

Impacts of new and
retained business in the

Australian Manufacturing Sector

Compiled for ICN
By AECgroup - 2012

Document Control

Job ID:

16281

Job Name:

Economic Impacts of New and Retained Business in the Australian Manufacturing Industry

Client:

Industry Capability Network Limited

Client Contact:

Derek Lark

Project Manager:

Kieron Lacey

Email:

kieron@aecgrouppltd.com

Telephone:

07 3831 0577

Document Name:

Impacts of New and Retained Business in Australian Manufacturing

Last Saved:

14/6/2012 4:05 pm

Version	Date	Reviewed	Approved
Draft v1.0	26 March, 2012	KL	ARP
Final Report	17 April, 2012	KL	ARP
Final Report Mk II	16 May, 2012	KL	ARP

Disclaimer:

Whilst all care and diligence have been exercised in the preparation of this report, AEC Group Limited does not warrant the accuracy of the information contained within and accepts no liability for any loss or damage that may be suffered as a result of reliance on this information, whether or not there has been any error, omission or negligence on the part of AEC Group Limited or their employees. Any forecasts or projections used in the analysis can be affected by a number of unforeseen variables, and as such no warranty is given that a particular set of results will in fact be achieved.

Executive Summary

The manufacturing industry is an important industry in Australia, accounting for 8.0% of total gross domestic value added in 2009-10. The manufacturing industry has been under pressure from a number of global macro-economic issues in recent years, such as a weakened global economy following the global financial crisis (GFC), competitive pressure from increasing wages and the strong Australian dollar, and competition for labour from the resource industry. The industry is likely to face additional pressure in the future from the introduction of a carbon tax and rising energy costs. This report provides an overview of relevant performance indicators for the industry, as well as an assessment of the industry's direct and flow-on economic activity multipliers to outline the benefits and important contribution of the manufacturing industry to the Australian economy.

The manufacturing industry recorded turnover of approximately \$390.0 billion in 2009-10, with an associated \$96.8 billion in gross value added activity. The industry employed approximately 955,000 people, and recorded approximately \$51.9 billion expenditure on wages and salaries. Both turnover and gross value added (GVA) experienced growth in absolute terms over the six years between 2004-05 and 2009-10 (19.5% and 10.3% respectively). However, both turnover and GVA growth has eased since 2006-07, and a decline was recorded in 2009-10. As a result, the contribution of the resource industry to GDP has fallen in recent years. Employment in the industry declined over the six year period by 7.3%. Over the last six years, the manufacturing industry contributed an average of 9.5% to GVA and an average of 9.5% of total employment in Australia.

Within the manufacturing industry, food product manufacturing recorded the highest turnover (approximately \$75.3 billion) and associated GVA (\$16.8 billion), and employed the most people (approximately 210,000) in 2009-10. The basic chemical and chemical product manufacturing sub-division recorded the highest growth in turnover (46.1%), associated GVA (50.1%) and employment (7.1%), between 2004-05 and 2009-10. It was one of only three sub-divisions to experience positive employment growth in the manufacturing industry between 2004-05 and 2009-10 (food product manufacturing recorded 6.6% and fabricated metal product manufacturing recorded 1.7% growth).

Turnover per employee in the manufacturing industry increased over the six years, from approximately \$317,000 in 2004-05 to approximately \$408,000 in 2009-10. The wage-to-turnover ratio for the industry during the six years recorded a steady decline (13.7% to 12.6%) until 2009-10, where it increased to 13.3%. This indicates wage expenditure over the five years grew at a slower rate than turnover (implying productivity growth), until 2009-10 where the reverse occurred.

Analysis surrounding the direct and indirect multiplier effects of \$1.0 million in increased or retained business output highlights the manufacturing industry supports:

- \$713,400 worth of gross value added in terms of industrial support activity (i.e., type I effects)
- Six full time equivalent (FTE) jobs
- \$64,900 in avoided welfare expenditure
- \$225,300 in tax revenue.

The beverage and tobacco product manufacturing sub-division is estimated to have the largest Type I multiplier effects for value added (\$799,000) and tax revenue (\$252,400), while textile, leather, clothing and footwear manufacturing provides the highest Type I multiplier for employment (eight FTEs) and welfare expenditure saved (\$88,300).

Table of Contents

Document Control	I
Executive Summary	II
Table Of Contents	III
1. Introduction	1
1.1 Project Background	1
1.2 Purpose Of This Report	1
1.3 Approach	1
2. Manufacturing Sector Performance	2
2.1 Industry Overview	2
2.2 Turnover	4
2.3 Gross Value Added	6
2.4 Employment	8
2.5 Labour Productivity	10
2.6 Price Indices	11
3. Multiplier Analysis	14
3.1 Methodology	14
3.2 Type I Multiplier Results	14
3.3 Type II Multiplier Results	16
References	17
Appendix A	20
Notes	21

1. Introduction

1.1 Project Background

Manufacturing is a significant industry in Australia, accounting for 8.0% of the domestic economy. The industry experienced strong growth between 2000 and 2008, however, a number of domestic and global events have seen the manufacturing sector experience a decline in its contribution to the Australian economy since 2008. Demand for Australian manufactured goods has been hit by a combination of:

- A weakened global economy following the events of the Global Financial Crisis and subsequent economic turmoil in Europe and the US, which has reduced global spending
- A high Australian dollar making domestic goods more expensive for foreign buyers and less price competitive in the global market
- Strong competition for labour, in particular from the resource sector, which has impacted on skilled labour availability and the costs of production.

The introduction of a carbon tax in July 2012, as well as anticipated increases in energy costs, will present further challenges to the Australian manufacturing industry.

1.2 Purpose of this Report

AECgroup was engaged by Industry Capability Network (ICN) to examine the importance of the manufacturing industry to the Australian economy. The outputs of this report will be used to outline the benefits of supporting the retention and growth of the domestic manufacturing industry.

A detailed summary of the services sector is available in a separate, but parallel, report titled “Economic Impacts of New and Retained Businesses in the Australian Services Sector”.

1.3 Approach

To demonstrate the importance of the manufacturing industry to Australia’s economy this report presents data from the previous six years relating to turnover, value add, employment, labour productivity, and price indices (Chapter 2). The report also examines the direct and indirect impacts of either obtaining new, or retaining manufacturing business using an input-output framework to measure the induced activity associated with the manufacturing sector (Chapter 3).

Impacts of the manufacturing industry are represented by:

- Turnover
- Value-added production
- Employment
- Government revenue from taxes and charges
- Government welfare savings.

2. Manufacturing Sector Performance

2.1 Industry Overview

Manufacturing turnover in the 2009-10 financial year was \$390.0 billion. Value added levels in 2009-10 for the manufacturing industry totalled \$96.8 billion, or 8.0% of the national gross amount. The industry employed approximately 955,000 people in 2009-10, constituting 8.6% of the total Australian employment levels. Expenditure on wages and salaries in 2009-10 grossed \$51.9 billion.

