



CENTRE FOR
INTERNATIONAL
ECONOMICS

*Drivers of
structural change in
the Australian
Economy*

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Executive summary

The structure of the Australian economy is constantly evolving in response to domestic and international forces which themselves are continually changing. Over the last five years the service sector has continued its inexorable increase while at the same time the mining sector has staged a rebound in response to increasing world demand for commodities. Manufacturing production has switched to more 'knowledge intensive' goods that emphasise design and other value-added components. Firms have grown bigger and computerisation and information technology has replaced thousands of clerical workers who have found jobs in other service industries.

To analyse the drivers of structural change over the last five years and what is likely over the next decade, it is useful to distinguish between the things that are outside the control of Australian industry and government and the response to those outside factors. In technical terms there are exogenous drivers and endogenous responses. Like death and taxes the exogenous drivers are inevitable. The only question is how we respond to them – whether we can do so in a way that anticipates and capitalises on the opportunities offered to maximise the benefits of change at least cost.

Australia is facing a period of increased structural change with a rapidly changing external environment, and domestically, with significant impacts to come from changing demographics. While the external environment is important for select sectors such as mining and manufacturing, the main drivers of change for most other industries are domestic (albeit often with an international aspect).

Structural change is the process by which an economy is progressively transformed over time. Change can occur across industries, within industries or at the level of the firm. The largest changes are occurring at the macroeconomic level affecting all industries and firms but often with a differential impact. The key changes over the last five years and how various drivers may develop over the next decade follow. The conclusions drawn are derived from a formal analysis with a consistent framework that 'adds up' over the economy.

- **Low world real interest rates.** The world real bond rate has halved since the 1990s due to lower world inflation, falling investment good prices and high levels of saving in China and other Asian countries. These have fed through to lower borrowing rates in Australia which have helped to drive asset prices higher with equity prices, house prices and household wealth reaching record levels. These have in turn underpinned high rates of growth in household consumption, and high levels of business investment and dwelling construction. Impacts have been spread across all industries but with the largest effects on construction.
- **Falling prices of investment goods.** Imported investment good prices have fallen by 40 per cent over the last few years, with continuing large falls in information technology and software prices. This has had particularly large effects on industries such as finance and insurance, communications, wholesale trade, and business services, which are intensive in their use of information technology. However, the pace of adjustment appears to have slowed over the last few years, with the share of information technology in investment expenditure stabilising and the productivity dividends beginning to taper off.

Combined with lower interest rates, the falling prices of investment goods are leading to greater capital intensity across industries, and large changes within industries, particularly those that are intensive users of ICT. It is also leading to increased returns to skilled labour. With returns on capital remaining high, and the training of skilled labour taking time, this process will continue over the next five to ten years.

- **The rise in China and India and their impact on commodity prices.** The economic boom in China, and to a lesser extent India, has driven commodity prices to record levels and this is having transitional impacts on the economy – particularly driving large increases in the construction industry as new mines are developed. This increased demand and activity in Western Australia and Queensland has led to an increased demand for tradespersons.

However, the commodity boom has not added to domestic demand in the same way as commodity booms in the past. A higher exchange rate has spread the effects across the economy redistributing some of the income to households. Commodity prices are widely expected to return towards historical averages over the next five years as world supply expands to meet demand. Once the investment phase of the boom is over, mining output and exports will be higher (mining output, as a per cent of GDP, will increase by around 50 per cent over the next five years), but the impacts on the rest of the economy will be fairly

minimal. After peaking in 2007, the demand for tradespersons will decline (with numbers employed falling in absolute terms).

- **Falling prices of world manufacturing goods** (particularly labour intensive goods). The combined effects of economic development in China and India, low interest rates and the use of ICT has seen the price of world manufacturing goods fall over the last five years. This aspect is the less discussed flip-side of our improving terms of trade. But unlike commodity prices, which are likely to fall over the next few years, the change in import prices of manufactured goods will persist. Falling relative import prices are having two effects. They are boosting consumption and real incomes and they are leading to declines in labour intensive import competing industries such as textiles clothing and footwear. Adjustment pressures have increased in recent years as a result of a higher Australian dollar. However many of the changes have now occurred and pressure will ease over the future now that most of the exchange rate effects have worked through.
- **Demographic change and slower productivity growth.** Australia is currently at a demographic turning point. Current projections are for growth of the working age population to slow dramatically over the next five to six years (to less than half its pace of recent years). Productivity growth has also slowed and seems unlikely to rebound to the high levels of the 1990s. Without another boost to productivity growth from more economic reform, the effect of slower population growth means that average annual GDP growth will fall to less than 2 per cent within the next five to six years. This will pose significant challenges for both business and government. For business it will mean that revenue and profits from the domestic market will be growing at a much slower pace than before. Firms that have an exposure to the rapidly growing Asian market will have a significant competitive advantage over firms that are confined to the local market.
- **Demographic change and a tightening labour market** – another implication of demographic change, when combined with other developments, is that the labour market will be much tighter in coming years. Compared to the 1990s it will be roughly three times more difficult to find the appropriate person to fill a job vacancy. At the same time increasing outsourcing opportunities will arise with a rapidly developing skilled labour forces in Asia. Local firms with good staff relations and management practices, and which are good at obtaining, training and retaining staff, will have a significant competitive advantage over firms that do not. Similarly firms which are able to tap into Asian labour markets for recruitment or outsourcing of labour

services will have an advantage over firms that are limited to the local market.

- **Demographic change, dwelling construction and health.** The aging in the population and the slowing in population growth will mean that the demand for dwellings will decline despite rising incomes. This will lead to a secular decline in dwelling construction activity which will fall by up to 30 per cent by 2015. At the same time, demand for health services will be expanding rapidly leading to further growth in this industry.
- **Implications for occupational change and education.** The changes discussed above, particularly falling IT prices and cheaper labour intensive manufactures, are leading to rapid changes in the occupational structure of the labour force. By 2015 professionals, managers and associate professionals will account for a third of all jobs compared to a quarter in 2000. At the same time the proportion of people engaged in clerical, production and trades work will decline. This in turn will have significant implications for the education and training system, which will also need to respond to occupational changes arising from the development of offshoring. (The OECD estimates that up to 20 per cent of jobs will be subject to some extent of offshoring in coming years.)
- **The secular decline in manufacturing's share.** The share of manufacturing, as traditionally defined, in output and employment has roughly halved over the last thirty years. This relative decline is not primarily due to increased trade in manufactured goods (although that has made a small contribution) or falling productivity (as this has continued to increase). Rather it is mainly due to the contracting out of functions previously done inside the firm, and the increase proportion of services in the value of the final product.

The main impact of international trade has been to drive large changes within manufacturing. There has been a decline of labour intensive sectors such as textiles clothing and footwear, and the rise of knowledge and design intensive sectors such as machinery and equipment and medicines and pharmaceuticals. Industry policy has been traditionally focussed on physical production. Arguably the focus needs to change to include the in-sourced and outsourced service components of the activity. This is where the real growth potential in the industry more broadly defined appears to be.

There is a wide gap between perceptions of what the main drivers of change are and actuality. The rise in commodity prices is obvious to all with visible effects on investment in the mining industry. But the effects are

limited. More important for change in the economy has been computerisation, changing household preferences as incomes rise, the emergence of new products, changing demographics and the ageing population, and the shift in comparative advantage towards more knowledge intensive goods and services with consequent impacts on the occupational structure of the labour force.

From a structural standpoint the changes that are occurring and the opportunities that are arising as a result of the other aspects of the rise of China and India would seem to be potentially more important. In particular, developments seem to be favouring knowledge and human capital intensive industries which represent a large share of domestic value added and employment. In addition, the increased supply of consumer, capital and intermediate good imports have contributed to lower inflationary pressures and improved business competitiveness, and made a major contribution to meeting the demand generated by booming consumer and investment demand over recent years.

The rise of China, India and other Asian economies are creating many opportunities for local companies. However, at the moment, business surveys seem to show that local firms do not appear well placed to take advantage of them. Where overseas links do exist they are mainly with other English-speaking countries. But, the surveys show business attitudes are changing rapidly as are those of government.

Structural change is pervasive. Ongoing structural change due to technical, organisational, and regulatory innovation is a natural feature of a modern economy. The report shows that there are a wide range of influences driving structural change occurring at a number of levels. There is no single cause of change, and each industry is being affected by a different mix of factors. Consequently there is no 'one size fits all' conclusion to draw.

International experience indicates that the key requirement for successful adjustment to change is adaptability, flexibility and competition (which in turn drives the incentive for innovation and adaptation). These features tend to be associated with high levels of productivity growth rising incomes and low inflation. This in turn helps policy makers maintain a macroeconomic environment which is supportive of change with low interest rates and low unemployment. Good macroeconomic and microeconomic policy are strongly complementary in this way. Much has already been done to make the Australian economy more competitive and flexible with the deregulation of product, labour and financial markets starting in the 1980s, the corporatisation and reform of public utilities, and the introduction of competition policy.

More remains to be done as new challenges emerge, particularly with regard to foreign investment policy, business regulation and areas involving federal and state government cooperation, such as transport, water, electricity, and health and education. All of these have impacts on input costs and the operating environment, and hence the competitiveness of Australian business, and its ability to take advantage of opportunities as they occur.

One thing that has changed in Australia over recent time and as compared to many other OECD countries, is that unemployment is now low. The focus on adjustment has moved from how to preserve employment in declining sectors, to how to facilitate new areas of growth. Particular challenges are being created for the education and training sector with rapid growth in the demand for skilled and professional employees, and with prospective large impacts from the outsourcing of some jobs overseas.

China and India and other Asian countries present far more of an opportunity than a threat to Australian industry. Our economic structure is complementary to these developing economies rather than rival to them. With low rates of unemployment and high rates of turnover and labour mobility, Australians have little to fear and much to gain from the opportunities being created by the developments in our external environment. The main challenge is how to continue to improve the workings of the domestic economy so we can take advantage of the opportunities that are arising in our region. Understanding what is likely to drive change in the economy is necessary to identify those areas requiring attention and prioritise them.

1 Summary changes in sectoral shares and growth rates: Australia

Sector	Share of GDP		Average growth rate	
	2005-06	2014-15	2000-01 – 2005-06	2005-06 – 2014-15
	%	%	%	%
Agriculture, forestry & fishing	3.1	2.9	1.3	2.4
Mining	4.9	6.7	-0.3	6.2
Manufacturing: Food, beverage & tobacco	2.1	1.8	0.1	0.8
Manufacturing: Textile, clothing, footwear & leather	0.3	0.2	-10.7	-3.5
Manufacturing: Wood & paper products	0.7	0.5	0.5	-0.7
Manufacturing: Printing, publishing & recorded media	1.2	0.9	0.5	-0.2
Manufacturing: Petroleum, coal, chemical, etc	1.3	1.1	-0.4	0.3
Manufacturing: Non-metallic mineral products	0.6	0.4	7.0	-0.8
Manufacturing: Metal products	1.8	1.7	1.5	1.8
Manufacturing: Machinery & equipment	2.0	2.0	3.6	2.3
Manufacturing: Other manufacturing	0.4	0.3	0.5	-1.1
Manufacturing: Total	10.4	8.9	1.0	0.8
Electricity, gas & water	2.2	2.0	0.6	1.5
Construction	6.8	4.8	9.8	-1.2
Wholesale trade	4.9	4.9	3.8	2.5
Retail trade	5.8	5.8	4.1	2.7
Accommodation, cafes & restaurants	2.2	2.2	3.3	2.5
Transport & storage	4.5	4.7	4.4	2.9
Communication services	2.8	3.4	5.3	5.0
Finance & insurance	7.1	7.7	3.4	2.9
Property & business services	11.8	12.5	3.4	3.7
Government administration & defence	3.8	3.8	2.1	2.5
Education	4.2	4.2	1.6	2.5
Health & community services	6.0	6.4	4.5	3.2
Cultural & recreational services	1.5	1.6	3.9	3.2
Personal & other services	1.9	1.8	2.8	1.6
Ownership of dwellings	8.0	7.8	4.0	2.2
Taxes less subsidies on products	8.4	8.1	3.6	2.2
Gross domestic product	100.0	100.0	3.3	2.5

1

Introduction

There have been profound changes in the world economy over the last five years. China has emerged as a major source of growth and demand for industrial commodities. The development of China and India has been described by the Department of Treasury as ‘a major tectonic shift’.¹ In Treasury’s language the development is akin to a second industrial revolution – the ramifications of which have only begun to become apparent in recent times. World trade has continued to expand at a rapid rate, particularly within the Asian region. Portfolio diversification across national boundaries has continued, with flows of foreign direct investment roughly doubling in 2005 following the post 2000 slump. World oil and mineral prices have hit record highs which, when combined with lower prices of manufactured goods traded internationally, have increased Australia’s terms of trade to a 50 year high.

With such spectacular changes on the world stage it would be easy to focus on them as the main drivers of structural change for Australian industry. However, it needs to be remembered that by and large, the output of Australian industry is consumed by Australian households and by other Australian industry.² While the external environment is important for select sectors such as mining and manufacturing, the main drivers of change for most other industries are domestic (albeit often with an international aspect). At the domestic level change is being driven by things such as demographics, shifting household preferences, changing regulatory environments, the take up of technology, changing business practices, and the responses of domestic households and business to changing relative prices.

The domestic scene within Australia has changed substantially over the last five to ten years. The introduction of the GST combined with other tax reforms led to large changes in domestic relative prices in 2000. National competition policy has been implemented and continues to be refined. A

¹ Commonwealth Treasury, 2006.

² Around 83 per cent of domestic output goes to domestic uses. (Around 15 per cent of the value of exports are supplied by imports.)

national market for electricity has been established. A national single water market is in the process of being developed. Industrial relations reform has continued with the introduction of the Work Choices legislation. Research and development has increased from the low levels of ten years ago. Education and training activity has continued to expand with increasing levels of private expenditure on education and training and rapidly growing exports of educational services. The macroeconomic environment has been stable compared to previous periods and the economy is experiencing its fifteenth year of continuous growth. Nominal interest rates have been at their lowest levels on average since the 1960s. Unemployment has fallen to a thirty year low. The occupational structure of the workforce is changing rapidly. Superannuation changes have led to a dramatic growth in assets under management leading to an expanding industry in funds management and financial advice. Private sector wealth is at record levels. The ageing population is leading to growth in the health sector and expenditure on pharmaceuticals. Information technology continues to transform business organisation and the provision of services, with commercial use of the internet increasing rapidly in recent years.

The list goes on. Ongoing structural change due to technical, organisational, and regulatory innovation is a natural feature of a modern economy. Each decade brings new challenges. Change brings with it transitional costs, and the necessity for continual responses from business and government. But the benefits over long periods of time are enormous. Real income per capita in Australia has more than doubled over the last thirty years.

Transitional costs are minimised when the macroeconomic environment is supportive of change – when employment growth is strong, and unemployment and interest rates are low. Microeconomic and macroeconomic policy are strongly complementary in this way. Good policy is mutually supportive. Good micro-economic and industry policy boosts productivity growth and hence real incomes, helping to keep inflation low, while at the same time increasing the government's revenue base. Good macroeconomic policy reduces the transitional costs of change, and creates an environment in which reform can take place.

This study is about structural change in the Australian economy over the last five years, and the outlook for change for the next five to ten years. What are the main factors that are driving change? What are the macro and microeconomic linkages? How will the economy respond, and what are the implications for Australian business and for industry policy?

Approach to analysis

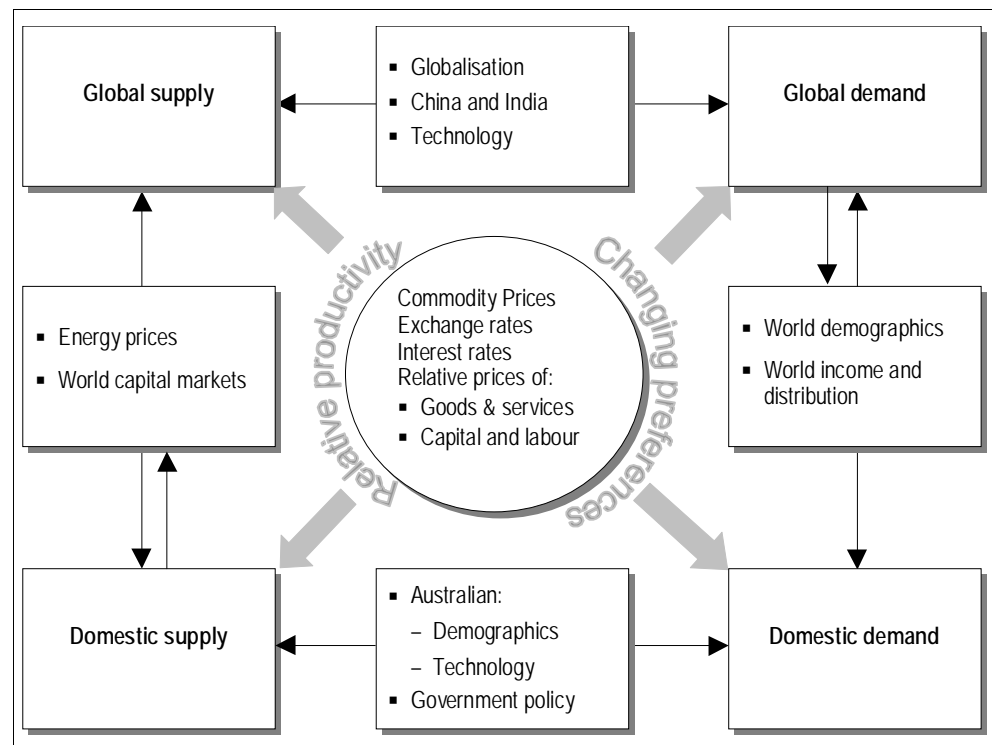
Structural change is a broad topic. A clear framework is required to look into the topic and analyse the linkages between its various aspects. The drivers behind structural change can be classified at three levels:

- demand side drivers as households and investors change their demands for different types of goods and services at different quality standards;
- supply side drivers as firms adopt new technologies and organisational practices and respond to changing prices of capital and labour; and
- the changing nature of the linkages and interactions between supply and demand factors, for example as technology alters the composition of industry contributions to final demands or as changed market structures (such as internet auctions) lead to substitution in the sources of supply.

Chart 1.1 summarises the analytical framework used in this paper. It identifies the dominant external factors that are driving structural change. However, understanding the responses of firms and industries to these factors is much more complex. This study utilises the CIE's AUSM model ³ to map out the impact of the underlying forces behind structural change.

³ See Appendix B.

