An overview of public intervention in the primary industry and resource sectors of the South Australian economy

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ABSTRACT

Primary Industries and Resources SA is an economic development agency of the South Australian Government. The PIRSA portfolio is a broad one, including agriculture, fisheries and aquaculture, minerals and energy resources, and sustainable resources associated with these industries, with the notable exception of water.

Allocating public resources in an economic development context across this diverse range of industry and resource issues requires, among other things, a rigorous framework and a means of communicating economic information to decision makers that can be effectively absorbed and applied.

In this paper, PIRSA involvement across the breadth of these sectors is discussed and analysed from an efficiency or market failure perspective. The pricing of the services provided in these markets is discussed under a ‘beneficiary pays’ principle. The potential economic impact of intervention is outlined for a variety of productivity and demand improving shocks in these markets, utilising the Monash MRF general equilibrium model.

Key words: primary industry and resources, public policy, resource allocation
1. Introduction

This paper summarises the prioritisation framework and a sample of the resulting economic information provided for decision makers in allocating public resources by a State Government agency, Primary Industries and Resources SA (PIRSA).

Primary Industries and Resources SA is an economic development agency of the South Australian Government. The PIRSA portfolio is a broad one, including agriculture, fisheries and aquaculture, minerals and energy resources, and sustainable resources associated with these industries, with the notable exception of water.

The framework for priority setting outlined here serves two main purposes. Project planners can use the framework as a tool in ensuring their ideas are transformed into projects targeted to maximise economic development. Secondly, decision-makers are provided with economic information to assist in the process of allocating resources, whether at the agency level or at a more focussed program level.

2. A prioritisation framework

PIRSA has used a process for evaluation and priority setting using as key criteria market failure, public benefit and the alignment of public benefit to cost share under a ‘beneficiary pays’ principle, and economic development impact. The rationale and current process for using these criteria are outlined briefly here.

2.1 A market failure screen

It has been long recognised that public intervention in markets may be justified on market failure grounds. That is, the incentives and actions of parties participating in well defined and operating markets results in efficient (and preferred) outcomes in an economic development context. Public intervention may be warranted when a market does not exist, for example because of a lack of well defined property rights, or when aspects of the market prohibit efficient operation of that market and hence outcomes are less than socially optimal. In the context of primary industry and resources sectors, this ‘market failure’ rationale for public intervention is well documented. (See for example ABARE 1992, Industry Commission 1995, and Godden 1997).
For this reason, all PIRSA projects face a market failure screen. If a ‘market failure’ is addressed by a proposed or existing project, then public funds may be justified. If a market failure is not addressed by the project, then Government involvement is to be reviewed, with the intent of justifying public expenditure, or either discontinuing the project or seeking private funding.

The following information is collated under this market failure screen for all proposed and existing projects:

- The type of market failure;
- The relevant market; and
- The intensity of market failure.

Information regarding the relevant market(s) is elicited from project proponents. A market may be defined as “the field of actual and potential transactions between buyers and sellers amongst whom there can be strong substitution, at least in the long run, if given a sufficient price incentive” (Government of South Australia 1998). If possible, information is provided on the product, functional level, geographic area and temporal aspect of the market involved. Projects more concerned with market creation than correcting for failures associated with existing markets can be documented as such.

Documenting the relevant market serves several purposes. Firstly, it may help focus project design. In addition, knowing the market and the extent of the market failure in that market can help in evaluating the impact of addressing the market failure. Having information documented regarding the relevant market and market failure associated with projects in a large organisation can also help highlight economies of scope and ensure against multiple projects targeting the same market failure in an ineffective or redundant fashion.