Food product manufacturing was the largest manufacturing sub-division in terms of turnover (approximately \$75.3 billion) and value-added (\$16.8 billion) in the 2009-10 financial year, accounting for 19.3% of total manufacturing turnover and 17.4% of total manufacturing value added, respectively. The primary metal and metal product sub-division was the second largest contributor to manufacturing turnover (\$62.1 billion or 15.9% of total manufacturing turnover), however, was only the fifth largest contributor to value added (\$6.8 billion, or 7.1% of total manufacturing value added). Machinery and equipment manufacturing (\$10.6 billion, 8.7% of industry total) and fabricated metal product manufacturing (\$10.5 billion, 7.4%% of industry total) were the second and third largest contributors to total manufacturing value add.

The smallest contributor to total turnover was furniture and other manufacturing, contributing 1.9% (approximately \$7.4 billion) of total manufacturing turnover. The lowest value adding sub-division was petroleum and coal products, at approximately \$1.6 billion or 1.6% of total manufacturing value added.

The average value added per employee in the manufacturing industry was \$101,371 in 2009-10. As with turnover, petroleum and coal production manufacturing recorded the highest value add per employee, at \$264,000. Furniture and other manufacturing produced the lowest amount of value added per employee at \$60,854.

In line with turnover, the food product manufacturing sub-division employed the most people in the manufacturing industry, employing approximately 210,000 people in 2009-10. This accounted for 22.0% of total manufacturing employment for the year. Fabricated metal product manufacturing (approximately 118,000) and machinery and equipment manufacturing (approximately 112,000) were also key employers within the manufacturing industry. Petroleum and coal production manufacturing employed the fewest people (6,000) contributing only 0.6% of total manufacturing employment.

The manufacturing industry's average wages in 2009-10 were \$54,296 per annum per employee. Petroleum and coal production manufacturing employees earned the most on average, at \$104,500 per employee, and the furniture and other manufacturing employees earned the least at \$35,244 per employee.

The average turnover per employee in the manufacturing industry was \$408,356 in 2009-10. Petroleum and coal production manufacturing recorded the highest turnover per employee at \$4.3 million. The next most productive sub-division in terms of turnover per employee was the primary metal and metal product sub-division at approximately \$1.1 million. The lowest turnover to employee ratio was the furniture and other manufacturing sub-division at \$179,146.

Further sub-division key performances indicators can be seen in Table 2.1.

Table 2.1. Summary of Manufacturing Industry Performance by Sub-divisions Total and Contribution to Industry, 2009-10

Sub-division	Turnover		Value Added		Employment		Wages and salaries		Turnover/ Employed	Value Added/ Employed	Wages/ Employed
	\$m	%	\$m	%	000s	%	\$m	%			\$
Food product manufacturing	\$79,253	29.3%	\$36,832	17.4%	230	22.4%	\$9,383	17.7%	\$386,949	\$80,162	\$46,729
Beverage and tobacco product manufacturing	\$14,706	4.8%	\$6,609	6.8%	31	3.2%	\$1,942	3.7%	\$603,439	\$213,194	\$62,646
Textile, leather, clothing and footwear manufacturing	\$9,274	2.9%	\$2,839	2.9%	44	4.8%	\$1,896	3.1%	\$219,773	\$94,523	\$36,280
Wood product manufacturing	\$12,805	3.8%	\$4,211	4.3%	49	5.0%	\$2,224	4.2%	\$286,771	\$87,729	\$46,333
Pulp, paper and converted paper product manufacturing	\$9,727	2.9%	\$2,833	2.7%	21	2.2%	\$1,489	2.8%	\$483,190	\$126,381	\$89,478
Printing (including the reproduction of recorded media)	\$9,252	2.9%	\$4,034	4.2%	80	5.2%	\$2,246	4.2%	\$185,040	\$80,880	\$44,820
Petroleum and coal product manufacturing	\$28,016	8.7%	\$1,894	1.8%	6	0.8%	\$627	1.2%	\$4,336,000	\$294,000	\$104,500
Basic chemical and chemical product manufacturing	\$31,834	8.2%	\$8,383	8.7%	46	4.7%	\$3,625	7.0%	\$707,422	\$186,511	\$80,588
Polymer product and rubber product manufacturing	\$38,234	4.2%	\$5,350	5.6%	49	5.0%	\$2,784	5.2%	\$538,000	\$112,292	\$57,893
Non-metallic mineral product manufacturing	\$17,472	4.9%	\$5,411	5.6%	43	4.9%	\$2,889	5.2%	\$406,336	\$126,837	\$62,539
Primary metal and metal product manufacturing	\$62,119	18.9%	\$6,844	7.1%	89	6.2%	\$4,885	8.9%	\$1,062,864	\$116,000	\$77,712
Fabricated metal product manufacturing	\$28,884	7.4%	\$20,510	20.9%	138	12.4%	\$5,620	11.2%	\$244,780	\$89,068	\$49,522
Transport equipment manufacturing	\$31,061	8.0%	\$8,446	8.7%	80	8.4%	\$5,350	10.2%	\$586,513	\$106,800	\$66,876
Machinery and equipment manufacturing	\$30,096	8.7%	\$20,575	20.9%	132	11.7%	\$6,299	12.1%	\$503,494	\$94,420	\$66,241
Furniture and other manufacturing	\$7,346	1.9%	\$2,495	2.6%	41	4.3%	\$1,445	2.8%	\$179,146	\$80,854	\$36,244
Total Manufacturing	\$309,999	3.0%	\$94,899	3.0%	938	3.0%	\$91,893	3.0%	\$428,798	\$161,271	\$84,286

Source: ABS Catalogue No. 6337.000002 Table 1.