1.1 Stylised framework for analysing structural change



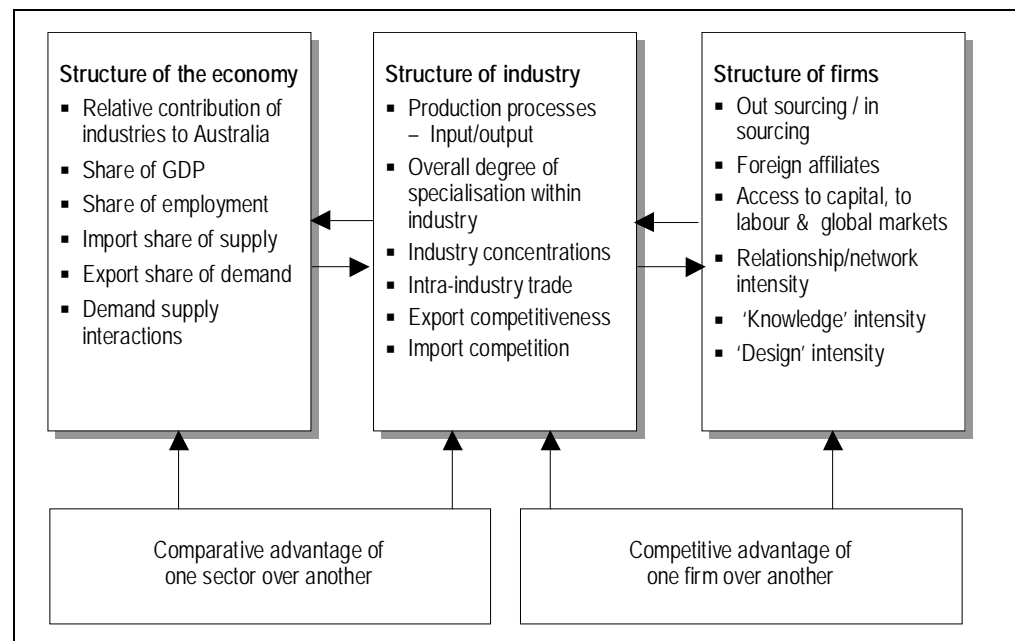
Defining structural change

Structural change is the process by which an economy is progressively transformed over time. This can include changes to industry, organisational and market structures as well as the various means by which market participants generate economic activity. Structural change is difficult to capture in a single measure. It is usually measured in terms of the reallocation of capital and labour across industries and regions. However, it can also be applied to a shift within and across industries, in the markets they sell to and the products and services they require, and the nature of their production processes.

Structural change occurs as firms respond to changes in the relative price of inputs and outputs and to opportunities and threats created by technology and by globalisation. When the factors affect all firms in an industry in a similar way, structural change is most apparent at the industry-wide or sectoral levels. However, when forces impact differently depending on the firms' focus and structure, the structure of the industry itself changes. We have defined three levels of structural change (chart 1.2):

- *within firms* reflected in their production practices as they adopt new technology and management practices and respond to the changing relative prices of capital, labour and other inputs;
- *within industries* as competitive pressures favour some firm structures over others, as input prices and consumption demands change and the operating environment evolves; and
- *across industries* or sectors of the economy as global and domestic demands shift with changes in consumption patterns (often related to demographics, but also technology), and changes in comparative advantage as Australian industries gain or lose their competitive edge with changes in exchange rates, market access, input costs or technology.

1.2 Three levels of structural change



This study looks at structural change in the Australian economy across these three dimensions. There are relatively good measures of structural change at the industry sectoral level. Some measures are also available at the more aggregate level for changes in the relative allocation of capital and labour across industries. But little data is available on the composition of firms within industries, nor on a firm's approach to production. The study draws on national data where it is available, and on individual reports, case studies and discussion with industry where it is not.

As well as classifying drivers by demand and supply, it is also useful to think in terms of what is affecting the economy from the outside

(exogenous factors – domestic and international) and the structural change that is coming about as a result of changing reactions to these factors (the endogenous response).

Chart 1.3 summarises the drivers of structural change that act predominantly on each level of structure in Australian industry.

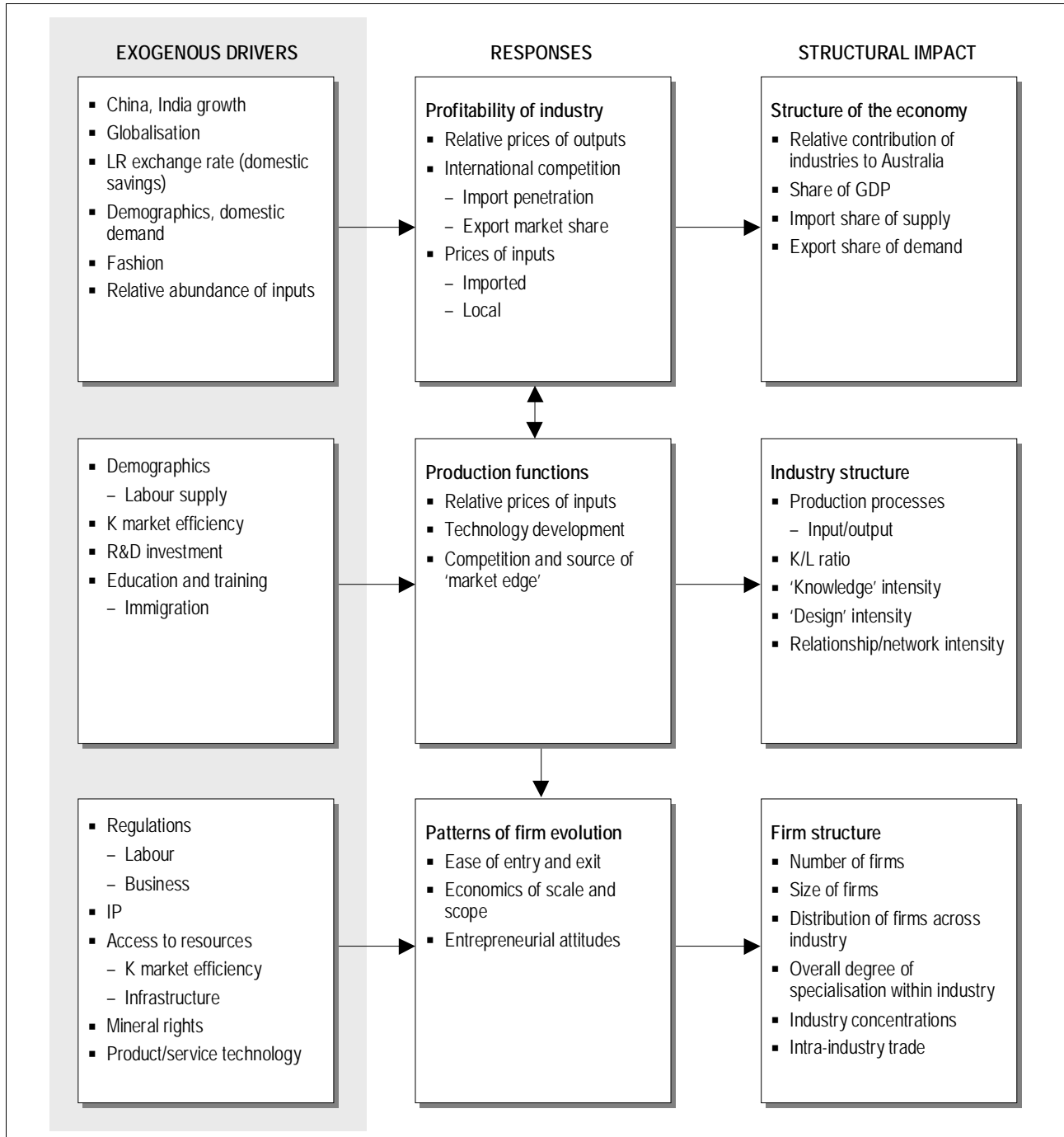
The structure of this report

Chapter 2 lists and outlines the major exogenous factors that we think are impacting on structural change at the broad industry level at present. These include factors such as: demographic change; falling computer and investment good prices; low levels of world real interest rates; and the impact of the rise of China and other Asian economies on commodity prices and the supply of low-price manufactured goods.

Chapter 3 then looks at the outlook for structural change in more detail including the question of whether the pace of structural change has accelerated or not. It begins with a broad description of the developments we might expect in the domestic economy given the drivers outlined in the previous chapter, for example whether or not the increase in the terms of trade requires a contraction of manufacturing and other industries. It then attempts to make a balanced assessment of the various effects using the CIE AUSM model. Detailed analysis of the changes on both the demand and the supply side of the economy are provided to give a more complete picture of the factors driving prospects at the industry level.

However, not every aspect of structural change is capable of being quantified. Chapter 4 looks at the more qualitative and detailed aspects – the impacts of higher levels of foreign investment, the development of intra-regional production chains in Asia and elsewhere, the detailed impacts on manufacturing at the sub-sector level, the rise in education and training and research and development overseas and in Asia, the development of global labour markets and out-sourcing opportunities and the implications for Australian business.

1.3 Drivers of structural change



Data source: CIE

Chapter 5 then looks at the implications for some selected industries, in particular those that are undergoing particularly large amounts of structural change (either shrinking or expanding). Industries include: textiles and footwear (where a large part of the structural change is in the past); machinery and equipment (which is expanding and accounts for half of research and development within manufacturing); property and business services and education (both of which have driven service exports higher over the last five years).

Finally chapter 6 attempts to draw the material together to bring out the implications for business and government policy. With low unemployment and a tightening labour market, and naturally high levels of turnover Australian's have little to fear and much to gain from the forces driving structural change. The keys to reaping benefits from change are competition, flexibility and adaptability. The key government policies therefore are those that increase competition, and those that increase flexibility and adaptability such as removing unnecessary regulatory burdens. These implications are not explored in depth – that would require a separate study – but rather noted in passing. The main implication for business is to be prepared to adapt to change. Many of the changes outlined would seem to favour large business over small, particularly those with overseas connections. These companies can minimise exchange rate risk by engaging in operational hedging, can exploit out-sourcing opportunities and the developing global labour market, and are probably far better placed to take advantage of the opportunities emerging in the Asian market.

2

Exogenous drivers of change

The World has been expanding at a remarkably rapid pace over the last five years. Both official and market expectations are for expansion to continue at a similar pace for the next five years despite higher oil and commodity prices, and rising interest rates. The conjunction of events that is leading to these remarkable outcomes will have large impacts on the structure of the Australian economy over the next five years, particularly given the emergence of China as a major consumer of industrial commodities and supplier of labour intensive manufactures.

However, not everything is being driven by globalisation and rising commodity prices. In addition to these external factors, (and arguably more important), there are a number of domestic developments, such as changing demographics and the impending retirement of the baby boom generation, changing regulatory environments, and changing organisational practices, which will have significant implications for the structure of the Australian economy over the next five to ten years.

This chapter looks at the major exogenous factors driving structural change in the Australian economy. The list is far from exhaustive and mainly includes factors which are changing rapidly or are driving large changes.

2.1 Exogenous drivers and the endogenous response

<i>Exogenous Drivers</i>	<i>What Changes</i>	<i>Effects</i>
Globalisation	Emergence of fully competitive global capital markets	Higher investment
	Increased access to and lower cost of capital – risk diversification	Diversification of sources of funding and holding of assets across national boundaries – lower risk
	Increased outsourcing opportunities	Lower inflation
	Falling transport and communication costs	Contraction of labour intensive manufacturing industries
	Changing economies of scale and scope	Greater demand for skilled labour.
	Access to networks / knowledge	Greater competition and incentive to innovate
	Availability of low cost consumer and investment good imports	Changing structure of firms with increased diversification overseas
Higher world growth and higher commodity prices	Higher mining investment and output	Increasing firm, industry and supply chain concentration - access to global supply networks / knowledge crucial
	Higher mining exports	Transitional effects on construction and demand for tradesmen
	Higher exchange rate	Mining output higher in equilibrium, but little effect on other industries once transition is over.
Demographics	Changing preferences for:	Falling construction activity
	▪ Housing	Rising demand for health professionals
	▪ Health and recreational services	Slower GDP growth
	Slower growth in labour force	Tighter labour market
Economic framework	Rising aged dependency ratio	
	Competition policy	Relative prices and productivity growth
	Regulation	Optimal size of firms
	Taxation	Adaptability and flexibility
	Education and training	Skill shortages
	Infrastructure	Capacity constraints

The main drivers addressed in this chapter are (starting with external factors and working down to domestic):⁴

- *The rapid industrialisation of China and India* and their impact on world industrial production, commodity prices, oil prices and manufacturing import prices and consequently Australia's terms of trade.
- *Increased exposure to trade and trade opportunities* – apart from the implications for commodity prices and the terms of trade, the rise of China and East Asia, combined with lower transport and communication costs, and falling trade barriers, means that Australia is not as distant from its trading partners as in the past. While this means it is cheaper to land goods in Australia, it also means there are greater opportunities for Australian companies to supply the overseas market.
- *Lower global inflation and lower world interest rates* – the reduction in manufactured good prices has been associated with a period of low inflation and low world interest rates, lowering long term interest rates in Australia and consequently adding to the increase in asset prices (house prices, equity prices) and household wealth. This has had significant impacts on the patterns of demand over the last five to ten years.
- *Falling capital good and durable consumption good prices* – combined with the reductions in real interest rates, the continued fall in capital good and IT prices has a significant benefit for investment. This favours more capital intensive industries. As opposed to the terms of trade shock, which might be thought to favour capital over labour and lead to a reduction in real wages⁵ the reduction in the price of capital leads to a rise in overall productivity that favours real wages.⁶ It also favours skilled labour, and arguably is having much more pervasive effects than the large rise in the terms of trade.⁷ Similarly, the fall in durable consumption good prices is leading to substitution towards these goods and away from other goods and services – driving changes in the structure of industry from the demand side.

⁴ The order is not meant to denote importance, but rather starts with those factors that are most exogenous. As discussed earlier the domestic factors, while involving less spectacular changes, are arguably having a more pervasive influence than the external.

⁵ Analogous to the Stolper-Samuelson effect – see Henry, 2006a and Appendix A

⁶ This result is obtained from both applied and theoretical models. For a simple theoretical model see Obstfeld and Rogoff, 1996, p.206-209.

⁷ The terms of trade primarily impacts on mining (which constitutes 1 ¼ per cent of total employment) manufacturing (10 ½ per cent) and agriculture (3 ½ per cent). In contrast the large reduction in the price of capital impacts on all sectors.

- *Slower productivity growth* – productivity growth has slowed over the last five years, following exceptionally strong growth in the 1990s driven by micro-economic reform and the impacts of information and communications technology on a number of industries.
- *Demographics, labour supply and underlying GDP growth* – growth in the working age population will fall dramatically over the next five years. Combined with slower productivity growth this will lead to much lower rates of GDP growth than business is used to, and will have differential impacts across industries.
- *Much tighter domestic labour markets and the development of global labour markets* – the combination of lower unemployment and rising demand for skilled labour is already leading to a much tighter labour market than business has been used to in the past. These trends are likely to continue in future particularly given the reduced flow of new entrants to the labour market. At the same time global labour markets are developing rapidly with increasing supplies of graduates in engineering and science in China and India.
- *Demographics, construction and health* – the ageing of the population will also have significant implications for the demand for dwellings and hence for construction. It also has implications for health and energy demand. Overall we would expect a slowing in construction activity, a significant rise in health expenditure, and some possible moderation in the demand for energy.
- *China, the Stolper-Samuelson effect and the demand for education* – it is arguable that the rise in the terms of trade and the advent of cheap labour intensive manufacturing good imports, rather than reducing the returns to labour in aggregate,⁸ have increased the returns to skilled labour relative to unskilled labour,⁹ as has the introduction of computer technology and falling cost of capital. This adds to the demand for education, which is also being boosted by increasing demand from Asia for exported education services.

⁸ See Appendix A

⁹ What is required for this result is the addition of human capital and knowledge to the factors of production in the industry production functions and differentiation across types of labour. As capital intensive sectors are usually also human capital and knowledge intensive then there is no necessary significant reduction in the return to labour particularly when a distinction is made between skilled and unskilled labour and a dynamic response from human capital formation (education and training) is added to the normal comparative static results. The unambiguous result is an increase in the returns to skilled over unskilled labour.

The primary drivers of many of these changes can be summarised in three words: globalisation, technology and demographics. These three factors are driving structural change in many other OECD countries. The point of interest for this report is in the individual details of how these factors will play out in Australia. The remainder of this chapter describes in detail the driving factors outlined above. The next chapter then uses the CIE's AUSM model to describe the economy's response to these changes and the resulting projections for the structure of the economy.

Globalisation

Many of the factors described above are the product of increasing globalisation – the interconnectedness of countries through trade, capital flows and increasingly labour flows. This greater connectedness means Australia is more exposed to external shocks, but also has greater opportunities to diversify. This works both on the financial side and the trade side. Globalisation offers opportunities for financial diversification. For borrowers there is a wider range of sources for finance, while investors can diversify their portfolios lowering country specific risk. Consumers have a wider choice of goods and services, while producers can expand and diversify their markets and source cheaper business inputs.

Over the last five years international developments have been highly favourable for the Australian economy. However as the discussion below demonstrates, the sectoral impact is uneven, and these external conditions have favoured some sectors over others.

Growth of China and India

Possibly the most noticeable change impinging on the Australian economy is coming from the external environment, the much-vaunted rise of China. But the developments are much wider than China.¹⁰ A large number of other countries and regions such as Eastern Europe, Latin America, and other parts of Asia are also developing at a rapid rate. Trade is dominated by manufactured goods and as trade barriers, transport and

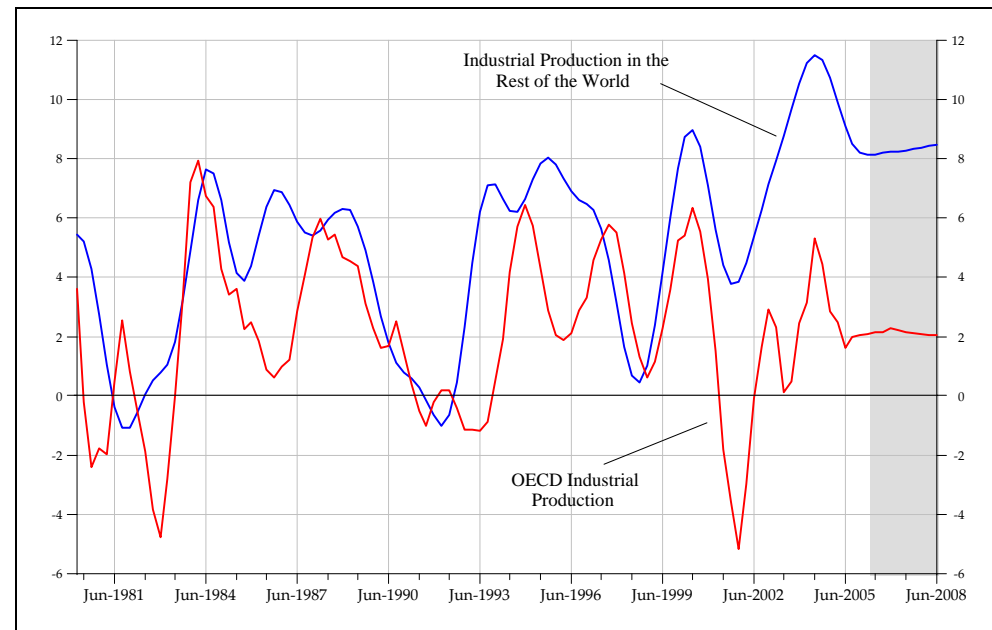
¹⁰ While China has been adding substantially to growth in demand for industrial commodities, it still only accounts for around 5 per cent of World output measured in US dollars. Moreover, while growing rapidly it still only accounts for around for around 12 per cent of Australia's merchandise exports (equivalent to 2 per cent of GDP). China's relevance is perhaps more pervasive in terms of falling import prices for intermediate and final consumer goods and competing exports of manufactured goods to third country markets (crowding out).

communication costs have fallen, manufacturing production chains have become globalised, leading to rising volumes of trade particularly within regions. There has been a commodification of some manufactured goods (integrated circuits, motor vehicles), and price has come down dramatically. There has been an increase in intra-firm and related-party trade, increasing concentration of trade to fewer firms and the development of more complex and diverse supply chains.