The type(s) of market failure being addressed by the project are documented as being public good, externalities, information problems or uneven market power. Refer to Box 1 below for an explanation.
**Box 1 Types of market failure**

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>public good</strong></td>
<td>The reward for producing the good/service is inaccessible and there will be an under supply of it by the market. This may occur with “nonrival consumption”, where consumption of the good/service by one person does not prevent it from being consumed by others; or, with “nonexcludability”, where individuals who have not paid for a good/service cannot be excluded from the benefits.</td>
</tr>
<tr>
<td><strong>externalities</strong></td>
<td>Spillover effects during either production or consumption, so that ‘true’ costs are not reflected in a producer’s outlay or in the price a consumer pays. One individual’s production or consumption activities affect another person’s production or consumption and those impacts are not adequately compensated through a market transaction. With negative externalities, the market will not require the producer to bear the ‘true’ cost and the good/service will be over supplied since the consumer can get it at an inefficiently low price. With positive externalities, the market will not permit the producer to receive (or require the consumer to pay) a price high enough to reflect the ‘true’ cost of production and the good/service will be under supplied.</td>
</tr>
<tr>
<td><strong>information problems</strong></td>
<td>Costs and accuracy of information varies between and among market participants (buyers and sellers) such that there is asymmetric market access which results in inefficiency. For a competitive market to operate efficiently, all participants need complete, accurate, and equally available information. Risk and uncertainty can be included in this category.</td>
</tr>
<tr>
<td><strong>uneven market power</strong></td>
<td>Where there is one or a small number of market participants that are so large as to be able to determine/influence the price level, this may prevent efficient market outcomes.</td>
</tr>
</tbody>
</table>

(Source: PIRSA 1999, Explanatory notes to PIRSA project evaluation form)

The extent of the market failure is also estimated under a scale of:

- ‘severe’ for when no private market exists;
- ‘moderate’ for when a private market exists, with resources allocated in a way that is clearly not socially optimal; and
- ‘slight’ for when a private market exists with minimal deviation in socially optimal resource allocation.

Note that when a market failure is estimated as slight, COAG suggests that there is unlikely to be a case for government intervention (COAG 1997).

This screen may help managers in forming better projects, in the sense that intervention proposals are more likely to be targeted at a market failure. Understanding the market failure being targeted can also assist in the effective design of a project, and the choice of instrument to address the market failure, from suasion through to regulation.
Note that passing a market failure screen is a necessary, but not sufficient condition for public intervention in this framework. For example there may be no feasible instrument for addressing the market failure. Alternatively, the benefits of addressing the market failure by a chosen method may not be sufficient compared to the costs of intervention.

This market failure analysis results in a wealth of information on PIRSA projects, with the analysis applied to over 500 projects across the agency. Using this information for strategic decision making in the agency, however, requires some form of filtering or aggregation of data for use by decision-makers in planning and allocating resources. This is discussed in 3.1 below.

2.2 Public Benefit and Cost Shares

All PIRSA projects are analysed in terms of the share of the total benefit accruing from the project which is public, and how that public benefit share compares to the cost share under a ‘beneficiary pays’ rule. Public and private benefits are defined for this analysis as in Box 2.

Box 2 Public and Private Benefits

A project with benefit more widely enjoyed, and for whom individual beneficiaries can not be readily identified, is determined as having public benefit. To be determined as constituting private benefit, the project would provide direct return as improved income, by increasing product value or reducing unit cost of production. This improvement in income would be captured by individuals or a discrete group (ie, a specific industry).

Analysis of public and private benefits is different from ‘public good’ and ‘private good’. The focus with public good and private good is the attribute of the product or service, within the context of market failure where the central question is whether or not the market does provide or can effectively provide the product or service. The analysis of public benefits and private benefits focuses on the agent who captures the direct economic benefit of the project, and not on whether the market can provide or does provide the product or service.

The difference between public and private project benefit is not discrete for all projects. Some projects provide benefits that are to the advantage of readily identifiable private interests as well as providing much broader public benefits. Projects may have a proportion of public and a proportion of private benefit.

Alignment of public funding and public benefit = [%public benefit / % public funding]

(Source: PIRSA 1999, Explanatory notes to PIRSA project evaluation form)
The justification for adopting a ‘beneficiary pays’ rule is usually based on an equity judgement of such arrangements. The availability of funds available for public agencies such as PIRSA has remained relatively stable over recent years, despite pressures for increased attention on issues such as resource sustainability, food safety and post farm gate ‘value adding’. In the face of such pressures, increasing the alignment of public funding to public benefit and private funding to private benefit seems reasonable.