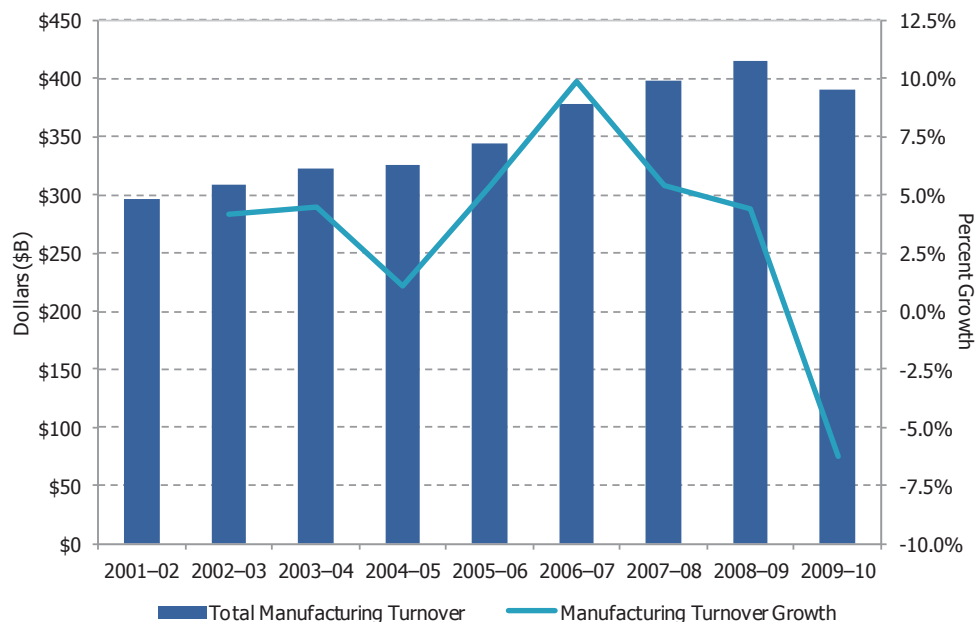
2. Manufacturing Sector Performance

2.2 Turnover

Turnover is a key measure of the performance of manufacturing establishments. It represents the sales of goods and services by an establishment. Turnover totalled approximately \$390.0 billion in 2009-10 for the Australian manufacturing industry. Table 2.2 shows turnover in the industry has grown 19.5% from 2004-05, at an average annual growth of 3.3% for the period. A strong decline, however, was recorded in the 2009-10 financial year, with turnover dropping by 6.2%.

Figure 2.1 shows the rising trend in total manufacturing turnover for the period between 2001-02 and 2008-09. Turnover figures peaked in 2008-09 then experienced a 6.2% decrease in 2009-10. This is the only year to show a decrease in manufacturing turnover for the nine year period.

Figure 2.1. Manufacturing Turnover, 2001-02 to 2009-10



Source: ABS Catalogue No. 8115.0DO002 Table 1; ABS Catalogue No. 81550DO001 Table 1.

The food product manufacturing sub-division recorded the highest turnover in 2009-10 (approximately \$75.3 billion) (see Table 2.1). Food product manufacturing has consistently been the largest contributor to total manufacturing turnover since 2004-05. Primary metal and metal product manufacturing has been the second largest contributor to total manufacturing turnover over this period. Furniture and other manufacturing has consistently been the lowest contributor to total manufacturing turnover, recording approximately \$7.4 billion in 2009-10.

During the period from 2004-05 to 2009-10 both basic chemical and chemical production manufacturing, and primary metal and metal production manufacturing sub-divisions recorded growth of over 40% (see Table 2.2). Three sub-divisions – transport equipment manufacturing, and textile, leather, clothing and footwear manufacturing, and printing manufacturing – recorded declines in turnover over the six year period, of 8.3%, 3.0% and 0.4% respectively.

Table 2.2. Manufacturing Industry Turnover by Sub-division, 2004-05 to 2009-10

Sub-division	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	Growth	Average Annual Growth
	\$m	\$m	\$m	\$m	\$m	\$m	%	%
Food product manufacturing	\$59,296	\$60,294	\$65,244	\$68,528	\$72,616	\$75,253	26.9%	4.5%
Beverage and tobacco product manufacturing	\$15,867	\$16,003	\$18,013	\$16,599	\$17,764	\$18,706	17.9%	3.0%
Textile, leather, clothing and footwear manufacturing	\$9,556	\$9,100	\$9,675	\$10,104	\$9,871	\$9,274	-3.0%	-0.5%
Wood product manufacturing	\$12,302	\$12,246	\$11,761	\$13,411	\$12,746	\$12,805	4.1%	0.7%
Pulp, paper and converted paper product manufacturing	\$9,618	\$9,613	\$9,621	\$9,965	\$9,562	\$9,727	1.1%	0.2%
Printing (including the reproduction of recorded media)	\$9,287	\$9,527	\$9,466	\$9,666	\$9,924	\$9,252	-0.4%	-0.1%
Petroleum and coal product manufacturing	\$23,566	\$30,911	\$32,483	\$32,973	\$37,447	\$26,016	10.4%	1.7%
Basic chemical and chemical product manufacturing	\$21,788	\$23,495	\$25,707	\$28,643	\$30,512	\$31,834	46.1%	7.7%
Polymer product and rubber product manufacturing	\$14,956	\$14,683	\$16,247	\$17,502	\$15,992	\$16,224	8.5%	1.4%
Non-metallic mineral product manufacturing	\$14,256	\$14,629	\$16,178	\$17,210	\$17,834	\$17,472	22.6%	3.8%
Primary metal and metal product manufacturing	\$43,752	\$46,934	\$61,054	\$66,408	\$70,369	\$62,119	42.0%	7.0%
Fabricated metal product manufacturing	\$22,665	\$25,143	\$27,665	\$29,973	\$32,098	\$28,884	27.4%	4.6%
Transport equipment manufacturing	\$33,899	\$34,464	\$34,001	\$35,748	\$33,930	\$31,081	-8.3%	-1.4%
Machinery and equipment manufacturing	\$28,467	\$29,819	\$32,782	\$33,307	\$37,526	\$33,988	19.4%	3.2%
Furniture and other manufacturing	\$6,946	\$6,866	\$7,839	\$8,192	\$7,677	\$7,345	5.7%	1.0%
Total Manufacturing	\$326,220	\$343,726	\$377,736	\$398,229	\$415,866	\$389,980	19.5%	3.3%
Year on Year % Change	N/A	5.4%	9.9%	5.4%	4.4%	-6.2%	N/A	N/A

Source: ABS Catalogue No. 8115.0DO002 Table 1.