The surge in world industrial production...

The emergence of China and India and other developing and transitional countries has had a major impact on the demand for, and price of industrial commodities such as iron ore and coking coal. As countries industrialise they typically go through a phase where manufacturing is growing more rapidly than other industries. The natural increase in manufacturing activity as these countries develop, in combination with the relocation of production from OECD countries has led to a surge in industrial production outside the OECD (chart 2.2).

2.2 OECD and non-OECD industrial production ^a



a. Percentage change on a year earlier

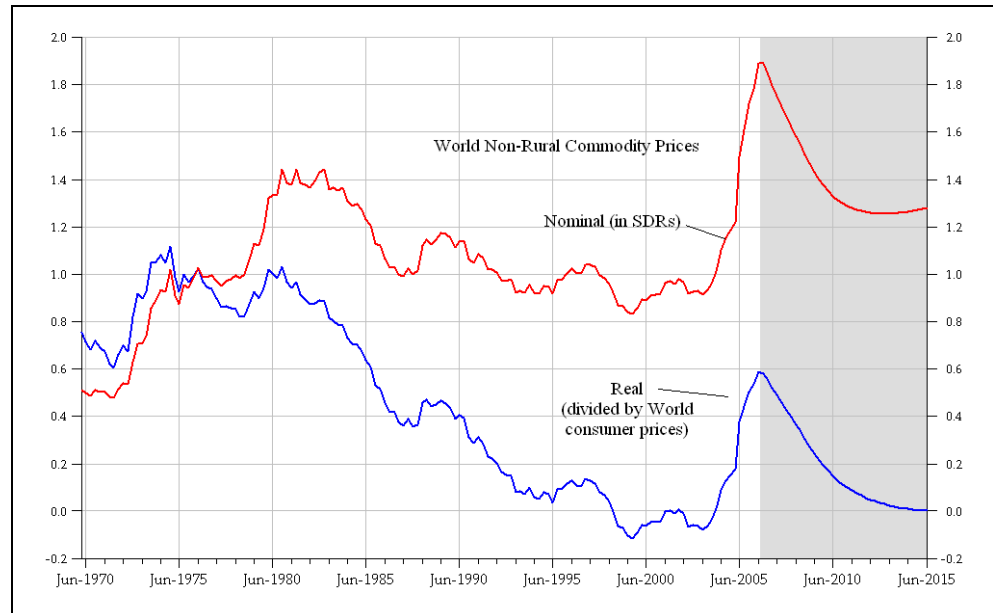
Data source: OECD Main Economic Indicators, World Bank, World Development Indicators and CIE calculations.

Consequently despite the fact that OECD industrial production has been growing relatively slowly in recent years, world industrial production has accelerated. On CIE estimates, world industrial production increased by 6.3 per cent in 2004, the largest increase in 30 years.

...leads to high commodities prices...

The rapid growth in industrial production, and high levels of construction activity in countries such as China and more recently India, has led to a surge in commodity prices, as global supply has struggled to keep up with demand. Chart 2.3 shows the global non-rural commodity prices underpinning the AUSM projections. It is interesting to note that expressed in real terms (divided by world consumer prices) commodity prices do not appear to have risen to particularly high levels and are less than the levels of the early 1980s. (Similar observations can be made for oil prices – despite the most recent rise they are still comparable in real terms to the peak reached in the second oil shock in 1981.)

2.3 World non-rural commodity prices ^a



a. Series shown is the RBA non rural commodity price measured in SDRs and divided by a World consumer price deflator. Series are shown in log terms

Data source: RBA Bulletin, CIE AUSM model database,

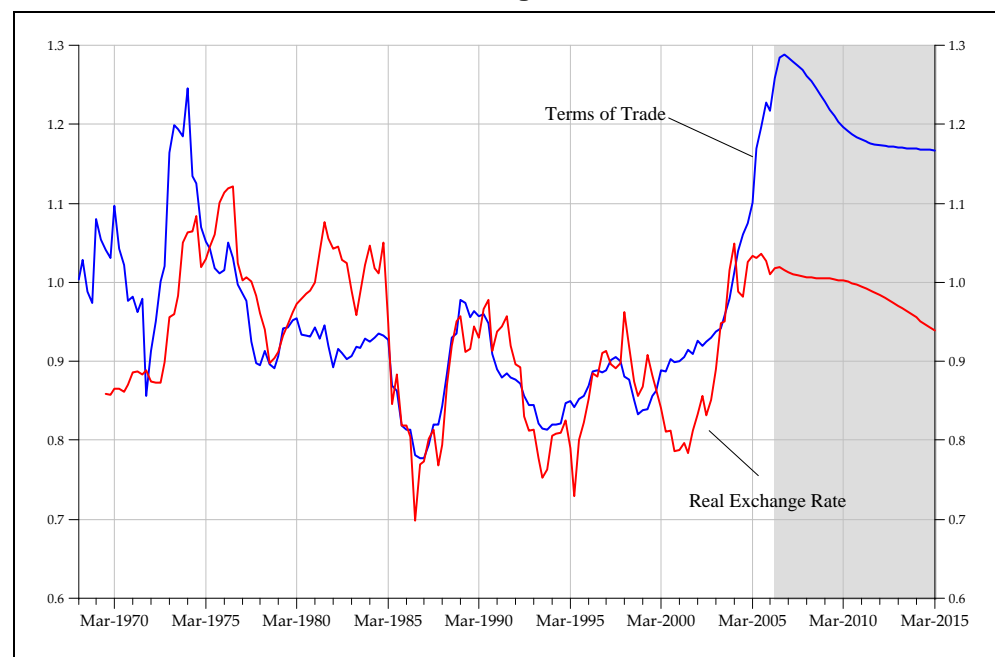
As with most commodity price forecasters, the projections are based on the assumption that prices will come down to closer to historical average levels over the next five years, as production expands to meet demand.¹¹ (Cost curves will rise as less accessible deposits are brought into production, but not to anywhere near the extent of current price rises).

¹¹ ABARE, the government's principal commodity forecaster, has mineral commodity prices falling by 26 per cent in SDR terms by 2010-11, with prices coming off a little earlier than in the AUSM projections, (ABARE, 2006). The commodity price equation in AUSM is also projecting a 26 per cent fall in prices by 2010-11 compared to 2005-06.

...but the rise in the terms of trade is two sided – it also depends on falling import prices

The process is two-sided with cheaper imports due to falling import prices for imported manufactured goods mentioned earlier as well as higher prices for commodity exports. Largely as a result of cheaper imports the rise in the terms of trade should persist for some time – even with commodity prices falling back to more normal levels, Australia’s terms of trade will be much higher than the past decade (chart 2.4).

2.4 Terms of trade and the real exchange rate ^a



a. the real exchange rate is measured as the TWI(trade weighted index) times domestic consumer prices divided by consumer prices in our trading partners. Both series are indexes (equal 1 in 2003-04).

Data source: ABS Cat No 5603.0, CIE AUSM Model Database and CIE AUSM model projections.

The long term impact depends on the exchange rate response

One key issue that will determine the impact of the rise in commodity prices on the domestic economy is the exchange rate response.¹² In moving

¹²As many authors have noted the Australian dollar is influenced by commodity prices and the commodity price outlook. See for example Blundell-Wignall et al 1993, Douglas et al., 1997, and most recently Chen and Rogoff, 2002. The non-rural commodities market is a forward looking market (spot prices tend to move with future prices). As commodity prices rise in the spot market they usually indicate that the market expects commodity prices to be higher in future. That in turn would be associated with an improved trade balance in future and consequently a higher equilibrium exchange rate. Hence, the spot exchange rate tends to move with expectations of future commodity price (other things being equal).

with commodity prices the exchange rate redistributes the income effects of a rising terms of trade from commodity producers to consumers, and to those industries heavily dependant on imported investment goods and intermediate inputs. It therefore has a large impact on the industry composition of output and employment. It is arguably the most important relative price in the economy. (It is also one that is extremely volatile, particularly when large commodity price changes are occurring or are in prospect. This has important implications for risk management behaviour by firms (discussed a little further in Chapters 4 and 6.)

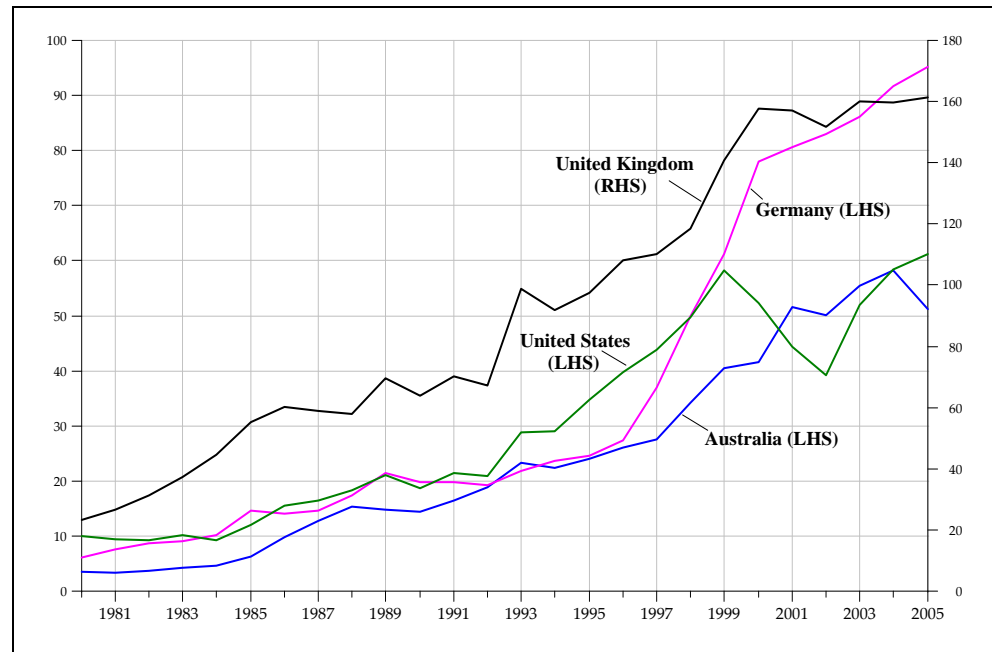
Between late 2001 and early 2004 the real exchange rate appreciated by 33 per cent, driven by the recovery in the world economy, perceptions that commodity producers would be favoured by the recovery, and also relatively high interest rates in Australia. The exchange rate has been relatively stable since, and did not rise with the subsequent rise in commodity prices through 2005 and 2006. (While contract prices have risen there is a widespread expectation that prices will fall back towards more normal level over the next several years.) The current level of the real exchange rate is consistent with the current account deficit falling to around 4 per cent of GDP, and net foreign liabilities stabilising at around 50 per cent of GDP in the CIE AUSM projections.¹³

Changing Investment Patterns

Following financial deregulation in many countries in the 1980s, and relaxation of capital controls there was a rapid diversification of investment portfolios across countries (Chart 2.5).

¹³ In other words the current level is broadly consistent with fair value according to the model – contingent on the outlook for commodity prices factored into the model. The exchange rate fell in 2000-01 following the bursting of the tech bubble, September 11 and with the downturn in the United States and Europe. However, growth in China and East Asia continued unabated leading to a rapid turn around in perceptions about the commodity outlook once the US economy began to recover in 2002-03.

2.5 Foreign portfolio and direct investment as a percentage of GDP



Data source: IMF International Financial Statistics

The diversification was partly driven by a significant increase in international merger and acquisition activity in the 1990s. It was also partly driven by increased trade and the development of regional and international production chains, with direct investment following trade patterns. It was most marked in Europe where foreign direct and portfolio assets are now equivalent to more than 100 per cent of GDP in many countries.

This dispersion of capital across national boundaries has changed the nature of international business cycle transmission with the financial linkages adding to the impact of increased trade linkages.¹⁴ It means that for many countries a significant part of national income is now earned overseas. This has lowered country specific risk for investors and increased the availability of finance to firms.¹⁵

¹⁴ See Downes and Drew, 2003.

¹⁵ The benefits of diversification to investment are large, and even the international flows that have already occurred are not sufficient to eliminate the “home-bias” from most portfolios. Estimates by the IMF for example indicate significant gains to Australian investors from increased diversification particularly into the Asian region where equity markets and investment returns are not correlated to our own. (Equity returns to investors are fairly highly correlated across OECD countries, particularly among the English speaking countries. The benefits from diversification come from finding returns which are not correlated with those in the domestic market.)

The development probably has more important implications for structural change within industries than for that between industries. The within industry implications will be discussed in Chapters 4 and 5. However, it does have significant implications for how the terms of trade boom impacts on the rest of the economy. Since 2003 the improvement in the terms of trade has added 6 percentage points to current price GDP (i.e. \$60 billion per year). As mentioned part of this has been transferred to consumers via a higher exchange rate.¹⁶ Another part has been transferred overseas via a higher income deficit on the balance of payments, which has risen by more than one per cent of GDP since 2003, largely due to the effect of higher flows of profits (particularly mining) to investors overseas. As much of the increased consumption expenditure has also flown overseas, the commodity boom has not added to domestic demand in the same way as commodity booms in the past. The converse will be that as commodity prices fall there will not be as great a fall in incomes as there has been in the past.

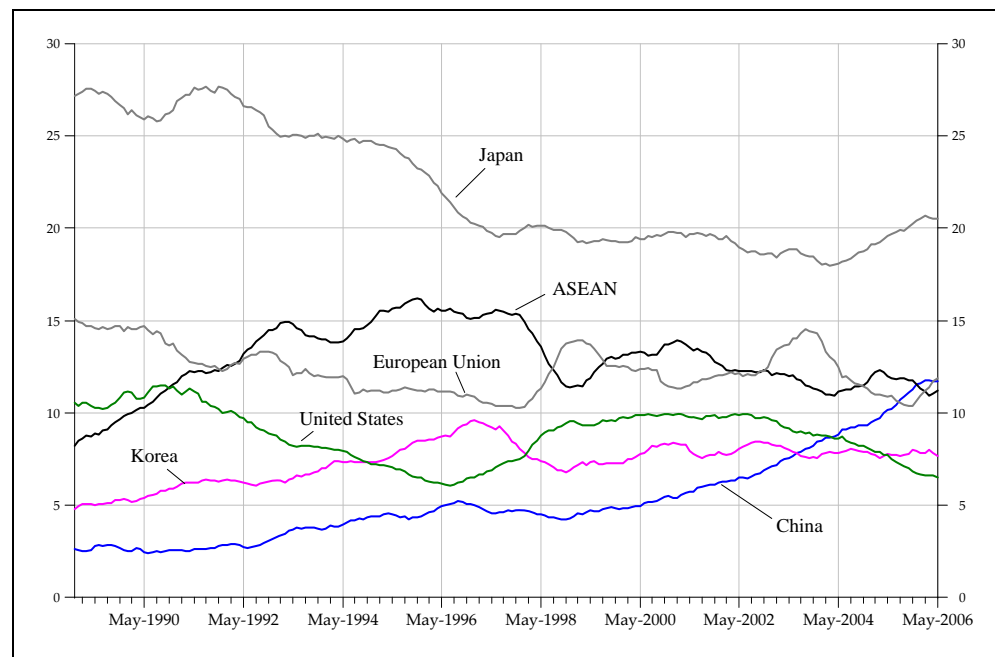
Changing patterns of trade

There has been a rapid growth in trade in the Asia region

There has been a rapid expansion in regional trade in East Asia since 2000, due to a combination of the emergence of China and its accession to the WTO and the recovery of the rest of south-east Asia from the 1997-98 Asian financial crisis. The strong growth in Asian trade is reflected in the share of Australian exports going to Asia particularly China (see chart 2.6).

¹⁶ Real import prices fell by around 20 per cent between late 2002 and early 2004 adding between 3 and 4 per cent to household real incomes once fully passed through.

2.6 Australian exports by country and region of destination ^a



a. Expressed as a percentage of total export values (12 month moving average to the month shown). Source: ABS International Merchandise Exports Cat No. 5432.0.

But apart from trade with China, Australia is not participating in the expansion...

However, while the share of Australian exports going to Asia has risen Australia's share of Asian trade has fallen. Australia has not participated in the significant pick up in Asian intra-regional trade. The pick up in Australian exports to China has been dominated by commodities. This in turn reflects that Australia is not particularly well linked into the intra-industry production chains that are opening up in Asia.¹⁷ While Australian firms have diversified overseas, most Australian sourced foreign direct investment has gone to the United States, the United Kingdom, Europe and New Zealand. Similarly most of our inward FDI is sourced from these countries. As foreign direct investment is closely related to intra-industry and related party trade it is perhaps not surprising that Australian manufacturing has not participated in booming regional trade.¹⁸

¹⁷ The exception is the Australian motor vehicle manufacturing industry, which has established some links into Asia.

¹⁸ The World Economic Forum, *World Competitiveness Report* also rates Australia lowly on its integration into global production chains

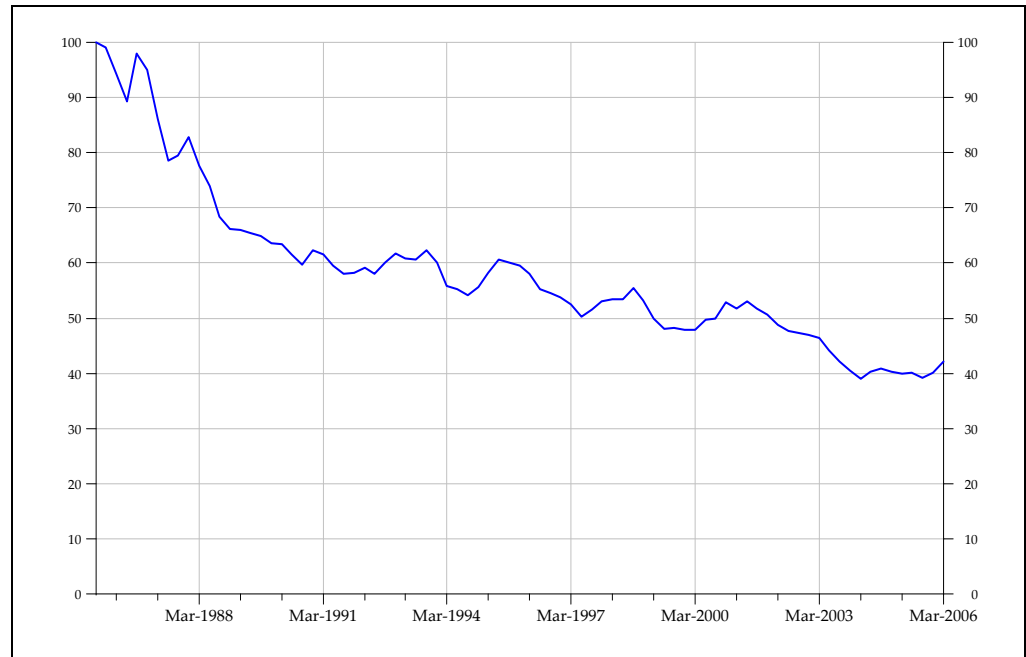
...and is performing below potential

No doubt remoteness is also an important factor in this. Recent estimates from the Treasury indicate with the development of China and other East Asian countries Australia's degree of remoteness from World GDP has declined by 10 per cent over the last twenty years.¹⁹ It is likely to fall by as much again over the next ten years. Using a gravity model the Treasury authors argue that Australia's trade share will increase as a consequence. The Treasury gravity model does not predict how this will come about, but the implication is that there are some high value-add areas in manufacturing that should be increasing their trade shares. It should be the case that certain sections of Australian manufacturing have an emerging comparative advantage. (Chapter 5 looks at manufacturing developments in more detail.)