There are efficiency related issues associated with determining cost levels and shares, however. Beneficiaries may be more likely to monitor and optimise their own investments rather than public investments made on their own behalf. The pricing of public goods and natural monopolies also has efficiency implications that have been recognised by for example Hotelling, Ramsey and Coase. The more recent ‘game’ of negotiating cost shares between industry bodies and other ‘private’ investors and public agencies also has efficiency implications. (See Watson 1996 for a review of these issues in the context of arranging funding for agricultural research and development.)

It should be noted that the financial information used in this paper includes recurrent project costs only. That is, the capital costs of assets utilised for projects are not included. In addition, at the time of this study, financial information on the public share of industry investments from bodies such as Research and Development Corporations (RDCs) was not available either. These funds are recorded as private. For these reasons, the public/private alignment will be generous towards private investors. This is partially offset in some instances. For example, while the financial contribution from individuals and industry bodies is recorded, in-kind contributions are not. Further discussion of the benefit analysis applied in PIRSA can be found in Cook (1998), and Weatherford and Oborne (1998).

2.3 Economic Development Impact

The final component of economic information collated on PIRSA projects relates to economic development impact or potential.
Within all groups of the department, economic analyses of various forms have provided valuable information to program managers on the relative economic development impact or potential of public intervention.

For example, across the primary industries group of PIRSA (Food and Fibre) *ex ante* benefit cost analyses of all projects have been conducted in the past. Other analyses across PIRSA have included: National Competition Policy analyses of public regulation where competition has been restricted; in some instances, *ex ante* benefit cost analyses for projects proposed for internal and/or external funding; and *ex post* analyses when reviewing large individual projects being contemplated as low priority. *Ex post* benefit cost analyses of public intervention have also been carried out at a program level (group of similar projects within a group) as a regular accountability measure in some groups, for example by the research and development group of PIRSA (the South Australian Research and Development Institute or SARDI).

While this range of economic information has undoubtedly been of value to program and group managers in making resource allocation decisions within programs or groups, very little consistent economic development impact information has been available to assist decision-makers in allocating resources between PIRSA groups. Put another way, strategic decision making has used, as its starting point, historical expenditure patterns, and relies on the argument and expertise of individual group managers.

Information on the economic development impact of PIRSA activities that could be assimilated and used by group managers at the agency level was recognised as a missing, but valuable tool if available. To facilitate this process, an applied general equilibrium economic model (Monash MRF) is used to highlight potential economic impacts of PIRSA intervention in various markets.

The majority of public interventions made by PIRSA affects: the supply of goods or services by industries; demand for these goods or services, or the supply of factors used in production. The Monash model can estimate the economic impact of such interventions by imposing ‘shocks’ to parameters representing industry productivity;
commodity demand (local or export); or factor productivity respectively. By assuming competitive markets, and equilibrium or market clearing in all these markets, the resulting impact of these ‘shocks’ on a range of economic variables such as gross state product and consumption, returns to labour and capital by industry, as well as changes in industry output, employment and capital utilised can be computed. (See Peter et al (1996) for documentation of the Monash MRF general equilibrium model).

The economic development impact information provided in the next section is partial. The major reason for this is that the magnitude of market ‘shocks’ is hypothesised, rather than estimated. Attributing the economic development impact of PIRSA intervention in markets requires both valid assumptions or estimates regarding the direct or physical influence of PIRSA intervention in markets, and a system for assessing the economic development impact of that physical influence. Appropriate use of the Monash MRF model can be used to estimate the latter. Advice from project and program managers, together with the use of farm level models nearing calibration with respect to broadacre farming productivity changes, will be used to estimate the former in the near future.

3. Applying the framework to the PIRSA portfolio of investments

In this section, a sample of economic information available from applying this framework to PIRSA projects is tabled and discussed.