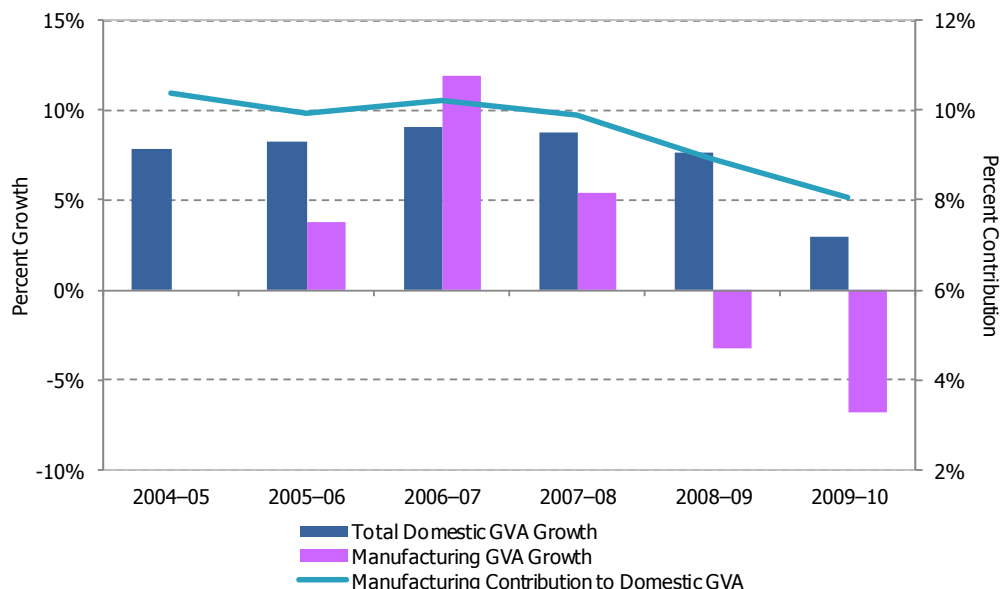
2. Manufacturing Sector Performance

2.3 Gross Value Added

Value added represents the difference between sales of goods or services and the costs of the inputs required to produce those goods or services. The sum of all value added in a country and taxes on products represents a measure of Gross Domestic Product (GDP).

In 2009-10, Australia's manufacturing industry recorded \$96.8 billion in value added. Table 2.3 shows the growth of value added in the manufacturing industry was 10.3% between 2004-05 and 2009-10, equating to an average annual growth rate of 1.7% over the six years. Figure 2.2 shows the year on year value add growth in the manufacturing industry. Year on year growth in manufacturing value added activity has been below overall domestic economic growth since 2006-07. Growth in manufacturing value added activity has declined in the past two years. This has seen the manufacturing industry's contribution to total domestic gross value added also decline since 2006-07.

Figure 2.2. Manufacturing Gross Value Added, 2004-05 to 2009-10*



*Note: 2004-05 manufacturing growth data unavailable due to ANZSIC changes.
Source: ABS Catalogue No. 81550DO002 Table 1; ABS Catalogue No. 5204.0 Table 5.

Table 2.3 shows the largest sub-divisions in terms of value added were food product manufacturing, machinery and equipment manufacturing, and fabricated metal product manufacturing (approximately \$16.8 billion, \$10.6 billion, and \$10.5 billion, respectively). The smallest sub-divisions in value added terms were petroleum and coal product manufacturing, and furniture and other manufacturing (approximately \$1.6 billion and \$2.5 billion, respectively).

Growth in value added by sub-division over the six year period between 2004-05 and 2009-10 was led by basic chemical and chemical product manufacturing, recording 50.1% growth, or an average of 8.4% annually. Four sub-divisions recorded a decline in value added activity over the six year period, with primary metal and metal product manufacturing, and petroleum and coal product manufacturing recording the largest declines of 38.8% (6.5% annually) and 30.4% (5.1% annually), respectively.

Table 2.3. Manufacturing Industry Gross Value Added by Sub-division, 2004-05 to 2009-10

Sub-division	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	Growth	Average Annual Growth
	\$m	\$m	\$m	\$m	\$m	\$m	%	%
Food product manufacturing	\$13,313	\$13,956	\$14,833	\$15,988	\$16,441	\$16,832	26.4%	4.4%
Beverage and tobacco product manufacturing	\$5,263	\$5,339	\$5,810	\$5,912	\$5,899	\$6,609	25.6%	4.3%
Textile, leather, clothing and footwear manufacturing	\$2,719	\$2,536	\$2,816	\$2,988	\$2,848	\$2,839	4.4%	0.7%
Wood product manufacturing	\$4,042	\$3,932	\$3,995	\$4,396	\$4,203	\$4,211	4.2%	0.7%
Pulp, paper and converted paper product manufacturing	\$3,031	\$2,926	\$2,741	\$2,935	\$2,769	\$2,633	-13.1%	-2.2%
Printing (including the reproduction of recorded media)	\$3,698	\$3,822	\$3,963	\$4,053	\$4,393	\$4,034	9.1%	1.5%
Petroleum and coal product manufacturing	\$2,276	\$2,999	\$4,717	\$4,237	\$1,011	\$1,584	-30.4%	-5.1%
Basic chemical and chemical product manufacturing	\$5,591	\$6,214	\$6,968	\$7,551	\$8,291	\$8,393	50.1%	8.4%
Polymer product and rubber product manufacturing	\$4,712	\$4,584	\$5,148	\$5,857	\$5,011	\$5,390	14.4%	2.4%
Non-metallic mineral product manufacturing	\$4,393	\$4,582	\$5,163	\$5,398	\$5,786	\$5,411	23.2%	3.9%
Primary metal and metal product manufacturing	\$11,192	\$11,202	\$14,040	\$14,023	\$12,190	\$6,844	-38.8%	-6.5%
Fabricated metal product manufacturing	\$7,564	\$8,423	\$9,293	\$10,838	\$11,636	\$10,510	38.9%	6.5%
Transport equipment manufacturing	\$8,716	\$8,593	\$9,255	\$9,682	\$9,034	\$8,448	-3.1%	-0.5%
Machinery and equipment manufacturing	\$9,018	\$9,704	\$10,761	\$10,887	\$11,805	\$10,575	17.3%	2.9%
Furniture and other manufacturing	\$2,215	\$2,219	\$2,395	\$2,667	\$2,608	\$2,495	12.6%	2.1%
Total Manufacturing GVA	\$87,742	\$91,033	\$101,898	\$107,413	\$103,925	\$96,809	10.3%	1.7%
Year on Year % Change	N/A	3.8%	11.9%	5.4%	-3.2%	-6.8%	N/A	N/A
Total Domestic GVA	\$845,369	\$915,398	\$998,277	\$1,086,112	\$1,168,875	\$1,203,046	42.3%	7.1%
Year on Year % Change	7.8%	8.3%	9.1%	8.8%	7.6%	2.9%	N/A	N/A
Contribution to Domestic GVA	10.4%	9.9%	10.2%	9.9%	8.9%	8.0%	N/A	-3.7%