...despite rapidly falling costs of trade

Adding to this trend towards increasing trade shares has been declining freight rates. With containerisation, improved logistics and more efficient ports, real freight rates have fallen by 60 per cent in the last 20 years, and by 20 per cent over the last five years (chart 2.7).

2.7 Declining real freight rates



Data source: ABS Cat No 5302.0. Real freight rates defined as the implicit price deflator for the freight component of service imports, divided by underlying consumer prices from the AUSM data base.

¹⁹ Battersby and Ewing, 2005, P.32

The combination of falling freight rates, declining communication and logistics costs, reduced air fares and the advent of the internet and associated technologies have all served to reduce Australia's degree of isolation. Industries which were once sheltered by tariff barriers and high levels of natural protection, are now more exposed to international competition. While some industries have become subject to increased import competition as a result – new opportunities and markets have opened up for others.

Lower inflation and world interest rates

Low inflation across the OECD has been driven by cheap imports of manufactured goods and services

Falling prices of imported goods have reduced inflation pressures in OECD countries, to such an extent that the potential for the world falling into a deflationary trap became a concern for policy makers following the 2000-01 downturn.²⁰ According to the IMF, lower world manufacturing prices subtracted half a percentage point per year from inflation in OECD countries between 2000 and 2004, and 1 percentage point a year in the United States.²¹

Falling manufacturing prices were due to a combination of factors such as: (a) movement of unskilled labour intensive production to low cost developing countries such as China and Mexico (see below) (b) increased economies of scale as the world market has expanded and transport and logistic costs have fallen leading to a rapid expansion in cross border production chains²² and (c) continued increases in productivity with computerisation.

²⁰ See for example statements by Federal Reserve Governor Greenspan in 2002 and 2003. Counterfactual analysis conducted by the Federal Reserve Board International Economics Department in 2002 indicated that one of the mistakes that the Japanese authorities had made was in not easing far enough soon enough when asset prices fell in 1990. While the probability of the US falling into a deflationary trap was always viewed as very small, the consequences if that were to happen were alarming enough to ensure that interest rates were lower than would otherwise have been the case. Downes and Drew, 2002, present deflation scenarios which formed the basis for discussion at a meeting of G7 central bank officials in November 2002 (OECD WP3).

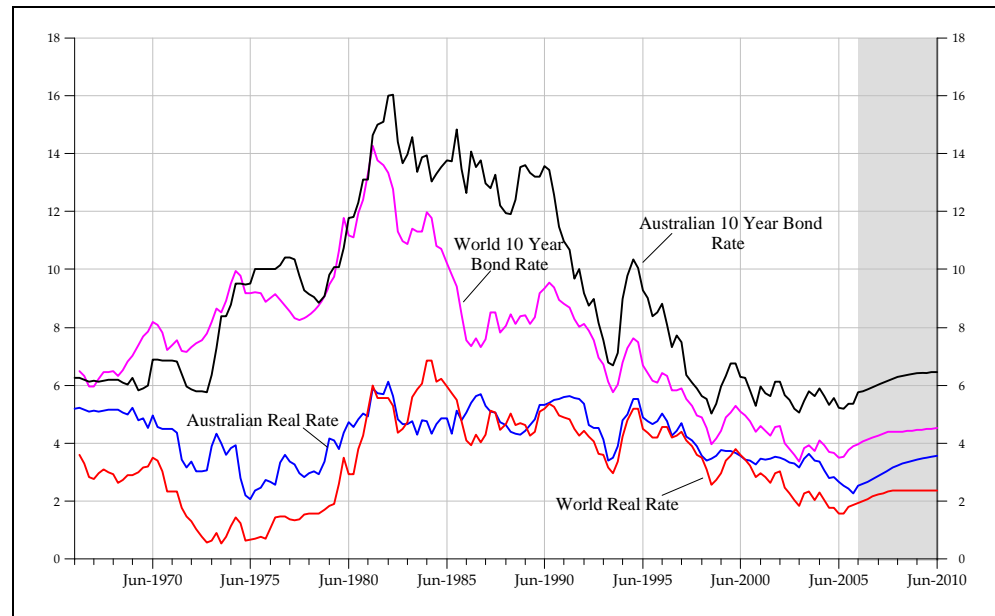
²¹ IMF, 2005, p.34.

²² Mann for example estimates that off-shoring in the IT hardware sector, with parts of the production chain moving to China and other developing countries, reduced hardware prices by between 10 and 30 per cent between 1995 and 2002.

Which has contributed to low real interest rates

The combination of: lower inflation, competitive financial markets, a more stable macroeconomic environment, falling investment good prices, high levels of saving in Europe, China and oil producing nations, and zero interest rates associated with deflation in Japan has led to historically low world interest rates. Nominal world bond rates have fallen to their lowest levels in 50 years over the last five years. Real world bond rates have fallen to less than half their level of the mid 1990s, from around 5 per cent, to less than 2 per cent by mid 2005 (see chart 2.8).

2.8 World and Australian real interest rates



Data source: OECD Economic Outlook Database, RBA Bulletin Database, CIE calculations, AUSM projections.

As Australia is a small open economy with free capital flows our borrowing rates are ultimately determined in world markets (with a premium for exchange risk). Therefore the fall in world long term real interest rates represents a substantial shock that has impacted on the Australian economy in recent times, with significant implications for investment, risk taking activity and asset prices.

This fall in real world interest rates and its impact on domestic borrowing costs, although relatively unheralded, has been a significant factor driving domestic asset prices and investment and hence the composition of demand. It has lowered hurdle rates of return, increased the availability of finance and boosted business investment. It has played a role in the increase in both equity and house prices, and consequently in household wealth (which is at record levels). This has underpinned a surge in both

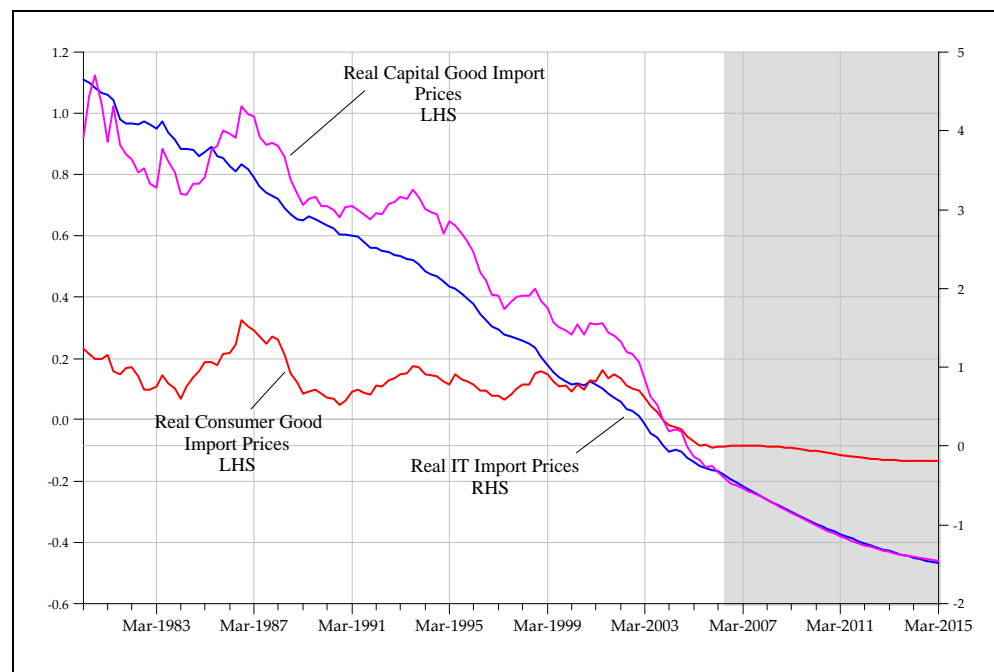
dwelling investment, and the consumption of durables (financed by increasing household indebtedness).

IT imports and capital good prices

Investment has also benefited from falling capital goods prices

In addition to the fall in real interest rates, which by itself would be a considerable boost to investment, Australia has continued to benefit from the falling price of investment goods. Underpinned by falling IT prices, and by a rising real exchange rate, imported investment good prices fell by 40 per cent in real terms over the five years to the March quarter 2006 (chart 2.9).

2.9 Falling capital good prices ^a



a. Real prices equal import prices divided by the household consumption deflator – series shown in logs. Projections assume continued falls in world IT prices.
Source: ABS Cat Nos 5302.0 and 5206.0 and CIE AU\$M projections.

In combination with low real interest rates, this decline in investment good prices represents a substantial structural shock that will continue to have longer term repercussions. Declining prices of investment goods and lower interest rates favour industries that are capital intensive, particularly those that are intensive in their use of computers, software and IT services. The implications of this will be discussed in more detail in the next chapter.

Domestic factors

Productivity growth and the regulatory structure

Productivity growth is both a key driver and a key benefit of structural change. It is not entirely exogenous as it is partly a function of the response of firms to competitive market pressures, demands from shareholders for better returns and their ability to exploit technological and organisational opportunities that are open to them. Policy that resists change or create barriers to competition in product or capital markets will reduce labour productivity growth and hence incomes over time.²³

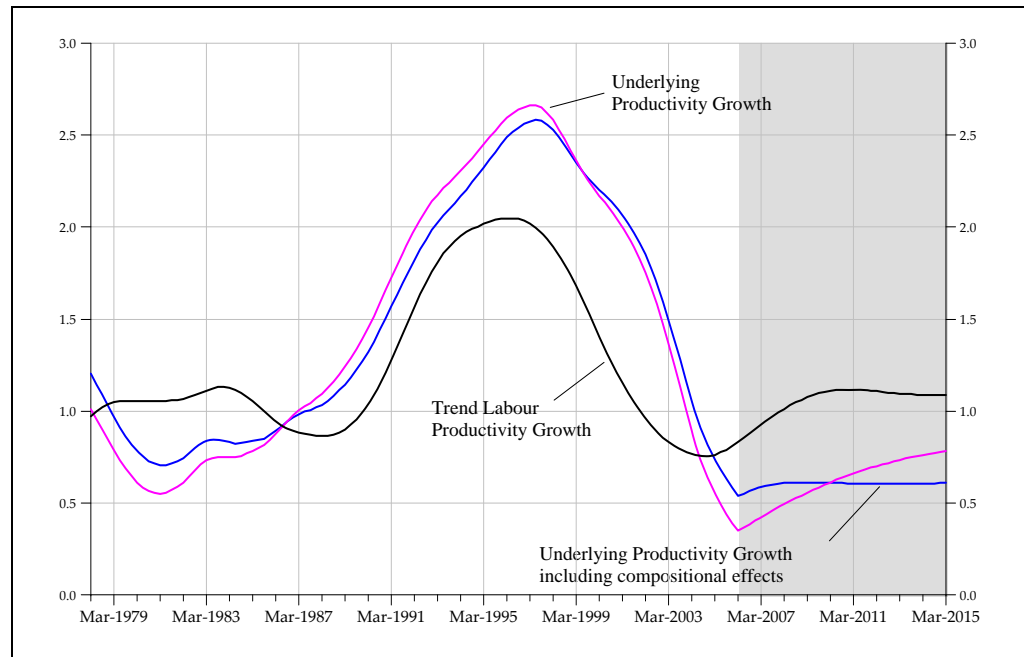
However there is a part of productivity growth that is exogenous, that has little to do with government policy. Policy can maximise the benefits that come from opportunities, but it can't create them. Hence at any point in time productivity growth is a combination of policy and the technical and other changes that would occur in any case.

Productivity surged in the 1990s due to a combination of policy and technology but has slowed over the last eight years.

Measured labour productivity growth surged in the 1990s (chart 2.10). This was due to a combination of microeconomic reform and technological change. The reforms included such things as: the deregulation of the financial system; reform and corporatisation of public enterprises and utilities; reductions in protection; deregulation of the labour market including the introduction of enterprise bargaining; and the introduction of reforms under national competition policy. These reforms both created the environment and the incentive for firms to take advantage of technological and organisational innovations. The largest productivity gains through the 1990s were in finance and insurance, communications, electricity gas and water, and distributional services²⁴, all areas directly affected by the reforms, but also all areas affected by the ICT revolution.

²³ As mentioned in the introduction these benefits are enormous over time. Labour productivity and hence per capita GDP has more than doubled over the last forty years.

²⁴ Defined here as wholesale and retail trade and transport and storage.

2.10 Underlying productivity and trend labour productivity growth ^a

^a Percentage change on a year earlier. Underlying productivity growth combines labour and capital productivity and abstracts from cyclical and substitution effects both to capital and to labour, and is built up from the industry estimates. Trend labour productivity is a Hodrick-Prescott filter of actual labour productivity growth (GDP/hour worked).

Data source: ABS Cat No 5206.0 and 6203.0 and CIE AUSM estimates and projections

However, there has been a significant slow-down in productivity growth since the late 1990s.²⁵ Again this is due to a combination of factors. Some of the reforms that eliminated inefficiencies in factor-driven industries (such as workplace reform and reform of the utilities) have only had a one off impact on productivity levels. Hence productivity growth increases for a period but falls back to more normal levels once the new level is achieved. Similarly the introduction of information technology also had initial impacts that have since declined in some industries. For example computerisation of clerical functions and the introduction of automatic teller machines allowed banks to reduce their clerical staff dramatically in the 1990s.²⁶ However, the gains from this process seemed to have slowed

²⁵ As can be seen in the chart both the acceleration and the slowdown are larger in underlying terms. The underlying measure combines capital and labour productivity and abstracts from cyclical and substitution effects. The wage booms of 1974 and 1981 led to substitution away from labour thereby adding to productivity growth a process that was reversed in the late 1980s and 1990s. Labour productivity growth determines how fast wages can grow without impacting on employment, whereas the combination of labour and capital productivity determines the trend in output prices (given wages and the cost of capital). See Attachment C for details on the calculations.

²⁶ The number of clerical staff in finance and insurance has fallen by 70 per cent since 1990. In contrast the number of professional and managerial staff has increased by almost a factor of three since 1994.

over the last five years, with employment in finance and insurance again beginning to grow.²⁷ Similarly the initial benefits of computerisation and reform in other areas such as communications, electricity gas and water and distributional services appear to be waning with productivity growth in those sectors also gradually returning to more normal levels over the last five years.²⁸ (The sectoral details are discussed further in the next two Chapters with more detailed data for each industry presented in Appendix C.)

Demographics, labour supply and GDP

Demographics are usually thought of as slow moving. However, Australia is currently at a demographic turning point. The baby boomer generation is hitting retirement age, and this will have impacts on the business environment over the next ten years across a number of dimensions. It will affect, for example, the pattern of consumption, the demand for housing (and hence construction), the level of saving and the availability of skilled labour. One important issue is to what extent industry will be able to tap into the wealth of experience and human capital that will be moving into retirement.

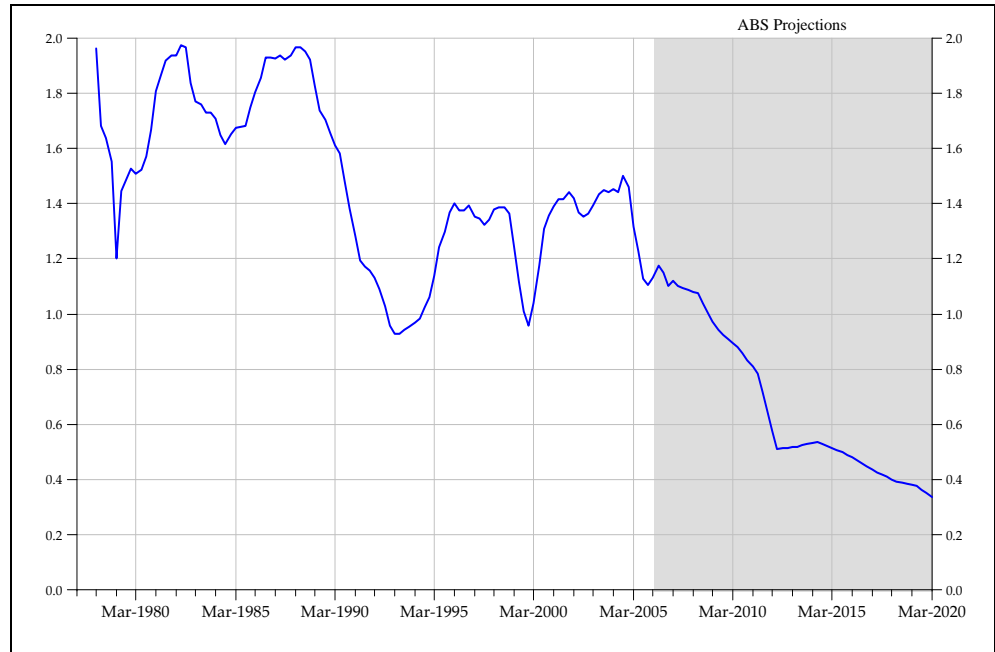
Labour supply growth is starting a rapid decline

The most obvious effects are on labour supply. The combination of high rates of exit, as the baby boomers cross the 65 year old threshold, and low rates of entry will mean that the growth of the working age (15-64) cohort of the population will slow dramatically in coming years (chart 2.11).

²⁷ Particularly with growth in financial management and investment advisory services. The focus on eliminating clerical functions appears to have shifted from computerisation to outsourcing.

²⁸ In the case of electricity gas and water measured labour productivity growth has been negative.

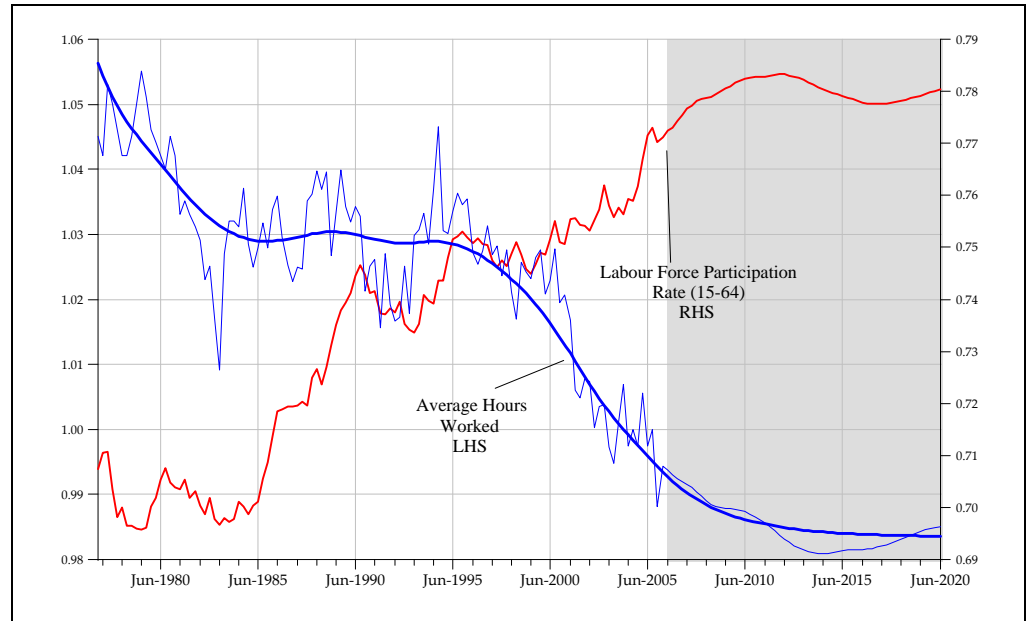
2.11 Growth of the working age population (15-64) ^a



a. Percentage change on a year earlier.