3.1 Justification for Government Involvement – A market failure screen

The market failure screen appears to be working well when projects addressing ‘slight’ market failures are assessed as passing the screen. Those projects assessed as not addressing market failure at all included some commercial services such as vine propagation and fleece measurement services, and a Community Service Obligation (CSO).

The public expenditure on non-market failure addressing projects was dominated by this CSO which ensured equitable energy costs for consumers in remote areas. Despite the efficiency of the energy market not being addressed by this project, the justification for this project is not under review from an economic development perspective. It has been deemed by Government to be a matter of equity or fairness
within the energy market, and declared a CSO. Governments, as the democratically elected representatives of the public, and not Government departments, make such distributional decisions. An alternative way of viewing this project, is that it does address a market failure in the provision of welfare goods. That is, the private welfare market was not likely to lead to a socially desirable price for energy and thus well being for people in remote areas. This was the only PIRSA project with non-efficiency objectives that was analysed.

A summary of information on the performance of PIRSA projects against market failure criteria is provided in Figure 1 (PIRSA 1998/99 projects). The market failure analysis of all PIRSA projects has been aggregated here to provide an overview of the opportunity for worthwhile state government intervention. The method of aggregation is as follows. Total (PIRSA and external) expenditure recorded against PIRSA projects with significant or severe market failure in a particular market area (eg Agriculture) is reported as a share of the total expenditure on projects in that market area.

At first glance, a loose targeting of opportunities for state government intervention in Agriculture and Food and Fibre (processed) may be concluded. Before confirming such conclusions, however, the underlying market failure analyses warrant review. The relative effectiveness of instruments in addressing market failures should also be taken into consideration. It is also important to note that there may also be opportunities for worthwhile government intervention in these markets that were not proposed and therefore not assessed here.
Figure 1 Market Failure Significance

3.1.1. Agriculture

Slightly fewer than 35% of total recorded expenditure in the agriculture sector was analysed to have addressed a significant or severe market failure. The projects considered here involve agricultural research, development and extension related to the range of agricultural industries in South Australia. It also includes the plant and animal health programs, and the regulatory review and administration of marketing and other regulations associated with these industries, as well as policy advice for the Minister regarding these industries.

Many of the research and development and extension programs were deemed to be addressing only a slight market failure. Often cited market failures associated with organising agricultural research and development is recognised as being addressed by Federal regulation that enabled the forming of the now well functioning industry research and development corporations. These club or ‘industry’ goods with the power of compulsory industry levies (and a matched public subsidy for research and development expenditures) are assumed to be now largely able to ensure the optimal provision of industry research, development and extension. This does not infer that PIRSA may not be involved in the provision of research, development and extension...
services for industry bodies, merely that the market failure has been addressed, and the outstanding issue is what charge should be negotiated for these services.

Some agricultural research, development and extension programs were assessed as addressing a significant market failure. Some projects that benefit many agricultural commodities, either through multi enterprise farming systems, or through benefiting a factor in production, such as land or water, were given a greater market failure rating. This was based on the assumption that there may be either uncertainty over institutional responsibility for organising the service in question, or that the transaction costs associated with industry RDCs collaborating to provide the service were sufficient for PIRSA involvement. Note that this may be a generous assessment given the existence of RIRDC and its brief, the limited number of RDCs and their success in organising many commodity (or many RDC) programs targeting pasture productivity and rabbit pest control for example.

Another aspect of some extension projects, or what may be better described as farmer training projects is that they may be viewed as investments in human capital. (Such projects are now likely to be funded under the Federal FarmBis program). These programs were not assessed as addressing a market failure, but an equity judgement on the amount of education received by agricultural producers.

Many animal and plant health programs cannot rely on industry collaboration alone. State Government regulation is often required to address externalities in disease spread, and in what is often an ‘industry’ good, and sometimes a public good of disease monitoring and control. These projects were assessed with moderate or severe market failure intensity.