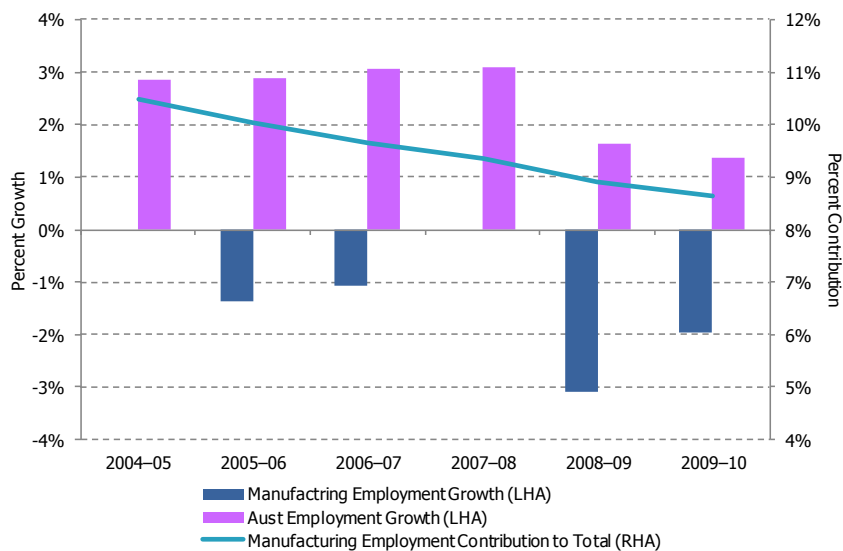
Source: ABS Catalogue No. 81550DO002 Table 1; ABS Catalogue No. 5204.0 Table 5.

2. Manufacturing Sector Performance

2.4 Employment

As at 30th June 2010, the Australian manufacturing industry employed approximately 955,000 people. Manufacturing employment in Australia decreased by 7.3% between 2004-05 and 2009-10, resulting in an annual average decrease of 1.2% annually (see Table 2.4). Figure 2.3 highlights the manufacturing industry's decline in employment since 2004-05 in contrast to growth in total Australian employment over this period. The manufacturing industry's contribution to total Australian employment has steadily declined over the past six years.

Figure 2.3. Manufacturing Employment, 2004-05 to 2009-10



Note: 2004-05 manufacturing growth data unavailable due to ANZSIC changes.
Source: ABS Catalogue No. 81550D0002 Table 1; ABS Catalogue No. 6291.0.55.003 Table 6.

Table 2.4 shows the food product manufacturing sub-division was the largest employer in the manufacturing industry in 2009-10, employing approximately 210,000 people Australia-wide, or 22.0% of total manufacturing employment. Fabricated metal product (approximately 118,000 employed), and machinery and equipment manufacturing (approximately 112,000 employed) also contributed strongly to total manufacturing employment (12.4% and 11.7%, respectively). The sub-divisions employing the fewest people were petroleum and coal product manufacturing (approximately 6,000 employed; 0.6% of total manufacturing employment) and pulp, paper and converted paper product manufacturing (approximately 21,000 employed; 2.2% of total manufacturing employment).

Of the sub-divisions, only three recorded growth in their level of employment between 2004-05 and 2009-10:

- Basic chemical and chemical product manufacturing grew by 7.1% between 2004-05 and 2009-10 (annual average of 1.2%)
- Food product manufacturing employment grew by 6.6% (1.1% annual average)
- Fabricated metal product manufacturing grew by 1.7% (0.3% average annual).

Primary metal and metal product manufacturing recorded the same level of employment in 2009-10 as in 2004-05, however, overall employment in this sub-division has been declining since 2006-07.

Table 2.4. Manufacturing Industry Employment by Sub-division, 2004-05 to 2009-10

Sub-division	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	Growth	Average Annual Growth
	000s	000s	000s	000s	000s	000s	%	%
Food product manufacturing	197	203	206	220	217	210	6.6%	1.1%
Beverage and tobacco product manufacturing	33	33	34	33	30	31	-6.1%	-1.0%
Textile, leather, clothing and footwear manufacturing	57	53	54	52	47	44	-22.8%	-3.8%
Wood product manufacturing	55	54	51	53	49	48	-12.7%	-2.1%
Pulp, paper and converted paper product manufacturing	24	24	24	23	21	21	-12.5%	-2.1%
Printing (including the reproduction of recorded media)	53	53	50	48	50	50	-5.7%	-0.9%
Petroleum and coal product manufacturing	7	7	7	7	6	6	-14.3%	-2.4%
Basic chemical and chemical product manufacturing	42	45	45	45	45	45	7.1%	1.2%
Polymer product and rubber product manufacturing	59	54	53	53	51	48	-18.6%	-3.1%
Non-metallic mineral product manufacturing	45	46	46	42	42	43	-4.4%	-0.7%
Primary metal and metal product manufacturing	59	59	63	62	60	59	0.0%	0.0%
Fabricated metal product manufacturing	116	115	115	114	115	118	1.7%	0.3%
Transport equipment manufacturing	110	108	97	95	86	80	-27.3%	-4.5%
Machinery and equipment manufacturing	124	118	119	120	114	112	-9.7%	-1.6%
Furniture and other manufacturing	49	44	41	39	42	41	-16.3%	-2.7%
Total Manufacturing Employment	1,030	1,016	1,005	1,005	974	955	-7.3%	-1.2%
Year on Year % Change	N/A	-1.4%	-1.1%	0.0%	-3.1%	-2.0%	N/A	N/A
Total Domestic Employment	9,828	10,112	10,421	10,743	10,919	11,067	12.6%	2.1%
Year on Year % Change	2.8%	2.9%	3.1%	3.1%	1.6%	1.4%	N/A	N/A
Contribution to Total Employment	10.5%	10.0%	9.6%	9.4%	8.9%	8.6%	N/A	-2.9%

Source: ABS Catalogue No. 81550DO002 Table 1; ABS Catalogue No. 6291.0.55.003 Table 6.