Data source: ABS Cat No 3222, Series B, Medium Projection and CIE calculations

Australian industry has been used to the working age population growing at a rate of around 1.3 per cent per year for the last ten to 15 years. This will fall by almost two thirds over the next five to six years. There will likely be further increases in labour force participation particularly among older workers, but these will be offset by continued declines in average hours worked. In history these two trends have been broadly offsetting. This in turn means that the growth rate of labour supply is unlikely to be very different to the growth rates of the working age population itself (chart 2.12).

2.12 Labour force participation and average hours worked^a

a. Hours worked measured as an index, 2003-04 =1, labour force participation as a proportion of the population 15-64.

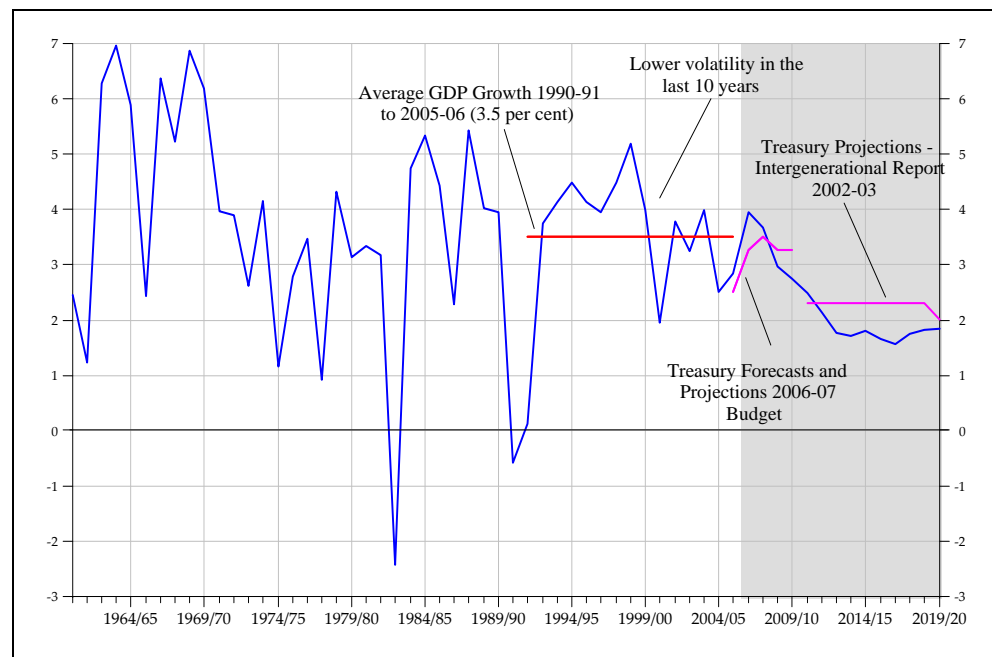
Data source: ABS Cat No 6203.0 and CIE AUSM Projections

Which will impact on output growth

Among other things, these structural changes mean that output growth will be lower on average across industries that are domestically focussed. Whereas industry has been accustomed to GDP growth of around 3.5 per cent per year over the last ten years, trend growth will fall to around 2 per cent in coming years. In the 2006 Budget Treasury projected GDP growth of 3.5 per cent in 2007-08 falling to 3.25 per cent in 2008-09 and 2009-10. However, as the Treasury is careful to note, these are not forecasts but projections based on 'historical averages'. In the 2002-03 Intergenerational Report, Treasury projected that due to slowing population growth, average GDP growth rates would fall to 2.25 per cent in the decade beginning in 2010. The CIE's AUSM model has growth higher than Treasury in 2006-07 but falling rapidly after that as the demographic effects start to kick in²⁹ (see chart 2.13).

²⁹ It appears that the outcome for 2005-06 will be higher than Treasury anticipated, which is also suggestive of a higher than anticipated outcome for 2006-07. Treasury's analysis of its own forecasting record indicates that it usually gets the direction of change in GDP growth correct, but tends to underestimate the amount of change both in downturns and recoveries.

2.13 Growth in GDP: history and projections



Notes: Percentage change on previous financial year
 Data source: ABS National Accounts, Cat No 5203.0, Treasury (2003), Treasury (2006) and CIE AUSM Estimates

Labour market implications

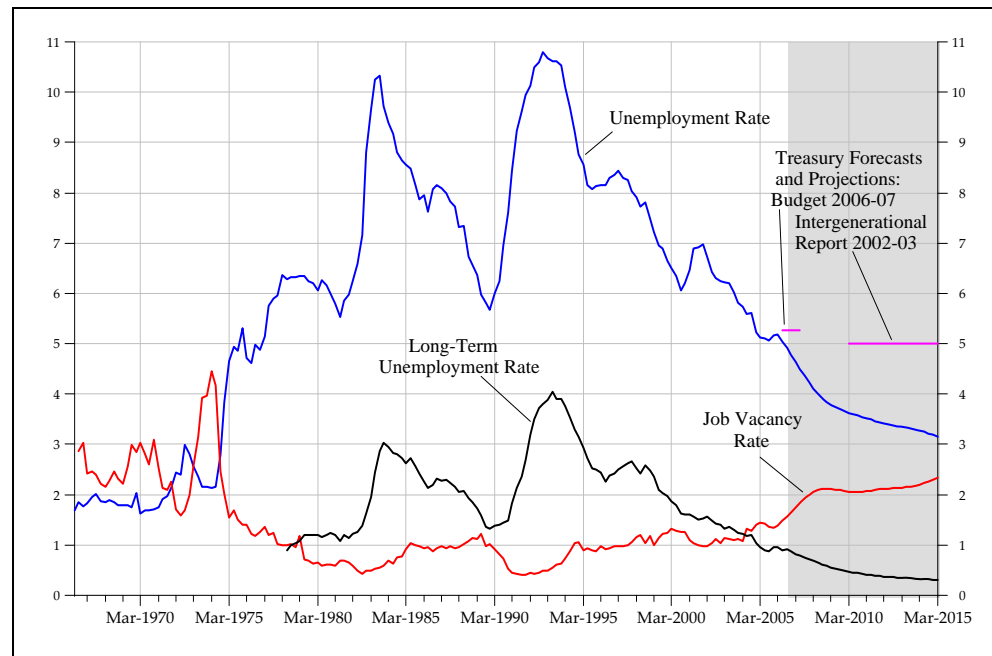
With slower population growth, the labour market will be tighter

Another key implication is for the likely future tightness of the labour market and the availability of skilled labour. The Treasury Budget projections had the unemployment rate remaining at 5 ¼ per cent till mid-2007. The projections in the Intergenerational Report in 2002-03 were based on an assumption that the non-accelerating inflation rate of unemployment (NAIRU) is 5 per cent. However, the last 10 years have seen a successive downgrading of the Treasury's NAIRU estimate from around 7 per cent to 6.5 per cent to 5 per cent. It is not clear what their revised assessment will be when the next Intergenerational Report is released next year. However, unemployment has already fallen below 5 per cent without any sign yet of an acceleration in wage inflation. On our analysis the changing demographics, the impact of income tax cuts and the work choices legislation on wage pressures, and the continued decline in long-term unemployment (which has fallen from 4 per cent of the labour force in 1993 to less than 1 per cent today) will all mean that unemployment will continue to decline.

With lower unemployment, and fewer new entrants into the labour market looking for jobs, job vacancy rates will be much higher. Vacancy rates are

already at the highest levels since the early seventies. On our projections this situation will tighten further over the next five years. The job vacancy rate in the June quarter was 1.5 per cent. This will possibly rise to over 2 per cent by around 2008, roughly three times the average level of the 1980s and 1990s (chart 2.14). (As turnover is roughly constant over time, this means that it will be taking roughly three times as long on average to find the right person to fill a particular job.) Problems in finding workers will not be evenly distributed, either across regions or over time. In the 1960s and early 1970s, firms were often constrained in responding to fluctuations in demand by lack of available labour.

2.14 Unemployment, long-term unemployment and job vacancies ^a



a. The job vacancy rate is defined as unfilled vacancies as a percentage of employment plus vacancies. Unemployment rates are expressed as a per cent of the labour force. Data source: ABS Cat No 6202.0, 6203.0, 6354.0 and CIE AUSM projections

With implications for management and employee 'on-costs'

This implies that firms will need to devote more resources to hiring and developing their staff, consider more flexible working arrangements and greater use of part-time employees etc. As mentioned above managing the transition of the baby boomer generation into retirement, drawing down their knowledge and experience, will throw up additional challenges.

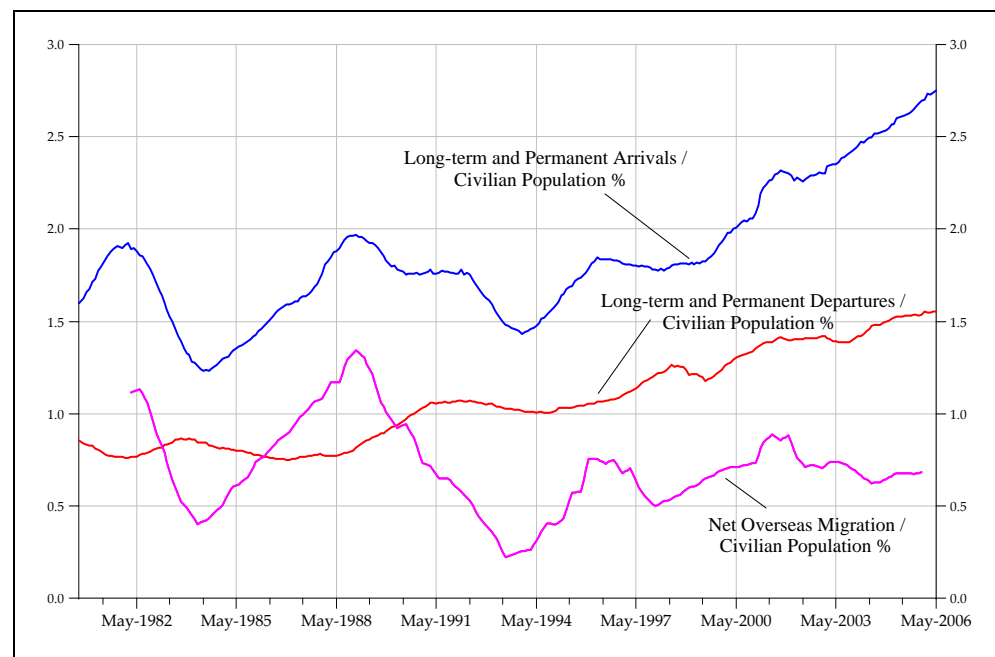
At the micro level, firms will need to have a greater focus on managing human capital than in the past. It seems likely that large firms, particularly those with international connections, will have a greater ability to manage the coming changes in the labour market than small firms. For example,

firms with international connections will be better placed to bring in workers from overseas, and to take advantage of outsourcing opportunities.

Globalisation of the labour market works in Australia's favour

Another aspect will be tapping into what is becoming an increasingly globalised market for professionals and skilled labour. This can be seen in Australia's own migration data (chart 2.15). Over the last ten years the number of long-term arrivals and departures has increased markedly as a percentage of the population. (This is even though the net migration rate has been unchanged.) This is no doubt partly due to the globalisation of production. Professionals who work in multinationals are often required to relocate overseas either to gain experience or apply their skills in other parts of the organisation. Also many more young professionals appear to be travelling overseas to gain experience in the European and North American markets as part of their careers.

2.15 Long-term arrivals and departures



Data source: ABS, Australian Demographic Statistics, Cat No 3401.0 Net overseas migration is net of category jumpers.

The slower population and GDP growth has a number of implications for industry structure. For example it implies that the need for construction investment will probably be much lower than in the past (discussed in more detail below). Other things being equal (i.e. abstracting from the infrastructure requirements of the commodity boom) it would also tend to mean less infrastructure investment than otherwise.

But possibly more important than the implications for infrastructure investment and the broad industry structure, are the implications for the way business operates. The GDP slowing is probably approaching much faster than many businesses realise. For Australian firms the potential for revenue growth will soon become relatively constrained in the domestic market.³⁰ The obvious alternatives include the fast growing Asian markets to our north. However, as noted in Chapter 4 the main location of FDI investment by Australian firms is in other advanced OECD countries such as the US, UK and Canada, countries which will experience similar or even greater demographic slowings to that of Australia. By and large Australian firms do not appear to be well placed to either grow into the developing Asian markets or take advantage of the outsourcing opportunities that are arising.

But the global skill balance is also shifting

Another aspect of this is the rapid development of an educated and professional workforce in China, India and other parts of Asia, and associated with that, the increased amount of research and development expenditure that is occurring outside of the OECD countries, particularly in China. China now has more graduates in science and engineering than the United States. There are questions about the quality of the education in some of the provincial universities, but the trend is clear.³¹ Together China and India will add around 300 million skilled workers to the global labour supply over the next 30 years – the tectonic plates are not only shifting in production.

Although Australia may be well placed to capture some of this shift

In some ways Australia may be well placed to tap into this market as a result of the large increase in Asian student numbers in the Australian education system. On the other hand domestic business, insofar as it does have an international focus, is mainly linked into the traditional United States and European markets. There are also potential implications for government policy possibly requiring coordination across a number of departments (Industry, Workplace Relations, Education and Training, Immigration) and coordination across levels of government.

³⁰ Within five years average rates of growth will be little above what would previously been regarded as near recessionary rates.

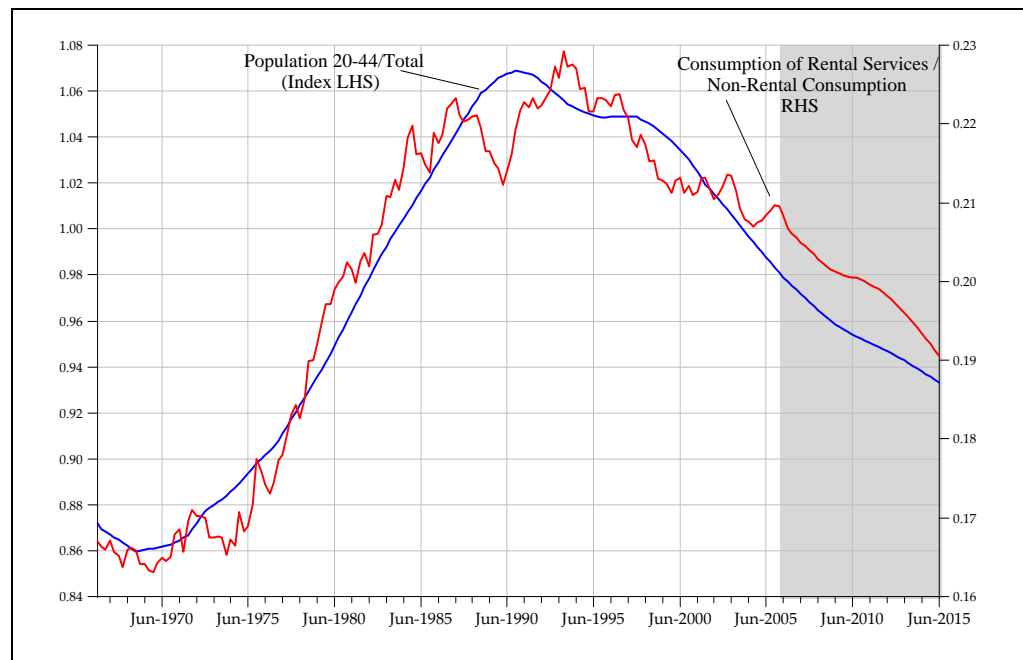
³¹ Survey data suggests around 20 per cent of the engineering and science graduates would be suitable for employment in western companies. [McKinsey 2005, P.55]

Changing patterns of domestic demand

Demographics is driving declining dwelling investment

The demographic change will be associated with changing patterns of consumer demand, for example greater demand for health services, more travel and entertainment, recreational services etc. But perhaps the largest change will be in demand for rental services. Census data indicates that for most people the amount spent on rental (dwelling) services peaks (as a proportion of total consumption) when people are forming families and raising children, i.e. between the ages of 20 and 45. This is also reflected in the aggregate time-series data. Rental consumption as a proportion of total increased by around a third as the baby boomers went through the family formation stage of life in the late 1970s and 1980s. (Rental consumption here includes the imputed component for owner occupied dwellings – see chart 2.16.)

2.16 Declining demand for rental services



Data source: ABS Cat No 5602.0 and 3222.0 and CIE AUSM projections

The combination of a falling share of consumption, and slowing overall growth in consumption due to the demographic slowdown mentioned above, means that the demand for dwelling services will be growing at a much slower pace than in the past.³² This means a much slower pace of

³² The AUSM projection accounts for the decreasing number of persons per household over time and the impact this has on the demand for dwellings.

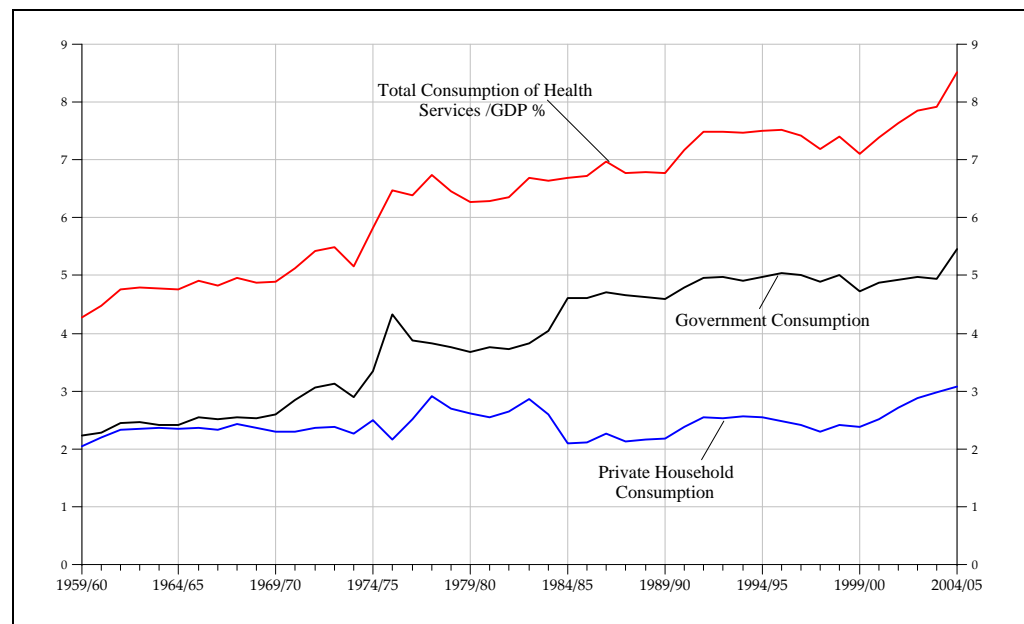
required increase in the dwelling stock. As dwelling investment is the increment of the capital stock, dwelling construction activity will be much lower (see Chapter 3).