The other major area of PIRSA activity involved the review of existing regulation and other policy advice to the Minister regarding the agricultural industries. These activities were assessed as addressing severe market failure. The assumption underlying this assessment was one of information problems (both adverse selection and moral hazard) where the Minister faced the potential for receiving biased information from the private sector, with damaging consequences. This may be a generous assessment, as it was applied to all policy advice services across all groups of PIRSA. Some individual advice of course would suffer from no ill effect if sought
from the private sector, and some may result in improved policy advice. The other factor to recognise here is that public sector bureaucracies have their own interests, and so public sector provision of policy advice should be recognised as not a perfect solution or instrument for this assumed market failure.

Initiatives targeted at attracting investment were not assessed as addressing a significant market failure. Such projects may be viewed as the SA Government marketing comparative and competitive advantages of industries in South Australia, with any activities associated with introducing investors to the commercial business, social and regulatory environment possibly lowering the cost (and increasing the effectiveness) of later dealings. On the other hand, they may be a subsidy to potential investors, with the associated opportunity cost of PIRSA activities addressing market failures elsewhere that must be foregone for such initiatives.

Note that the majority of projects targeted at environmental issues and factors in agricultural production such as land and water are incorporated in the sustainable resources category covered in section 3.1.6.

3.1.2 Fisheries and Aquaculture
The fisheries and aquaculture industries (when aggregated together) appear to have a much greater share of recorded project expenditure targeting moderate or severe market failure. Policy advice and research and development services were analysed in a fashion consistent with agriculture above.

The local scalefish and shellfish fisheries PIRSA is involved with, however, have the common problem of fisher access to the common property resource (the fishery). Externalities associated with both competition between current fishers for the available resource, and the effect of current fishing on future stocks are deemed to be significant market failures. South Australian fisheries are regulated to address these externalities, together with possible environmental externalities in production.

Aquaculture, however, does not have the common property resource problem. Likewise, if a fishery was owned and operated by a single entity, there would be little need for public intervention in the fishery regarding the rate of exploitation.
Addressing potential environmental externalities in aquaculture production was assessed as a significant market failure. Investment attraction and the organisation of industry infrastructure were assumed to not be a market failure issue.

3.1.3 Market Failure in Food and Fibre (processed)
This category summarises PIRSA expenditure in post farm gate activities. This categorisation is not a perfect one, as some agriculture projects involved pre and post farm gate marketing initiatives and investment attracting/advising activities discussed in the previous section.

There was little or no market failure found in initiatives proposed for further ‘value adding’, marketing, product differentiation or branding. The ‘club good’ of regional brands was assessed as being a ‘slight’ market failure. That is, it was assessed to be likely that regional producers would negotiate regional brands, if a worthwhile product attribute.

PIRSA is responsible for administering the Meat Hygiene Act. The potential externalities associated with food safety in meat processing, and the public good of investigating improved ways of addressing this externality were assessed as a significant market failure.

3.1.4 Minerals and Oil and Gas Exploration and Mining
Minerals and gas markets, although technically different in both exploration and production or extraction, face similar economic problems. Without some form of public intervention, externalities associated with land access for exploration were assessed as likely to occur. Inefficient scale and timing of development, production and mine rehabilitation were all assessed as likely to occur in a free-for-all market without publicly imposed property rights over these activities. Together with the potential for public health and environmental externalities, the chosen instrument of State government regulation of these activities was assessed as addressing significant market failures.

The collection of a resource rent (in the form of ad valorem levies on production and fees for exploration property rights) was assessed as not addressing a market failure.
Deeming Crown ownership of discovered (and undiscovered) resources, and collecting a rent from private miners was assessed as an equity issue, with minimal distortion on the level of exploration and mining activity.

PIRSA intervention also occurs in what is often called pre-competitive exploration markets. The provision of geo-scientific information has public good aspects in that geo-scientific information is non-rival in consumption. However, the information can be excluded from potential users. Given that private companies can (and sometimes do) club together to organise for the provision of such information in highly prospective areas, this market failure was assessed as slight.