2. Manufacturing Sector Performance

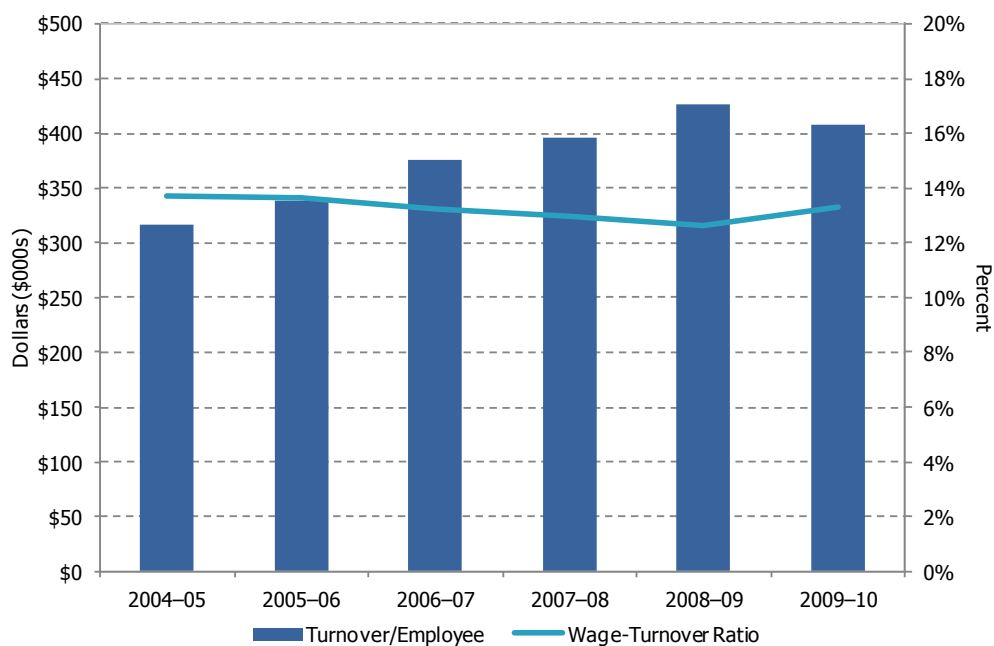
2.5 Labour Productivity

Labour productivity can be measured through a range of indicators, including turnover per employee and the wage-to-turnover ratio. Rising turnover per employee is indicative of higher labour output per unit of labour input, whereas a lower wage-to turnover ratio indicates higher value of production per dollar spent on labour.

Figure 2.4 shows the manufacturing industry's labour productivity in terms of turnover per employee has grown 28.9% between 2004-05 and 2009-10, to \$408,000 per employee. Turnover per employee peaked in the 2008-09 financial year at \$427,000 per employee.

The wage-to-turnover ratio declined by approximately 1.1 percentage points between 2004-05 and 2008-09, from 13.7% to 12.6%, before rising in 2009-10 to 13.3%. This is consistent with changes in turnover per employee over this period, and the combination of these measures indicates labour productivity declined slightly in 2009-10 following consistent year on year improvements.

Figure 2.4. Manufacturing Labour Productivity, 2004-05 to 2009-10



Source: ABS Catalogue No. 8155.0DO002 Table 1.

2. Manufacturing Sector Performance

2.6 Price Indices

The Australian Bureau of Statistics compiles two price indices relating to the manufacturing sector, the Price Indices of Materials Used in Manufacturing Industries and the Price Indices of Articles Produced by Manufacturing Industries.

Table 2.5 shows, with the exception of beverage and tobacco product manufacturing, the cost of materials used in production has increased for all sub-divisions of the manufacturing industry. The cost of materials used in the beverage and tobacco manufacturing sub-division is largely influenced by prevailing prices of core agricultural commodities, in particular grape prices for wine production. The largest growth in prices over the six year period was seen in the primary metal and metal product manufacturing sub-division, showing input price growth of 14.0%. Prices of materials in the petroleum and coal product manufacturing sub-division also showed strong growth of 6.9%.

In 2009-10, prices of materials decreased from the previous year's levels across all sub-divisions. This decline can largely be attributed to an increase in the value of the Australian dollar, which reduced the input cost of imported goods to production.

Table 2.6 shows petroleum and coal product manufacturing, and fabricated metal product manufacturing showed the highest increases in prices for goods produced, of 4.8% and 4.4%, respectively. All sub-divisions in the manufacturing industry recorded positive price growth of goods produced, with the exception of printing (including the reproduction of recorded media) which experienced a decline of 0.4%.

Table 2.5. Price Indices of Materials Used in Manufacturing Industries

Sub-division	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	Growth p.a.
Food product manufacturing	100.00	101.72	106.35	119.72	120.81	113.81	2.3%
Beverage and tobacco product manufacturing	100.00	117.04	91.08	99.14	106.29	99.43	-0.1%
Textile, leather, clothing and footwear manufacturing	100.00	108.91	102.44	104.75	104.06	101.41	0.2%
Wood product manufacturing	100.00	113.59	106.87	115.39	126.98	116.91	2.8%
Pulp, paper and converted paper product manufacturing	100.00	114.93	107.42	109.89	120.00	105.70	0.9%
Printing (including the reproduction of recorded media)	100.00	98.25	101.06	102.50	106.34	105.60	0.9%
Petroleum and coal product manufacturing	100.00	137.13	135.90	162.61	157.69	141.13	6.9%
Basic chemical and chemical product manufacturing	100.00	101.75	112.72	122.21	150.95	115.94	2.7%
Polymer product and rubber product manufacturing	100.00	101.51	109.86	110.79	123.49	105.92	1.0%
Non-metallic mineral product manufacturing	100.00	98.66	105.10	108.68	121.56	119.17	3.2%
Primary metal and metal product manufacturing	100.00	131.84	151.15	159.86	188.40	184.07	14.0%
Fabricated metal product manufacturing	100.00	110.36	123.08	119.21	127.77	112.74	2.1%
Transport equipment manufacturing	100.00	100.12	109.79	107.77	119.94	112.86	2.1%
Machinery and equipment manufacturing	100.00	101.28	118.00	117.57	127.86	111.87	2.0%
Furniture and other manufacturing	100.00	104.51	112.49	113.58	125.64	119.21	3.2%
All Articles	100.00	110.74	114.63	121.00	130.87	119.48	3.2%

Source: ABS Catalogue No. 6427.0 Table 14.

Table 2.6. Price Indices of Articles Produced by Manufacturing Industries

Sub-division	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	Growth p.a.
Food product manufacturing	100.00	102.56	106.06	112.55	123.08	121.18	3.5%
Beverage and tobacco product manufacturing	100.00	103.17	107.22	111.27	118.10	120.82	3.5%
Textile, leather, clothing and footwear manufacturing	100.00	99.95	101.73	105.26	106.89	109.74	1.6%
Wood product manufacturing	100.00	102.31	105.44	111.99	119.36	120.78	3.5%
Pulp, paper and converted paper product manufacturing	100.00	101.00	102.45	103.28	105.09	109.35	1.6%
Printing (including the reproduction of recorded media)	100.00	100.00	98.73	97.46	101.13	97.57	-0.4%
Petroleum and coal product manufacturing	100.00	131.13	130.31	163.26	146.95	128.59	4.8%
Basic chemical and chemical product manufacturing	100.00	102.17	105.65	108.94	122.94	114.60	2.4%
Polymer product and rubber product manufacturing	100.00	104.28	107.49	112.02	114.58	114.73	2.5%
Non-metallic mineral product manufacturing	100.00	102.19	104.23	107.15	113.55	116.52	2.8%
Primary metal and metal product manufacturing	100.00	118.18	146.69	136.66	131.34	118.72	3.1%
Fabricated metal product manufacturing	100.00	105.20	108.72	112.09	127.86	126.25	4.4%
Transport equipment manufacturing	100.00	100.20	102.50	101.51	102.70	103.65	0.6%
Machinery and equipment manufacturing	100.00	102.31	105.84	108.56	112.46	111.28	1.9%
Furniture and other manufacturing	100.00	105.22	108.93	109.31	119.19	118.18	3.0%
All Articles	100.00	106.93	110.98	116.54	119.71	116.57	2.8%

Source: ABS Catalogue No. 6427.0 Tables 10 and 11.