Demographics may drive lower per capita energy consumption

Demographics impacts on composition of consumption across a number of categories. For example, census data indicates that older households are much less energy intensive than younger households. Recent work reported by O'Neill (2005) indicates the age composition of the population can have large impacts on energy consumption. Using detailed modelling of consumption by household type, and projections of population by age group, he estimates that as the population ages in the United States overall energy demand will be reduced by up to 30 per cent (relative to a baseline where household age composition effects are not included). The issue will be the extent to which this occurs among a retiring baby boomer generation that is increasing wealthy and seeking quality of life outcomes.

Demographics, rising incomes and technology will drive rising share of health services

The largest impacts however will be on the demand for health services. Cross-sectional data indicates that consumption of health services increases significantly for those 65 years old and over. Consumption of pharmaceuticals peaks between 65 and 70. Surprisingly some health economists dispute the importance of aging on health expenditure. They point out that for any individual the vast majority of health costs occur in the last month of life. They argue that as everyone dies sometime, health costs do not necessarily increase greatly with longevity. Rather they point to rising incomes and changing technology as the chief drivers for rising health care expenditure. Certainly the increases over the last twenty-five years, where health expenditures have increased by more than two percentage points of GDP (chart 2.17) have been driven only partly by increased longevity. Moreover, health expenditures are highly correlated with per capita incomes across countries.

2.17 Health expenditure as a percentage of GDP ^a

^a Measured at current prices

Data source: ABS Cat No 5204.0.

The consensus that emerges from this literature is that, while being only one part of the picture, ageing will add to the upward trend in expenditure. As the Treasury notes³³, trends in health expenditure are partly dependent on developments in medical technology that are difficult to project into the future. For example while it is difficult to predict whether future developments in medical technology will be cost saving (e.g. reducing the cost of or eliminating the need for existing treatments) or lead to greater expenditures (a wider range of more expensive procedures). Quality of service considerations and increased expectations tend to favour the latter. It seems safe to assume on the basis of the cost of currently available procedures, that the current trend to higher health care expenditure will continue and possibly increase over the next five to ten years.

Summary

Overall the conjunction of factors outlined above seems likely to lead to a period of accelerated structural adjustment for the Australian economy (explored in more detail in the next chapter). Much of the focus in public discussion has been on the terms of trade and its impact on the economy.³⁴ Certainly the income stimulus provided by the terms of trade boost

³³ IGR, 2002-03.

³⁴ Henry, 2006a, Gruen, 2006.

provides a macroeconomic challenge for policy makers and the government. However, it needs to be remembered that the mining sector represents a relatively small part of the total economy (1 per cent of employment and 4 per cent of value added). The main part of mining value added is in profits (81 per cent) and as a result of international portfolio diversification part of this flows overseas. From a structural standpoint the changes that are occurring and the opportunities that are arising as a result of the other aspects of the rise of China and India would seem to be potentially more important. In particular developments seem to be favouring knowledge and human capital intensive industries which represent a large share of domestic value added and employment. The indirect impacts of China and those that are flowing from demographics, lower world interest rates and ever falling information technology and capital goods prices seem likely to be far more pervasive, from a structural point of view, than those arising from the terms of trade. For example demographics are likely to have a far greater impact on the construction sector over the next ten years than the decline in mining investment. Similarly changing preferences as incomes rise, the tightening labour market, slower trend rates of growth and a rapidly changing external environment are all likely to throw out significant challenges to domestic firms and industries, most of which have been relatively unaffected by the mining boom.

3

How the Australian economy responds

The previous chapter described the major drivers of structural change in the Australian economy. This chapter attempts to quantify some of these changes to the extent that is possible on the basis of available data. It is one thing to speculate about the nature of the changes, but another thing to attempt to tie them down. In theory the factors outlined in the previous chapter should have a variety of effects. For example, if resources in the economy are fully employed, a terms of trade shock of the magnitude that Australia is experiencing should lead to reallocations of resources within the traded goods sector as the mining sector expands, and between the traded goods sector and the non-traded goods sector. These reallocations are brought about by relative price changes, most notably the movement of the real exchange rate, which sets the price of tradeables relative to non-tradeables.

There are a range of effects arising from the drivers discussed in the previous chapter

In addition to the reallocations among industries are those among factors of production. According to the Stolper-Samuelson effect, the advent of cheap labour intensive manufacturing imports should lead to a reduction in demand for labour and reductions in the real wage.³⁵ However, the Stolper-Samuelson effect is a comparative static result and is based on a series of assumptions. Crucial among these are neoclassical production functions for industry and homogenous labour and capital. If in reality labour is differentiated between skilled and unskilled, and human capital and knowledge enter into the industry production functions, the net impact would be to increase the returns to skilled labour and human capital. This in turn implies increased returns from education and training and has implications for knowledge formation activities such as research and development.³⁶

³⁵ See Attachment A

³⁶ In equilibrium education activity should increase to the point where returns to skilled labour fall back to normal levels

Layered on top of the commodity price and Stolper-Samuelson effects are the impacts of falling capital good prices, low real interest rates, and the impact of demographic change on labour supply and the pattern of demand across industries. As discussed earlier, it seems likely that these latter effects will be much more pervasive than the terms of trade effect over the medium term. In assessing the impact of the terms of trade on industry structure it needs to be kept in mind that mining employment only represents one per cent of total employment, and the real exchange rate while higher than it was five years ago, is still lower than in the 1970s and early 1980s.

To make an assessment, given the diversity of drivers and the complexity of the responses, requires a modelling approach

To obtain some sense of the balance of effects across industries we use the CIE's AUSM model of the Australian economy. No model provides a perfect rendition of reality, but AUSM has the advantage of combining a theoretically consistent internal structure with a close fit of the historical time series data. It therefore provides a detailed explanation of how the factors outlined in the previous chapter have affected the structure of the economy over the last five years, and a means of projecting those changes into the future. It doesn't answer all questions particularly those which involve qualitative assessment, but it does provide a way of balancing the various effects to arrive at an aggregate outcome. The more qualitative and detailed aspects of structural change are discussed in the next two chapters.

Outline of the chapter

We start with the end results, digging deeper and unfolding the explanation as we progress. The first section looks at aggregate indicators of structural change. (Have the factors outlined in the previous chapter been associated with greater or lesser amounts of structural change than usual? Will the measured rate increase or decrease over the next five to ten years?) This is followed by a section looking at the details behind the aggregate measures – the projected developments in industry shares of employment and production. The three measures (production, income and employment) provide different pictures with industry shares changing dramatically with the increase in income flowing to the mining industry, but employment shares being relatively more stable. Finally we provide a detailed explanation of how these shares came about – how the response to the factors mentioned in the previous chapter is driving the changes. This is done by decomposing the changes into their component parts – starting with the response of the demand side of the economy (consumption, investment and exports) and tracing these through to the

supply side, (domestic production and imports). The supply side share is also dependent on productivity developments and relative prices between industries and hence productivity is also discussed. (Appendix B provides more detail of the system used.)

Is the pace of structural change increasing?

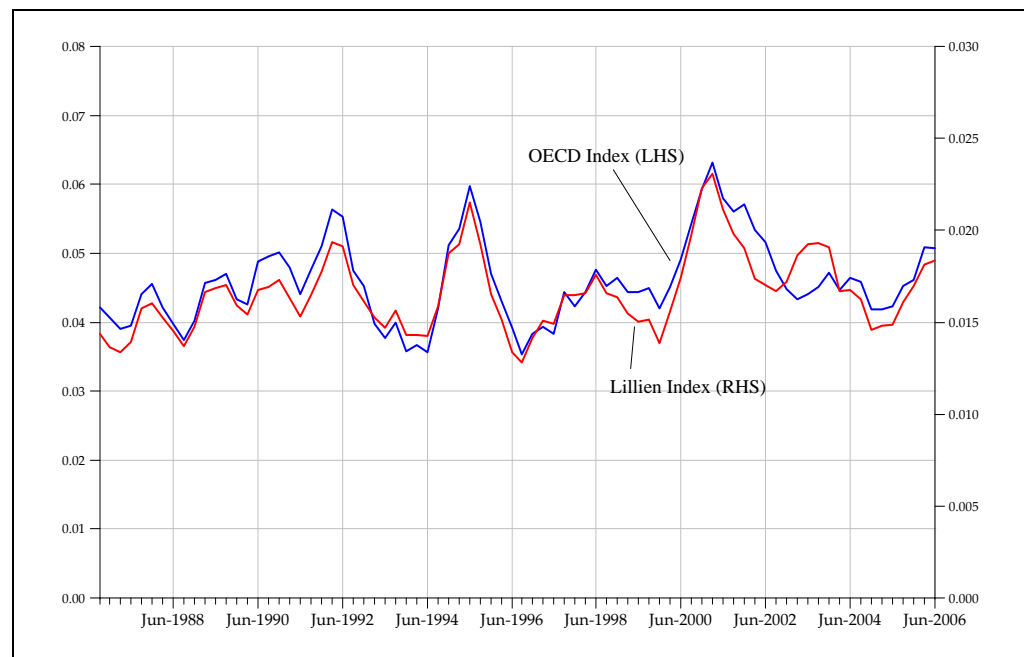
Aggregate measures of structural change

Structural change is a many faceted process and consequently is difficult to capture in a single measure. Two measures are often used in the literature. One first put forward in a paper by David Lilien is defined in terms of relative growth rates, and the other used by the OECD is defined in terms of the change in sectoral shares, (see Appendix A for the precise definitions). However, despite the differences in formulation the results of the indexes tend to be relatively close.

Employment based measures suggest higher levels of structural change on average since around 2000–01

Chart 3.1 below shows both the Lilien and OECD indexes for structural change in Australian employment. A rise in the index reflects a greater level of structural change.

3.1 Indexes of structural change in employment ^a



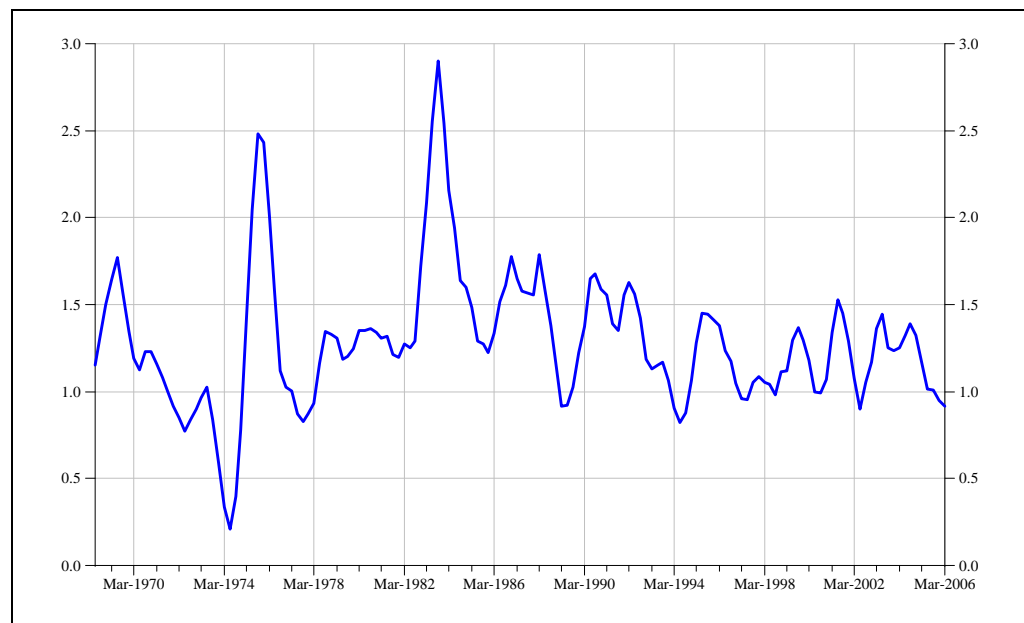
^a Measured at the 17 industry level available from the ABS Labor Force Survey.
Data source: ABS Cat No 6203.0 and CIE calculations

Interestingly, both indexes indicate a somewhat higher level of structural change in employment over the last five years compared to earlier periods, particularly during the downturn in 2000-01. However, in part this may be a function of changes in the ABS labour force survey methodology.³⁷ On the other hand, examination of the occupational data (discussed later) indicates that occupational shares have also been changing more rapidly over the last six to seven years. Combined with the employment data above this is suggestive of an increased pace of structural change within industries (perhaps driven by computerisation).

However output measures show structural change has probably slowed.

In contrast to the picture presented by the employment-based indexes, an index based on chain-linked value added indicates that the last 10 years have been a period of relatively structural stability with regard to output shares.

3.2 Index of structural change in industry value added ^a



^a At the 33 industry level available in the quarterly national accounts.
Data source: OECD Index; ABS Quarterly National Accounts Cat No 5203.0; and CIE calculations.

As can be seen (from chart 3.2) large changes in output shares occurred in the cyclical downturns of 1975 and 1982-83. These earlier recessions were

³⁷ Particularly the change from face to face, to telephone interviews that occurred in the first half of 2000. This change appears to have been associated with seemingly inexplicable shifts in employment shares across sectors, for example a sudden drop in employment in wholesale trade, and an increase in the share of manufacturing employment as the economy entered the downturn. Since 2000 the standard errors around the quarterly estimates also appear to have increased.

shorter and sharper than 1990-92, which in terms of GDP growth was shallow but drawn out, possibly explaining the lower level of the index compared to the previous recessions.

But this reflects transitory changes as well as permanent shifts

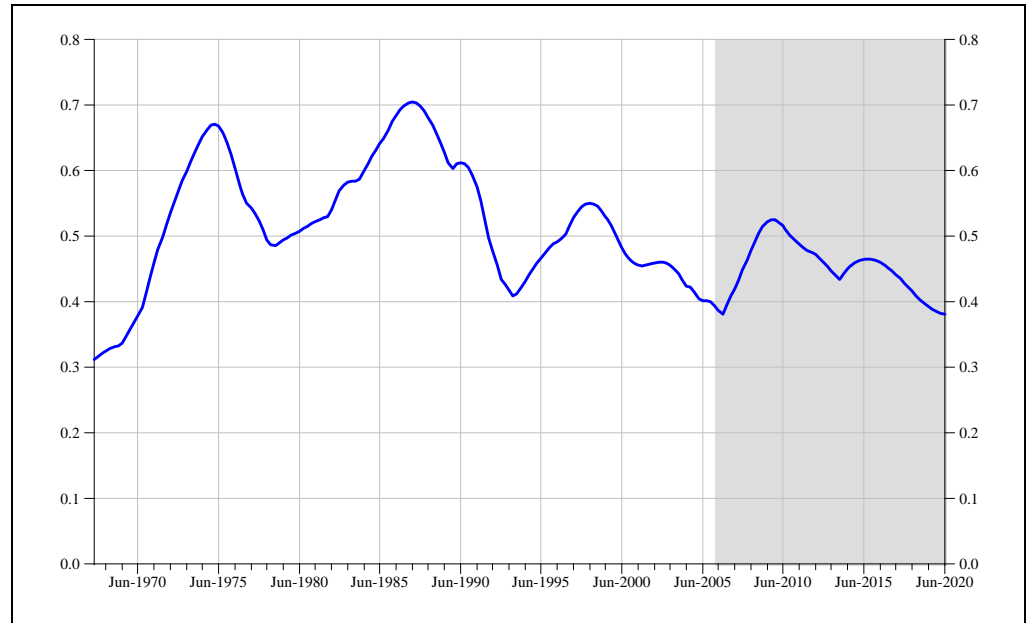
The cyclical nature of the series is a problem in that the point of interest is in permanent or structural shifts rather than the transitory changes associated with the business cycle. The indexes above include movements that are due to output and employment in some industries (manufacturing, construction) being more cyclical than in others.³⁸ This problem has led some authors to propose measures based on dynamic factor analysis (an econometric technique which attempts to isolate the common cyclical factor across time series, leaving the structural factors as a residual).³⁹ Another way to abstract from cyclical movements is to simply look at changes over long periods, or trend movements across series.⁴⁰ Chart 3.3 measures structural change in trend constant price value added across 11 industries including in the projection period.

³⁸ The point of Lilien's original paper was that a significant part (50 per cent) of the cyclical fluctuation in US unemployment was due to changing rates of structural change. A subsequent paper by Murphy and Topel criticised the methodology for not allowing for the endogeneity of the structural change measure to cyclical movements.

³⁹ See for example Heaton and Oslington, 2001. They find that 80 per cent of the movements in unemployment are accounted for by aggregate cyclical movements. They also find little contribution to unemployment from industries undergoing large structural change or subject to microeconomic reform. This in turn suggests that turnover and normal inter-industry flows in the Australian labour market have been high enough to allow the absorption of those displaced through structural change.

⁴⁰ A Hodrick-Prescott filter is used to trend each of the individual industry series before they are combined in the measure of structural change.

3.3 Index of structural change in industry value added



Data source: ABS Cat No 5206.0 and CIE AUSM projections

Overall trend is a decline in change in industry shares but change is projected to increase in the next five years

Overall the impression is that lower amounts of inter-industry adjustment have been occurring over the last 10 to 15 years, but with the possibility that intra-industry adjustment have increased over the last five to seven years. The inter-industry picture is consistent with analysis at the global level.⁴¹ While the 1970s and 1980s were periods of relative turmoil, the last 15 years has seen relatively stable growth. Partly this was due to the oil price shocks in 1973-74 and 1981, large relative price changes as real wages rose in many countries and large exchange rate realignments following the end of the Bretton-Woods system in 1972. In comparison the last 15 years has seen the absence of large relative price movements, and relative macroeconomic stability, something that is at least partly attributable to the introduction of inflationary targeting based monetary policy, and medium-term fiscal stabilisation frameworks.

However the next five years appear likely to see an increase in the amount of inter-industry structural change. However, part of this is driven by the increase in mining's share, which as discussed earlier will have little structural impact on other industries once the transition period is over. The other significant factor driving the increase in structural change is the demographic transition, particularly its impact on construction.

⁴¹ See for example OECD, 2005, P75.