3.1.5 Downstream Energy markets
The Office of Energy Policy, as the name infers, provides policy advice to Government on matters affecting the energy sector. Policy advice, as outlined earlier, was assessed as a significant market failure. Many of the matters for which this policy advice is provided, such as Greenhouse Gas policy and the National Competition Policy issues, are addressing externality and market power market failures.

3.1.6 Sustainable Resources
Addressing spatial and temporal externalities in agricultural production (whether on environmental assets or other agricultural producers for example) was assessed as a significant market failure.

Some PIRSA interventions in technology transfer activities were assessed as having slight market failure along the lines of extension projects under the auspices of a RDC can already address these issues.

The expenditures assessed as addressing ‘slight’ market failures in sustainable resources in PIRSA, however, were by far dominated by projects associated with water irrigation infrastructure. The provision of these utilities was assessed as addressing a ‘slight’ market failure issue of potential market power abuse. That is, that private provision of some of this infrastructure may lead to market power abuse in some instances by a monopolist supplier.
3.2 Pricing Information

Public benefit assessments and the resulting pricing alignment for 2000/01 PIRSA projects are summarised in Figure 2. Note that the private funding includes all outside PIRSA funds, and therefore some public funds, those matched to RDC industry funds for example, are incorrectly recorded here as entirely private funds.

Following the rationale for assessing public and private benefits discussed in Section 2, two points may be quite apparent.

1. The majority of PIRSA funds are spent on private benefit activities.
2. Even when recording some public funding as private, and ignoring capital costs borne by the public, the pricing alignment favours private interests when applying a ‘beneficiary pays’ rule.

Figure 2 Pricing Alignment

This may present an opportunity for PIRSA in the face of a budget constraint. For example, worthwhile market failure targeted projects may be proposed that also involve substantial public benefit. Additional public funding might not be available, however. In order to see such projects up and running, and not lose currently worthwhile projects, a feasible and equitable option may be to negotiate a transfer of costs with private individual producer, consumer or industry beneficiaries of existing projects that do not align well under the application of beneficiary pays. If private
interests do not see the project as being sufficiently beneficial to fund them, a careful review of the allocation of public funds to those projects may be warranted.

3.3 Economic Impact

In the context of addressing market failures in the primary industries and resources sectors, the economic impact of any PIRSA investment is assumed relevant to its priority. The objective here is to provide information on the economic impact of a range of options or ‘economic levers’ using an economy wide economic model (Monash MRF).

This information is provided in two formats.

1. Some scenarios of ‘economic shocks’ or levers and their resulting ‘economic impacts’ that will hopefully throw some light on the potential economic impact attributable to PIRSA investments.

2. An effectiveness comparison of various shocks or options for economic levers available to PIRSA in increasing annual gross state product by one percent.

The economic data presented here is an example of work in progress under the first of these formats.

The economic objectives of many PIRSA projects and programs can be expressed in terms of increased productivity or demand in certain markets. Accordingly, the economic levers considered here are:

- increasing productivity in industries;
- increasing productivity of labour or land used by industries; and
- increasing export demand for products/services supplied by industries.

The change in productivity or demand attributable to PIRSA can not currently be estimated with a great degree of accuracy. Models to assist in quantifying this impact for on farm shocks are being built and will be available early in 2001. Impacts of half historical productivity growth are used as a (possibly generous) proxy for PIRSA’s impact at this stage. For export demand, many sectors being targeted have had little or no export demand growth. A scenario of a 5 percent increase is therefore provided.
Some markets are not specified in the Monash model. PIRSA’s impacts in these markets, some environmental and human health impacts for example, can not be analysed within Monash.

3.3.1 Productivity growth

Table 1 outlines the impact of productivity shocks in various industries on annual economic growth in South Australia. Note that productivity growth varies significantly between sectors. Agriculture historically has been the stand out sector in terms of productivity growth. In the last decade, however, energy utilities (3% per annum) and communications (5%) have also had strong productivity growth compared to agriculture (2.7%).

