.0
Education	-17.2	-17.8	-19.3	-24.4	-30.1
Health & community services	-57.5	-52.7	-47.9	-45.5	-46.1
Cultural & recreational services	62.9	47.7	56.0	52.7	54.2
Personal & other services	-47.4	-49.7	-54.5	-51.6	-58.6

a 'Combined assistance' comprises budgetary, tariff and agricultural pricing and regulatory assistance. The estimates have been adjusted to take account of programs included in both tariff and budgetary assistance. **b** The estimates are derived using ABS Industry Gross Value Added at current prices data. This information is subject to periodic revision by the ABS. **c** Sectoral estimates also include assistance to the sector that has not been allocated to specific industry groupings. **d** Other primary production includes *services to agriculture, hunting and trapping* and *poultry farming*. *Source:* Commission estimates.

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