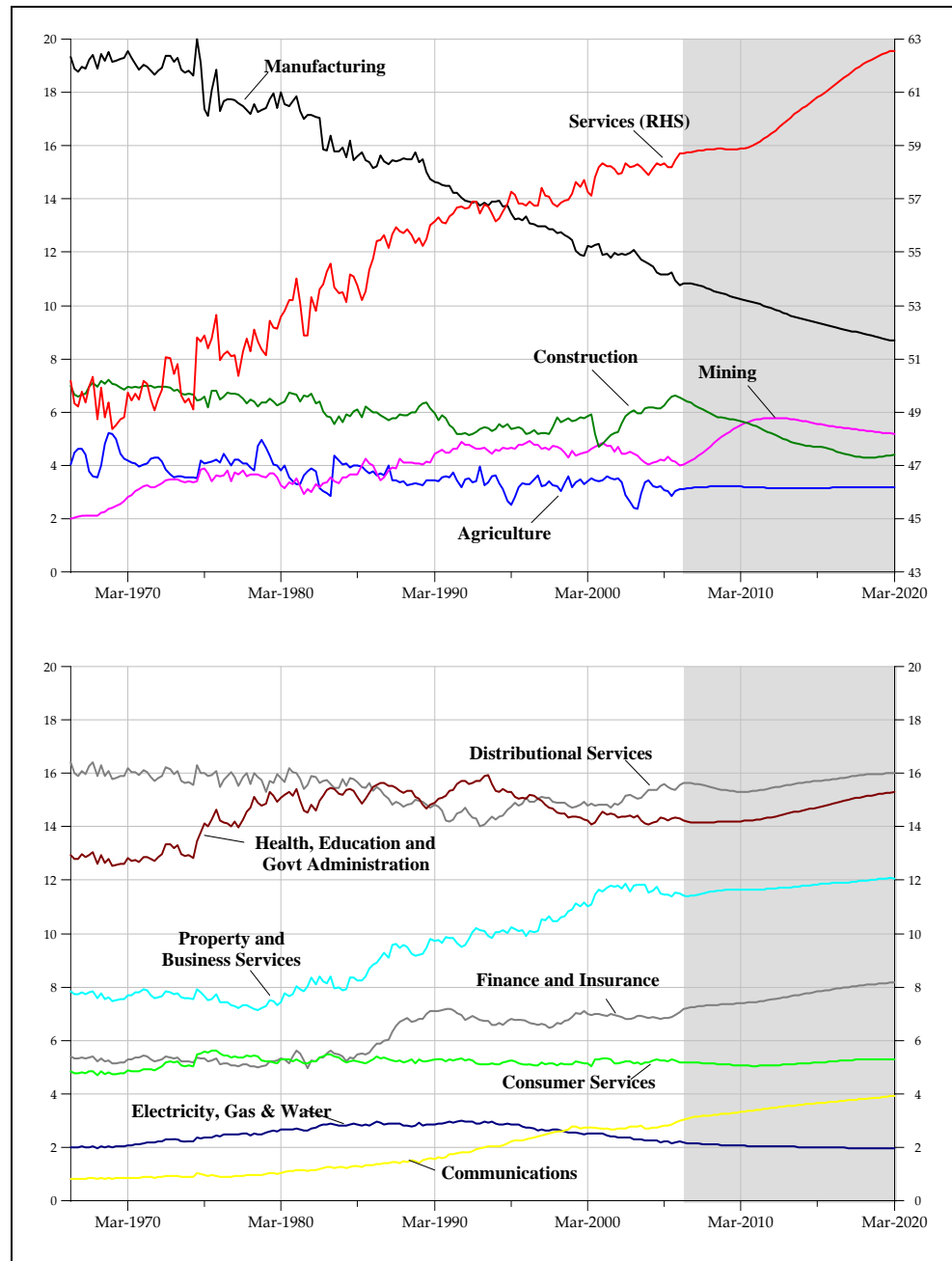
What has happened to industry shares?

The aggregate indexes of structural change above, while interesting, have a number of limitations. What is important from a policy perspective is the development in individual industries and occupations, whether there are pressure points or adjustment problems in particular sectors and the reason for the change.

The overall picture

Like most other OECD countries Australia has had declining manufacturing and a rising service share of the economy over the last thirty years. Chart 3.4 shows the past and projected shares in GDP for the major industry groups. Since 1967 the services sector share of total employment has increased by 19 percentage points, while that of manufacturing has declined by 14 percentage points. Similar changes have occurred in most other OECD countries. In the United States the services sector share has also increased by 19 percentage points, while it has increased by 21 percentage points in Japan and roughly 25 points in Italy, France and the United Kingdom.

The underlying secular trends are partly driven by productivity differentials across industries, and partly by trends on the demand side of the economy, for example the declining proportion of food in total consumption as incomes rise. On the supply side, lower productivity in services tends to lead to a higher services share over time because of the Baumol-Bowen effect (see Appendix A). However, the pattern of developments across services are quite distinct (for example, with the share of employment in finance and insurance falling, as opposed to the strong increases in consumer services and property and business services – chart 3.6 below). Moreover, the story surrounding the changing industry shares is much richer than simply differentials in productivity growth. For example, labour productivity growth in distributional services has been similar over the last ten to fifteen years to that in manufacturing, yet manufacturing's share of employment and output has fallen by a third while that of distributional services has remained relatively stable. This is partly because falling relative prices of imported goods has led to a substitution away from manufacturing. At the same time, strong growth domestically and the increase in exports and imports associated with business investment leads to increasing demand for distributional services.

3.4 Industry shares of production (value-added at constant prices)^a

a. Percentage of GDP.

Data source: ABS Cat No 5206.0 and CIE AUSM Projections

The story behind the individual developments in sectoral shares is therefore a complex one and addressed in more detail below. However several broad observations can be made on the basis of the trends in overall sectoral shares:

- The decline in the manufacturing share of employment and production has been relatively steady over time and is projected to continue at around the same rate over the next ten years. As discussed below, this

trend hides a consistent level of productivity gains and considerable restructuring within this sector towards advanced manufacturing and knowledge intensive activities (design, logistics and marketing).

- The largest swings in employment and activity over the last five years and the next five years are for mining and construction.
 - Construction's share of employment and activity has risen to its highest level in 25 years following the post GST slump in 2000-01. However it is set to decline significantly over the projection period.
 - Mining is yet to register any significant increase in constant price output shares. However its output share will increase rapidly as current and prospective investment projects come on stream over the next five years.

It is also notable that there are very large changes occurring in current price income shares across industries (chart 3.5 below). This in turn is reflective of the unusually large relative price movements occurring between sectors (particularly mining output prices relative to prices in the rest of the economy).⁴² For income (current price GDP) shares the dominant movement is in mining which is more than doubling from 4 per cent in late 2003 to reach 9 per cent by 2008.

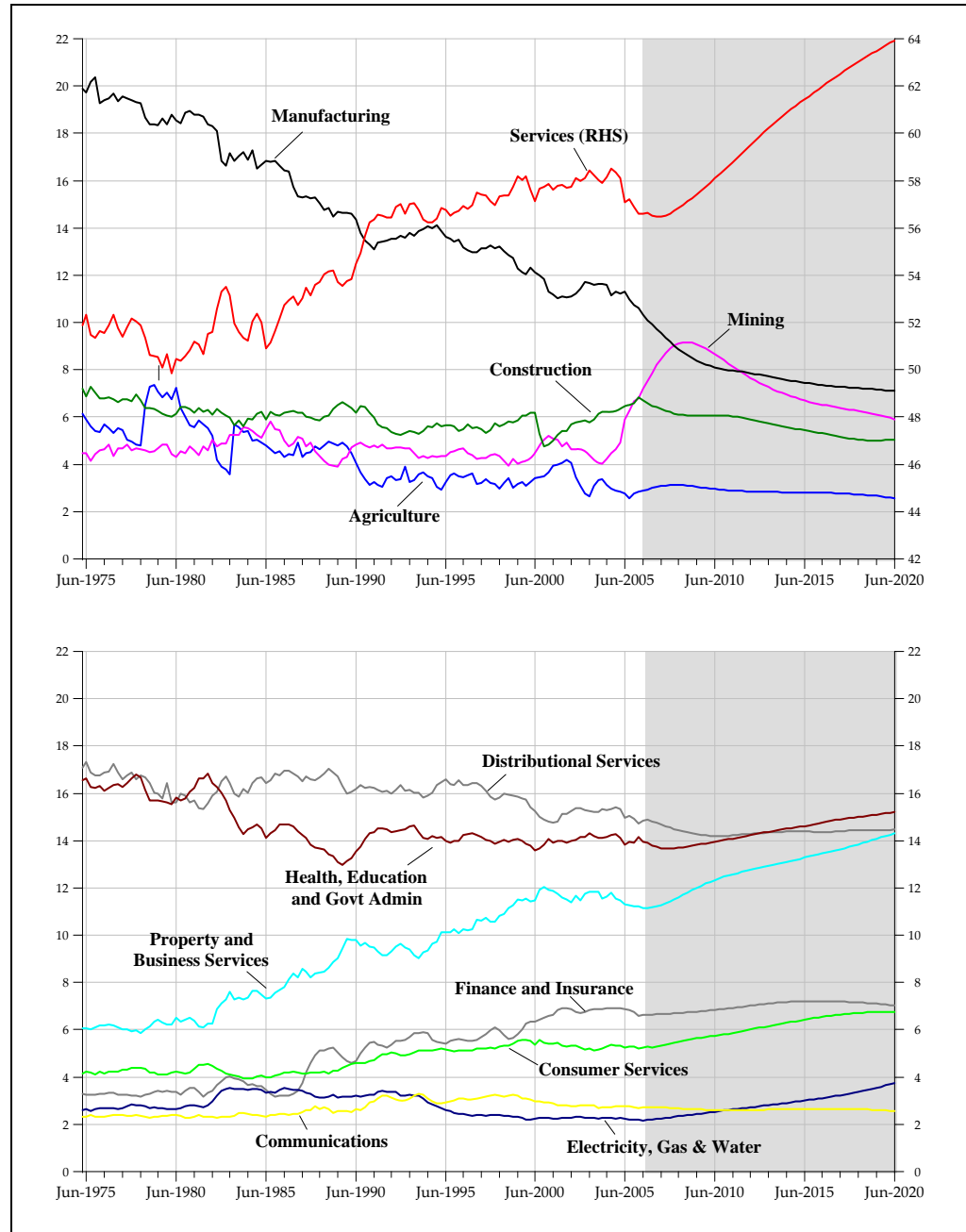
Mining income has risen but this does not imply a decline in income in other industries

The rise in the mining share drives a decrease in the shares of other industries (relative to what it otherwise would be). However, this probably exaggerates the true impact on other industries, for while their shares are lower than otherwise the overall level of GDP has increased.⁴³ Moreover, as noted earlier, over 80 per cent of mining income is gross operating surplus. As a significant part of the equity in mining is foreign owned part of this flows overseas contributing to a higher net income deficit. (In other words the impact on gross national income is less than that on current price GDP).

⁴² This in turn highlights the difficult measurement issues and index number problems involved in looking at structural change.

⁴³ The expansion of national income is due to the terms of trade increase. Similarly, as mining is capital intensive there is an expansion of national productive capacity via mining investment (paid for out of the higher income). That the surge in income is more than sufficient to fund the investment is witnessed by the fact that many of the major mining companies are currently engaging in share buy back schemes.

3.5 Industry shares of income (GDP at current prices)



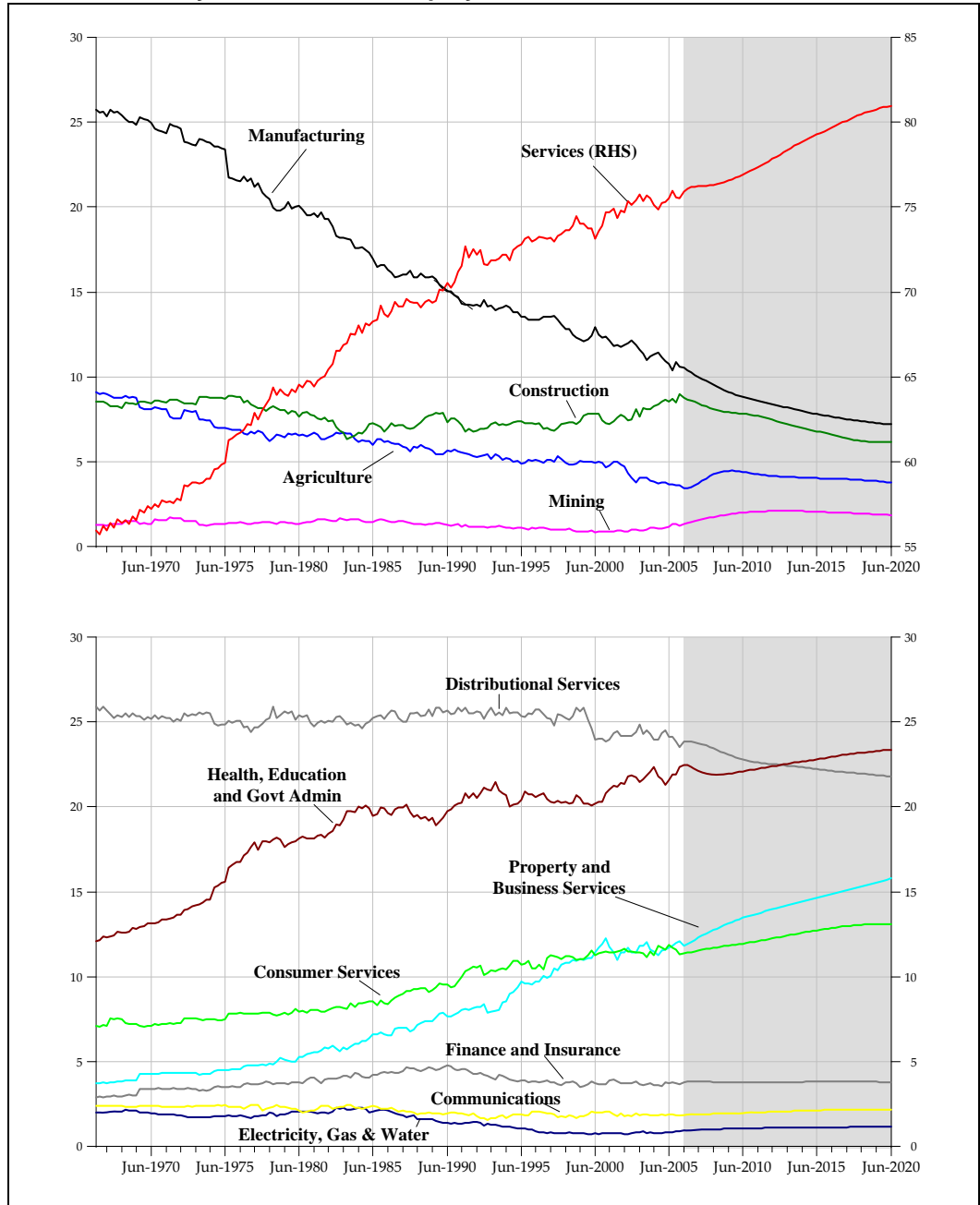
Data source: ABS 5206.0 and CIE AUSM Projections

Measured relative to where they would have been without mining, the other industries are relatively unaffected by the expansion. That is their income levels and shares of non-mining income are similar to what they would have been if the boom had not occurred.⁴⁴ The exceptions to this

⁴⁴ This can be demonstrated via a counterfactual simulation. Running a simulation on AUSM where non rural commodity prices do not rise post 2003, (with a lower consequent exchange rate) indicates that manufacturing output, employment and real wages all would have been lower from around 2006 onwards if the

are construction where the mining investment boom drives an increase in demand, and agriculture, which is export orientated and hence suffers a fall in income as a consequence of the higher exchange rate. There are also impacts within manufacturing due to the offsetting demand and relative price effects, but these are discussed further in Chapter 5.

3.6 Industry shares of total employment ^a



a. Measured on a heads rather than hours worked basis. Percentage of total.

Data source: ABS Cat No 6203, and CIE AUSM projections

commodity boom had not occurred. However, this is partly due to differences in the business cycle driven by the changes, with unemployment being higher in the absence of the boom.

Employment shares are less affected by the terms of trade and trends continue

Where the shares are truly reflective of the allocation of limited resources is in employment. Here the effect of mining is tiny. While the mining share of employment is roughly doubling over the projection period, its base level is so low (less than 1 per cent of total employment) that it has very little effect on the labour available to other industries (chart 3.6).⁴⁵ In comparison even small changes in productivity growth in the larger industries potentially have larger effects.

What explains the developments in industry shares?

As mentioned above the story behind the individual industry developments is a complex one. It involves significant developments both on the demand and supply side of the economy. Consequently, in understanding what is driving structural change it is useful to think of it as occurring across two dimensions. It occurs across the components of demand (consumption, investment and exports) and it occurs over components of supply (individual industry value added and imports). For example, if the exchange rate appreciates, import prices will fall and this will have two effects on the composition of output. Firstly there will be substitution effects across demand as consumers buy more of the products that are falling in price (and as firms shift investment towards cheaper imported capital goods). Secondly, there will be substitution effects across supply as domestic producers shift from domestic towards import sources. (In some cases the imports might be complements leading to higher demand for the domestic sourced input, for example for transport.) In fact given that substitution across sources of production is relatively limited, it is the demand reactions that are usually dominant in determining the pattern of industry growth over the short to medium term.

Following this logic we can break the determinants of industry shares down into three elements:

1. A demand element (changing patterns of demand)

⁴⁵ This means Rybczynski's effect (the effect of the expansion of the capital intensive industry on the output of labour intensive industries- see Appendix A) is very small. Much larger effects are coming from such things as the contraction in the construction industry, or even small changes in productivity trends in the larger industries.

2. A supply (relative price) element (from changing productivity levels and exchange rate movements); and
3. A structural shift element that comes from changing shares of value added in various final products that are unexplained by relative price movements. For example, as incomes rise consumers may value the service and design aspects of some goods more highly. Industry shares are also affected at times by product innovation (for example, substitution of nylon for wool and cotton in textile production) and from out sourcing across industry boundaries.

Developments in the first two elements are analysed in more detail below. The third element is harder to pin down and is discussed in more detail in the section analysing the combined impact of demand and supply developments on industry shares.

Patterns of demand

To understand the changes in industry shares we therefore need to start with the first element: changing patterns of demand. To do so we look at the broad categories of demand.⁴⁶ The sections below look at the changing patterns of demand that are occurring across (a) household consumption (b) private investment and (c) exports (which represent foreign demand for Australian goods).

Household consumption

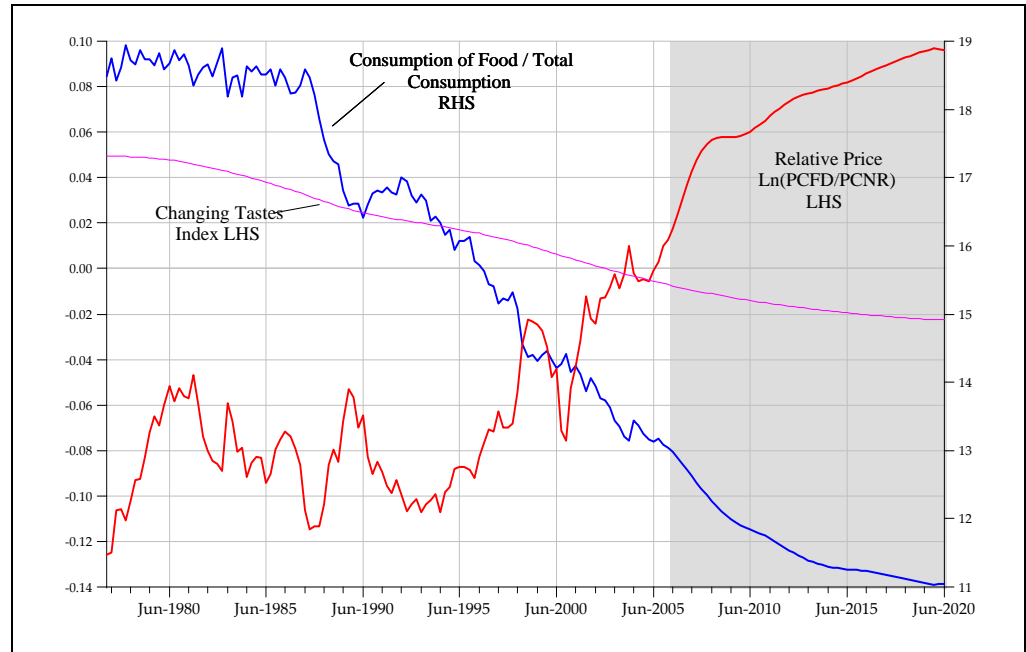
In aggregate consumption growth is projected to recover in 2006-07, driven by growth in household disposable income, high levels of household wealth and boosted by the large income tax cuts that came into force at the start of the financial year. In subsequent years consumption growth slows with the growth in GDP as the demographic slow-down begins to occur.