3. Multiplier Analysis

3.1 Methodology

Australia's 2007-08 Input-Output tables have been used to construct manufacturing industry multipliers. The table used value transactions at basic prices and allocates imports as an individual final input. Such a table leaves intermediate transactions free from tax and leakages distortions. To examine specific manufacturing indicators individually, the manufacturing sectors from Australia's 111-sector table were aggregated to a 34-sector table.

It is recommended Type I multipliers be used. However, both Type I and II are presented for comparison. Type I multipliers show induced activity resulting from industry production to supply inputs into either new or retained manufacturing business, assuming an exogenous household sector. Type I multipliers assume the income generated from induced industry activities does not affect household consumption decision.

Type II multipliers show induced activity resulting from industry production to supply inputs into either new or retained manufacturing business, and as households respond to income (generally by increasing demand for goods and services) from induced industry activity. Consequently, Type II multipliers give higher estimates of impacts than those of Type I as they include the Type I effects plus household expenditure effects.

3.2 Type I Multiplier Results

Table 3.1 shows the Type I multiplier analysis for the manufacturing industry, indicating for every \$1.0 million of new or retained output in the manufacturing industry, approximately:

- \$713,400 worth of gross value added is induced in the economy. Value-added includes wages, salaries, taxes paid and profits
- Six full-time equivalent (FTE) jobs are supported
- \$64,900 worth of welfare payments are saved. Welfare refers to payments made by Social Security in order to assist and sustain unemployed persons
- \$225,300 worth of tax revenue is raised.

The beverage and tobacco product manufacturing sub-division records the highest value added multiplier per \$1.0 million of output (\$799,000 value added for every \$1.0 million in new or retained activity). Several other sub-divisions record increases/ retention in value added of over \$750,000, including:

- Wood product manufacturing (\$786,800)
- Non-metallic mineral product manufacturing (\$786,300)
- Food product manufacturing (\$781,200)
- Printing (including the reproduction of recorded media) (\$761,100)
- Fabricated metal product manufacturing (\$752,500).

Petroleum and coal production manufacturing is estimated to record the lowest value added per \$1.0 million of output, at \$450,400.

3. Multiplier Analysis

Furniture and other manufacturing is estimated to have the highest employment (11 FTEs) and welfare saved (\$113,400) multipliers per \$1.0 million of output. Petroleum and coal product manufacturing records the lowest, supporting the equivalent of only 2 FTEs per \$1.0 of output and a welfare saving of (\$16,600).

The highest amount of tax revenue raised from the increase in output is recorded in the beverage and tobacco product manufacturing sub-division. For every \$1.0 million in new or retained output, approximately \$252,400 tax revenue is raised. The petroleum and coal production manufacturing sub-division is also the lowest yielding in terms of tax revenue, raising approximately \$142,200.

Table 3.1. Type I Multipliers - Activity Induced from \$1.0 Million of New or Retained Business (in 2008 dollar terms)

Sub-division	Value Add	Employed	Welfare Savings	Tax Revenue
	\$000s	FTEs	\$000s	\$000s
Food Product Manufacturing	\$781.2	8	\$83.5	\$246.7
Beverage and Tobacco Product Manufacturing	\$799.0	5	\$57.2	\$252.4
Textile, Leather, Clothing and Footwear Manufacturing	\$665.2	8	\$88.3	\$210.1
Wood Product Manufacturing	\$786.8	8	\$84.8	\$248.5
Pulp, Paper and Converted Paper Product Manufacturing	\$695.1	5	\$54.5	\$219.5
Printing (Including the Reproduction of Recorded Media)	\$761.1	8	\$86.8	\$240.4
Petroleum and Coal Product Manufacturing	\$450.4	2	\$16.6	\$142.2
Basic Chemical and Chemical Product Manufacturing	\$697.2	5	\$47.9	\$220.2
Polymer Product and Rubber Product Manufacturing	\$703.8	6	\$58.2	\$222.3
Non-Metallic Mineral Product Manufacturing	\$786.3	6	\$59.8	\$248.3
Primary Metal and Metal Product Manufacturing	\$728.7	3	\$35.0	\$230.1
Fabricated Metal Product Manufacturing	\$752.5	5	\$56.9	\$237.7
Transport Equipment Manufacturing	\$650.5	6	\$63.4	\$205.4
Machinery and Equipment Manufacturing	\$730.7	6	\$67.1	\$230.8
Furniture and Other Manufacturing	\$712.3	11	\$113.4	\$225.0
Total Manufacturing	\$713.4	6	\$64.9	\$225.3

Source: ABS Catalogue No. 1301.0; ABS Catalogue No. 5204.0 Table 5; ABS Catalogue No. 5506.0, Table 1 and 18, AECgroup

3. Multiplier Analysis

3.3 Type II Multiplier Results

Type II multipliers include measures of additional flow-on effects related to increased household consumption. This creates a larger value estimate of the impacts on the economy through an increase in manufacturing output than Type I multipliers, as outlined in Table 3.2.

For the manufacturing industry overall, \$1.0 million in new or retained output provides approximately \$1.2 million in value added, 10 FTEs (an additional four FTEs compared to Type I analysis), saves approximately \$101,800 in welfare payments, and create \$365,000 in tax revenue.

Of the manufacturing sub-divisions, printing (including the reproduction of recorded media) records the highest multiplier per \$1.0 million of output for gross value added (\$1.3 million). Petroleum and coal product manufacturing is estimated to record the lowest value added multiplier of approximately \$592,000, and is the only sub-division to record a multiplier of less than \$1.0 million in value added.

Furniture and other manufacturing is estimated to possess the highest employment (15 FTEs) and welfare saved (\$151,900) multipliers per \$1.0 million of output generated/ retained. Petroleum and coal product manufacturing is estimated to have the lowest employment (2 FTEs) and welfare saved (\$28,400) multipliers.

Printing manufacturing provides the highest amount of tax revenue per \$1.0 million of output within the manufacturing sub-divisions (approximately \$417,000). Petroleum and coal product manufacturing provides the lowest tax revenue multiplier of \$187,000.