<table>
<thead>
<tr>
<th>Industry/market sector</th>
<th>Productivity shock %</th>
<th>Increase in gross state product $m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture (On Farm)</td>
<td>1.35</td>
<td>293</td>
</tr>
<tr>
<td>Broadacre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheat Sheep b</td>
<td>0.9</td>
<td>59</td>
</tr>
<tr>
<td>Pastoral b</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>High Rainfall b</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Dairy a</td>
<td>0.8</td>
<td>13</td>
</tr>
<tr>
<td>Fishing e</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Manufacturing (Food &amp; Fibre)</td>
<td>0.65</td>
<td>311</td>
</tr>
<tr>
<td>Mining</td>
<td>0.75</td>
<td>86</td>
</tr>
<tr>
<td>Manufacturing (Industrial)*</td>
<td>0.65</td>
<td>1,075</td>
</tr>
<tr>
<td>Utilities (Electricity, Gas &amp; Water)</td>
<td>1.5</td>
<td>115</td>
</tr>
<tr>
<td>Gas</td>
<td>1.5</td>
<td>23</td>
</tr>
<tr>
<td>Electricity</td>
<td>1.5</td>
<td>82</td>
</tr>
<tr>
<td>Wholesale/ Retail Trade</td>
<td>1.0</td>
<td>311</td>
</tr>
<tr>
<td>Transport And Storage</td>
<td>0.6</td>
<td>112</td>
</tr>
<tr>
<td>Market Sector</td>
<td>0.5</td>
<td>2,037</td>
</tr>
</tbody>
</table>

\( ^a \text{Knopke et al (2000)}, ^b \text{Black (1999)}, ^p \text{Productivity Commission (1999)}, ^e \text{arbitrarily imposed} \)
In moving from productivity growth in a single sector and economy wide or GSP growth, the important determinants include size of the individual sector (and its impact on markets for inputs such as labour and capital) and the linkages between that sector and other sectors of the economy. For example gas and electricity are used by nearly all sectors of the economy, and hence productivity growth has significant economy wide impact.

We’ve assumed long run full employment and constant land utilisation in most runs here. Hence, productivity improvements must express themselves as changes in real GSP through

- increased use of capital; and
- cost savings from the productivity shocks.

Productivity improvement results in increased capital in the more competitive sectors. With employment fixed, real wages rise. The agricultural industries (on farm) are labour intensive compared to manufacturing and mining. All else being equal, agriculture will have less impact on GSP, but reward more wage earners in response to a productivity gain.

Productivity growth shifts out the supply schedule for the directly affected industry, and those sectors using the output of this industry. This assists both exporters and import competing industries. Assuming economy wide balance of trade, however, productivity growth then has an indirect effect of exchange rate appreciation that influences a range of sectors. Although not shown in Table 1, this implies that strong growth in, for example, wine exports, results in an appreciating exchange rate that hurts other export sectors such as mining.

Table 2 below highlights the returns to investments in human capital, expressed as labour productivity growth, and the productivity of land. The difference in labour productivity growth between mining and agriculture may be due to capital deepening in the mining sector, rather than absolute changes in the people working in these sectors. (That is, capital deepening (increased capital per unit of labour) tends to increase the productivity of labour as a unit of labour has more capital with which to produce a level of output).
The information tabled here with respect to land productivity impacts is partial, given there are many environmental impacts not addressed in the Monash model.

**Table 2 Economic Impact of Increased Factor Productivity (Half the Historical Growth Rate)**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Productivity shock %</th>
<th>Increase in gross state product $ m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour Agriculture &amp; Fishing</td>
<td>2</td>
<td>119</td>
</tr>
<tr>
<td>Mining p</td>
<td>2.85</td>
<td>47</td>
</tr>
<tr>
<td>Land</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture a</td>
<td>1</td>
<td>55</td>
</tr>
<tr>
<td>5% pro rata loss in productive land</td>
<td></td>
<td>-295</td>
</tr>
</tbody>
</table>


### 3.3.2 Export demand growth

A scenario of 5 per cent is provided for possible export demand growth, principally because many sectors targeted by PIRSA have had little or no export demand growth in recent years. The main points to take from Table 3 include that 5 per cent export demand growth has a greater impact on GSP in sectors currently with large export markets (eg meat).

The modelling here implicitly assumes that in the long run there is a balance of payments constraint. Hence, with increased exports by one industry, an offsetting increase in imports/ and or fall in exports by another industry must occur. The mechanism for this is a real exchange rate appreciation. (ie when a sector benefits from increased export demand, there is a partially offsetting effect on other export sectors through a stronger exchange rate.)

The other major factor to consider is that wool and non-traditional exports are assumed to have steeper foreign demand schedules. That is, demand increases less for a given price fall. Other exports are assumed to not have a large impact on world demand, and the market takes what is on offer for small price changes.
Table 3 Economic Impact of 5% Increase In Export Demand

<table>
<thead>
<tr>
<th>Industry/market sector</th>
<th>Increase in gross state product ($ m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy</td>
<td>3</td>
</tr>
<tr>
<td>Fish</td>
<td>15</td>
</tr>
<tr>
<td>Meat</td>
<td>34</td>
</tr>
<tr>
<td>Grains</td>
<td>8</td>
</tr>
<tr>
<td>TCF</td>
<td>22</td>
</tr>
<tr>
<td>Wine&lt;sup&gt;e&lt;/sup&gt;</td>
<td>22</td>
</tr>
<tr>
<td>Food and Fibre (excluding processed)</td>
<td>27</td>
</tr>
<tr>
<td>Food and Fibre</td>
<td>49</td>
</tr>
<tr>
<td>Mining (excluding processed)</td>
<td>0.2</td>
</tr>
<tr>
<td>Mining (including processed)</td>
<td>22</td>
</tr>
<tr>
<td>Market Sector</td>
<td>472</td>
</tr>
</tbody>
</table>

<sup>e</sup> Extrapolated from Wittwer 2000.

4. **Current and future use of economic information for priority setting**

The economic information tabled in this paper has the primary focus of assisting decision-makers making more informed, and hence better public resource allocation decisions in the primary industry and resources sector of South Australia. A second but possibly just as important focus is to assist project proponents in forming high quality projects that address market failures in a considered manner.

The first use of this economic information was an attempt at providing PIRSA decision-makers with a limited filtering of projects (or a basket of potentially low priority projects), and an economic framework upon which they could discuss and make determinations using their collective nous.

The filtering used was as follows. Project descriptions and analyses of all low market failure (0-1), low public benefit (less than 20%) and low pricing alignment (less than 20%, see Box 2 for alignment % definition) were collated. A project analysed with low assessments for all these criteria was put forward for consideration as being of potentially low priority. Note at this time, a consistent attribution of the economic impact of addressing the market failure by the instrument chosen in the project was not available. The extent of market failure provided valuable, but limited, information in this regard.
This information was useful for decision-makers, but was found to have several major deficiencies. Firstly, this filtering left a large number of potentially low priority projects. Secondly, when group managers looked further into possible low priority projects within their own groups, there was a call for further information on the economic impact of projects.

At the agency level, providing such micro information regarding individual projects and their possible impact has been found to be both costly in provision relative to the benefits of this information, and very unwieldy in terms of having senior managers absorb and utilise this information to make strategic decisions.

The response from the Economics group in PIRSA has been to:

1. attempt to aggregate similar projects (using the market or industry targeted) into a more easily discussed, but still valid basket of information on the relative priority of projects; and

2. develop and apply tools to enable attribution of PIRSA economic development impact.

The provision of this economic information has been recognised as being of value in strategic decision making. The value of closing the attribution, where economically and technically feasible, is continuing to be pursued from an *ex ante* perspective. Another method of helping inform on some attribution questions may be through an *ex post* exercise assessing historical performance of sectors, through a decomposition closure of the Monash model for example. This information is limited of course to circumstances where the performance of historical projects in a historical context is relevant to future economic environments.
References