Table 3.2. Type II Multipliers - Activity Induced from \$1.0 Million of New or Retained Business (2008)

Sub-division	Value Added	Employed	Welfare	Tax Revenue
	\$000s	FTEs	\$000s	\$000s
Food Product Manufacturing	\$1,267	12	\$123.9	\$400
Beverage and Tobacco Product Manufacturing	\$1,206	9	\$91.1	\$381
Textile, Leather, Clothing and Footwear Manufacturing	\$1,138	12	\$127.6	\$359
Wood Product Manufacturing	\$1,297	12	\$127.2	\$409
Pulp, Paper and Converted Paper Product Manufacturing	\$1,156	9	\$92.9	\$365
Printing (Including the Reproduction of Recorded Media)	\$1,321	13	\$133.4	\$417
Petroleum and Coal Product Manufacturing	\$592	3	\$28.4	\$187
Basic Chemical and Chemical Product Manufacturing	\$1,111	8	\$82.3	\$351
Polymer Product and Rubber Product Manufacturing	\$1,177	9	\$97.6	\$372
Non-Metallic Mineral Product Manufacturing	\$1,261	9	\$99.3	\$398
Primary Metal and Metal Product Manufacturing	\$1,016	6	\$58.9	\$321
Fabricated Metal Product Manufacturing	\$1,262	9	\$99.3	\$399
Transport Equipment Manufacturing	\$1,139	10	\$104.1	\$360
Machinery and Equipment Manufacturing	\$1,229	10	\$108.6	\$388
Furniture and Other Manufacturing	\$1,175	15	\$151.9	\$371
Total Manufacturing	\$1,156	10	\$101.8	\$365

Source: ABS Catalogue No. 1301.0; ABS Catalogue No. 5204.0 Table 5; ABS Catalogue No. 5506.0, Table 1 and 18, AECgroup

References

Australian Bureau of Statistics (2010). 2009-10 Year Book Australia. Cat No. 1301.0, ABS, Canberra.

Australian Bureau of Statistics (2011). Australian Industry 2009-10. Cat No. 8155.0, ABS Canberra.

Australian Bureau of Statistics (2011). Australian System of National Accounts, 2010-11. Cat No. 5204.0, ABS, Canberra.

Australian Bureau of Statistics (2011). Labour Force, Australia, Detailed, Quarterly. Cat No. 6291.0.55.003, ABS, Canberra.

Australian Bureau of Statistics (2011). Producer Price Indexes, Australia. Cat No. 6427.0, ABS, Canberra.

Australian Bureau of Statistics (2011). Taxation Revenue, Australia, 2009-10. Cat No. 5506.0, ABS, Canberra.

Appendix A

IO Model Overview

Input-Output (IO) analysis demonstrates inter-industry relationships in an economy, depicting how the output of one industry is purchased by other industries, households, the government and external parties (i.e. exports), as well as expenditure on other factors of production such as labour, capital and imports. IO analysis shows the direct and indirect (flow-on) effects of one sector on other sectors and the general economy. As such, IO modelling can be used to demonstrate the economic contribution of a sector on the overall economy and how much the economy relies on this sector or to examine a change in final demand of any one sector and the resultant change in activity of its supporting sectors.

The economic contribution can be traced through the economic system via:

- Direct impacts, which are the first round of effects from direct operational expenditure on goods and services
- Flow-on impacts, which comprise the second and subsequent round effects of increased purchases by suppliers in response to increased sales.

These effects can be identified through the examination of four types of impacts:

- Output: Refers to the gross value of goods and services transacted, including the costs of goods and services used in the development and provision of the final product. Output typically overstates the economic impacts as it counts all goods and services used in one stage of production as an input to later stages of production, hence counting their contribution more than once
- Value added: Refers to the value of output after deducting the cost of goods and services inputs in the production process. Value added defines the true net contribution and is subsequently the preferred measure for assessing economic impacts
- Income: Measures the level of wages and salaries paid to employees of the industry under consideration and to other industries benefiting from the project
- Employment: Refers to the part-time and full-time employment positions generated by the economic shock, both directly and indirectly through flow-on activity, and is expressed in terms of full time equivalent (FTE) positions.

Input-output multipliers can be derived from open (Type I) IO models or closed (Type II) models. Open models show the direct effects of spending in a particular industry as well as the indirect or flow-on (industrial support) effects of additional activities undertaken by industries increasing their activity in response to the direct spending.

Closed models re-circulate the labour income earned as a result of the initial spending through other industry and commodity groups to estimate consumption induced effects (or impacts from increased household consumption).

Appendix A

Explanation of Value Added and Gross Output

The concepts of value-added and gross output are often confused but can easily be explained via a simple example, illustrated in Table A.1. The example below represents a simple economy that consists of mining, smelting and refining companies. The mine produces ore and sells it to the smelter. The smelter concentrates the ore into ingots and sells them to the refinery. The refinery in turn manufactures the ingots into a range of products and sells them overseas.

Table A.1. Output and Value-Added Example

Description	Mine	Smelter	Refinery	Total
Sales (Output)	100	175	275	550
Value-Added	100	75	100	275

The process begins with the mining company extracting ore from the ground. Assuming that no capital or imported product is required the \$100 received from the purchase of the ore by the smelter is distributed by the mining company as follows:

- Employees - salaries, wages and other benefits
- Shareholders and lenders - interest paid, dividends to shareholders
- Government - income tax, royalties
- Retained profits.

The smelting company purchases \$100 of ore from the mining company, processes it into ingots and then sells these to the refining company for \$175. Note that of the \$175 received, \$100 goes directly to the mining company, therefore the smelting company has added \$75 of value. This \$75 is distributed in a similar fashion to the mining company, assuming that no capital or imported product is required.

The refining company purchases \$175 of ingots from the smelting company, processes them into products and then sells these to its overseas customers for \$275. Note that of the \$275 received, \$175 goes directly to the smelting company, therefore the refining company has added \$100 of value. This \$100 is distributed in a similar fashion to the mining company, assuming that no capital or imported product is required.

Therefore in total we have $\$100 + \$75 + \$100 = \275 of value-added in our simple economy.

Appendix A

IO Modelling Assumptions and Limitations

The key assumptions and limitations of Input-Output analysis include:

- The inputs purchased by each industry are a function only of the level of output of that industry. The input function is generally assumed linear and homogenous of degree one (which implies constant returns to scale and no substitution between inputs)
- Each commodity (or group of commodities) is supplied by a single industry or sector of production. This implies there is only one method used to produce each commodity and that each sector has only one primary output
- The total effect of carrying on several types of production is the sum of the separate effects. This rules out external economies and diseconomies and is known simply as the “additivity assumption”. This generally does not reflect real world operations
- The system is in equilibrium at given prices. This is not the case in an economic system subject to external influences
- In the static Input-Output model, there are no capacity constraints so the supply of each good is perfectly elastic. Each industry can supply whatever quantity is demanded of it and there are no capital restrictions. This assumption would come into play depending upon the magnitude of the changes in quantities demanded.

Despite these limitations, IO techniques provide a solid approach for taking account of the inter-relationships between the various sectors of the economy in the short-term and provide useful insight into the quantum of final demand for goods and services, both directly and indirectly, likely to be generated by the project.

Notes



icn.org.au