The charts below show the shares for consumption in recent years and for the projection period. The projections are derived using the CIE AUSM model's consumer demand system. This projects consumption for individual items based on relative prices and the model estimates of changes in preferences.

⁴⁶ The most interesting changes may be taking part within categories. For example the consumption of food may be falling (as a share of total) but within that there may be changing preferences for quality products and for the type of retail outlet. This in turn will have implications for demand both within and between industries. However there is insufficient space to deal with this here.

3.7 Components of Consumption

3.7a. Food



a: The share of food as a percentage of total (non-rental) consumption is shown on the right hand scale while relative prices and the changing taste indicator are shown in log terms on the left hand scale (.01 on the scale is equivalent to 1 per cent – a .01 shift in the taste indicator over time is equivalent to a one percentage point decline in the consumption share).

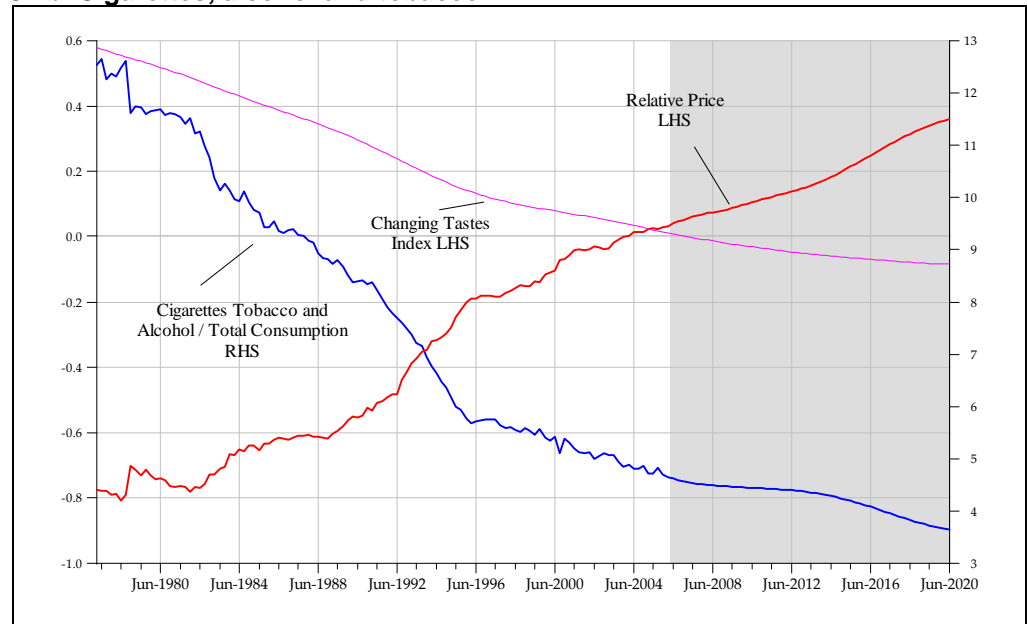
The share of food in total consumption has declined by a third over the last twenty years. This largely reflects changing preferences as incomes rise. (There is only so much food households can consume). This trend decline will continue over the projection period with the share falling to around 11 per cent by 2015. (The share will be declining in consumption which itself will be growing more slowly.)

Food prices have risen by 10 per cent relative to other prices since 1996. This partly reflects rising energy prices, and partly falling relative prices for imported durable goods. However, food consumption is relatively invariant to price so that rising prices have their main effect on the household budget available for other goods.

The falling share of food in consumption means that the parts of agriculture which service the domestic market are shrinking relative to GDP. Also, as consumption of food shifts towards higher value added products there has been a tendency for import penetration to rise over time. (In fact import penetration has doubled over the last twenty years.) Imported food is now a more important source of final consumption than domestic agriculture. The shrinking size of the domestic market largely serviced by small holdings (fruit and vegetable growers, market gardens, poultry and dairy) compared to a growing export market (serviced by large

broad acre farms) is leading to significant structural change within the agricultural industry.

3.7b. Cigarettes, alcohol and tobacco

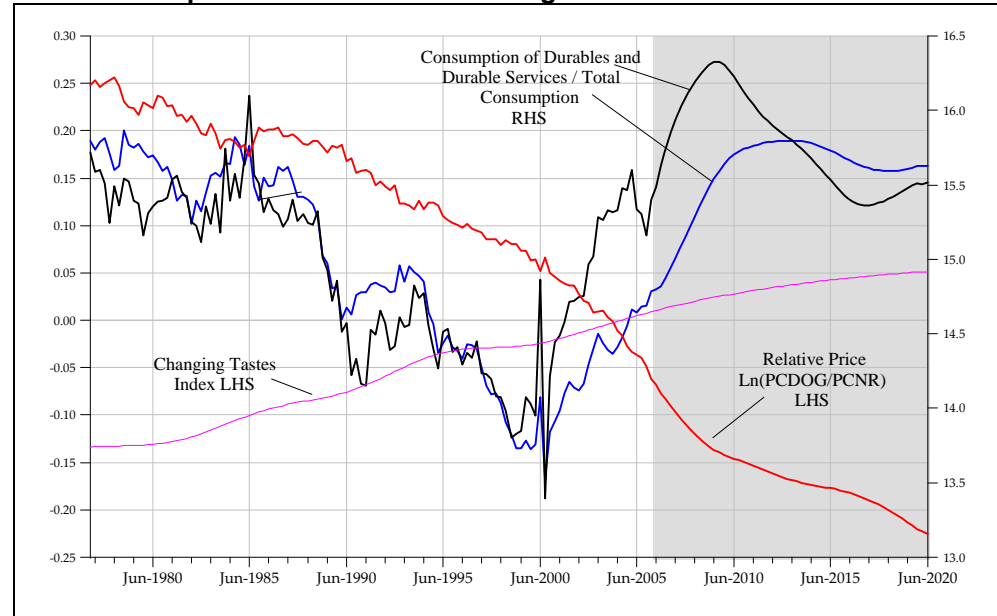


Like food, alcohol and cigarettes have an income elasticity less than one. Consumption of cigarettes per capita has fallen by two thirds over the last thirty years although the pace of the reduction has declined over the last ten years. The consumption of alcohol per capita in contrast has been relatively stable over time (and in fact has increased moderately over the last five years). The decline in per capita cigarette consumption has no doubt partly been driven by health concerns. It has also been driven by a threefold increase in prices since the early eighties due to increasing excise over time. (Alcohol prices rose by around 15 per cent over the same period of time. Taken together prices in the category have risen by 80 per cent since the early eighties.) Overall the share of alcohol and cigarettes in total consumption has fallen by two thirds since the early eighties. Altogether the income and taste effects have been dominant accounting for six percentage points of the eight percentage point reduction in share since the late 1970s, indicating that demand in the medium term is relatively price inelastic for both items.

Large changes have been occurring within the alcohol category with rising consumption of wine relative to beer, and increasing consumption of bottled wine relative to cask wine, and red wine relative to white wine. The implication of a declining share of consumption for wine producers is that they have needed to look to the expanding overseas market (which many have successfully.) Again it is change on the consumption side which is the

largest driver of structural change in the tobacco and alcoholic beverage industries.

3.7c. Consumption of durables and other goods



This category consists of furnishings and household goods, goods for recreation and culture, clothing and footwear and personal effects. Of these sub components, clothing and footwear has been falling as a percentage of total consumption over the last twenty years, while that of the other components, particularly recreational goods (which includes televisions, video equipment, cameras etc) have been rising. Like food, the decline in the clothing and footwear share is driven by the fact that clothing expenditure does not rise proportionally with income. In fact despite a 30 per cent decline in relative prices over the last 20 years, clothing and footwear consumption per capita is only a little higher now than it was in 1986. This decline, in combination with increasing competition from low cost imports, is an important contributing factor to the decline in domestic clothing and footwear production.

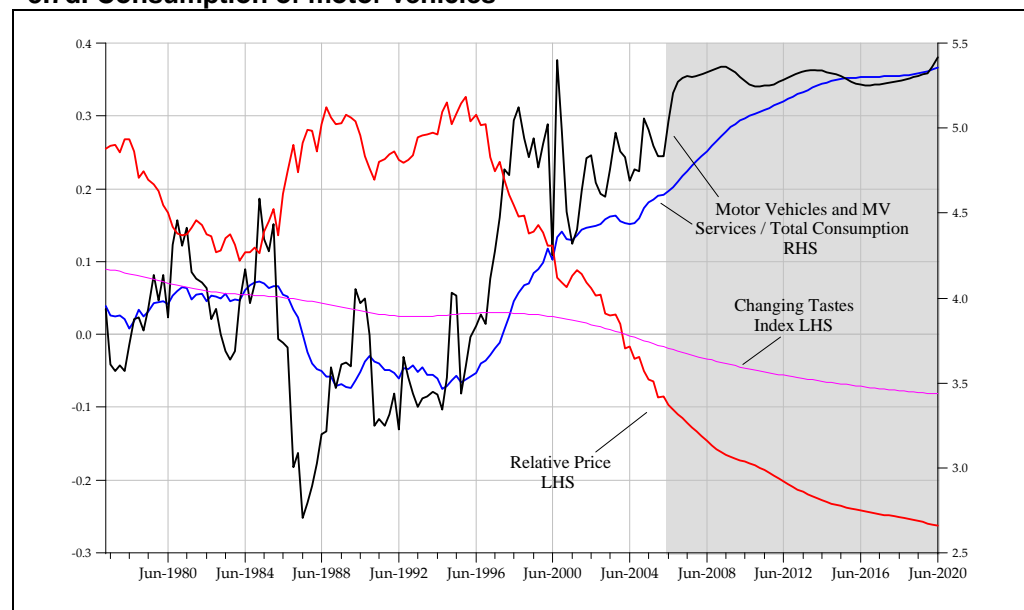
In contrast to the declining share of clothing and footwear, the share of durable goods has been rising rapidly over the last five years. The rise has been driven by falling relative prices and a continuous series of innovations (CDs, mobile phones, DVDs, plasma screens) which are boosting consumption.⁴⁷ Durables are also one of the most discretionary components of consumption as exemplified by the bring-forwards of

⁴⁷ A similar surge in consumption occurred in the mid 1970s with the introduction of colour TV.

consumption prior to the introduction of the GST in July 2000. It is the component of consumption most sensitive to income growth, interest rates and wealth.⁴⁸

Since 2000 expenditure on durables has increased by 50 per cent compared to total growth in consumption of 24 per cent. Much of this increase in demand has spilled over into imports as many of the items in demand are not manufactured within Australia. But the growth has been a positive for some domestic manufacturers, and has also given a boost to the distributional service industries (transport, storage, wholesale and retail trade). With relative prices projected to continue to decline, and with continued income growth, consumption of durables is projected to continue to grow faster than total consumption for the next two to three years. However as the demographic slow-down begins to kick in and the general pace of economic growth slows, durables expenditure will slow significantly.

3.7d. Consumption of motor vehicles

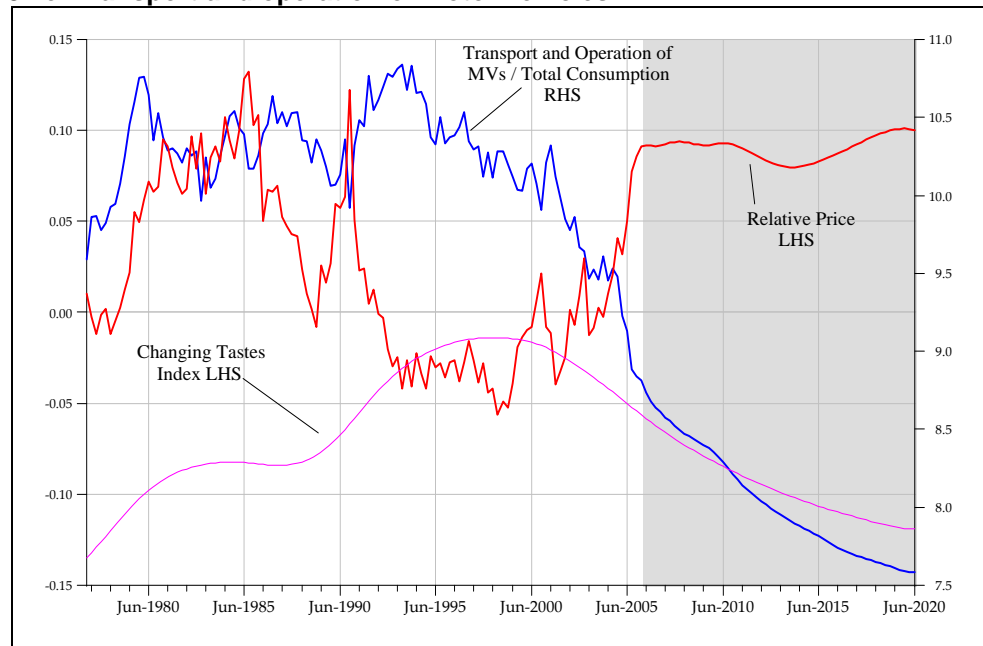


Motor vehicle prices (quality adjusted) have fallen by almost 40 per cent in real terms over the last ten years. This fall has driven an increase in

⁴⁸ The component is consequently modelled as an investment decision, with expenditure on durables adding to the stock of durables, which in turn provide a flow of (rental) services to the consumer. It is the estimated service flow (the second line in the chart) which enters into the consumption demand system and which households substitute towards as prices fall. With higher income and consumption growth, the desired growth of services increases, leading to an acceleration in durables expenditure.

consumption of motor vehicles, which as with durables, has also been boosted by rising income and wealth and lower interest rates. After being relatively stable for twenty years in per capita terms, consumption of motor vehicles per head has risen by 72 per cent over the last ten years. However, even though prices are projected to continue to fall, there are signs that new saturation points are beginning to be reached. Growth is projected to continue for another year or so, but after that motor vehicle expenditure will slow with the general slowing in consumption growth. As with durables, much of the increased expenditure in recent years has been met by imports (with import penetration rising from 50 to 70 per cent over the last 6 years). With consumption growth slowing from around 2008 onwards, domestic car manufacturers will be faced with a falling share of a slowing market.

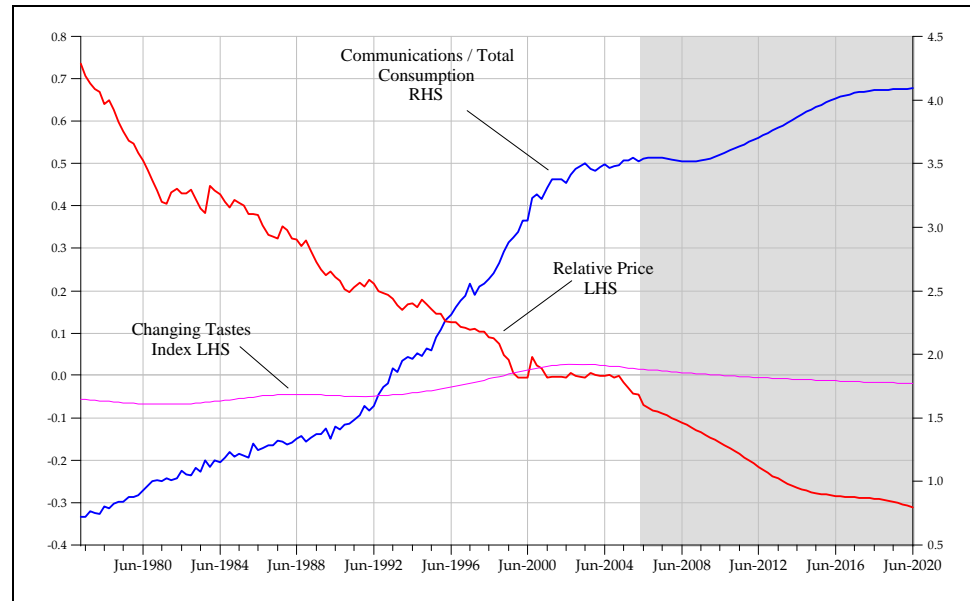
3.7e. Transport and operation of motor vehicles



Higher vehicle purchases contrasts with transport and operation of motor vehicles where the share has fallen by almost 15 per cent over the last five years. This has largely been partly driven by oil related price increases. It leads to the rather paradoxical outcome that households have more and newer cars but appear to be driving them fewer miles. Part of the puzzle is explained by the fact that the operation of motor vehicles includes the repair and servicing of cars. With more expenditure on new cars the average age of the vehicle fleet has fallen, and with that so have repair

costs.⁴⁹ It seems likely that engineering standards have improved and the servicing costs of the new generation of cars will continue to decline (with implications for the motor vehicle service industry). With oil prices remaining high this component of consumption is projected to continue to decline.

3.7f. Communication services

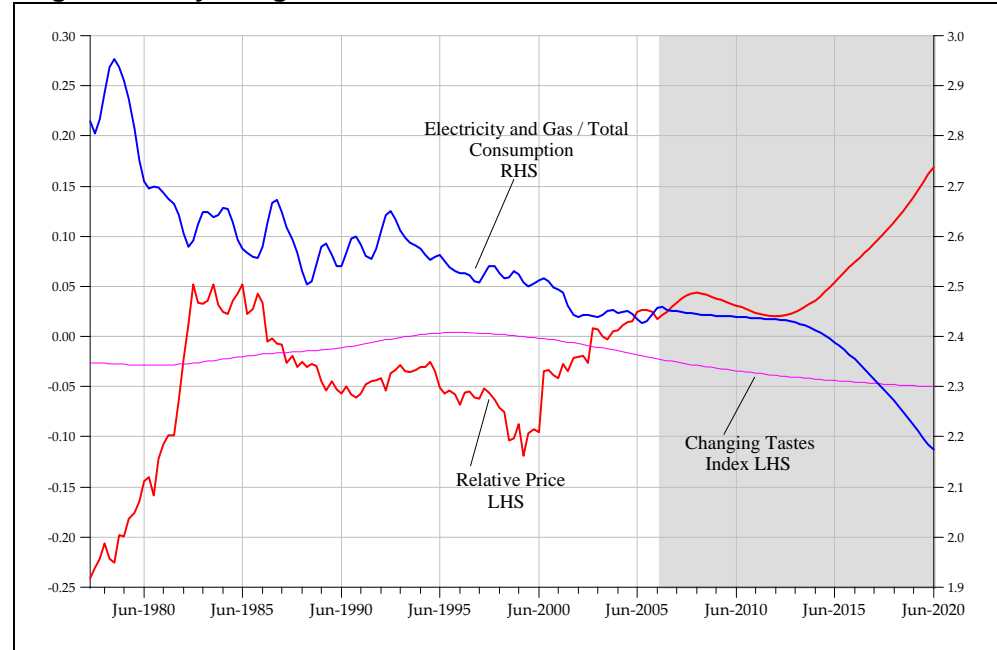


Consumption of communication services has tripled as a share of total consumption over the last twenty years. This has partly been driven by substitution towards these services as prices have fallen (relative prices have fallen by forty per cent over the same period) and partly by changing preferences due to innovations such as mobile phones, pay television and the internet. (The model estimates indicate that roughly one third of the change in share has been driven by changing preferences and two thirds has been driven by relative prices.) However, the “changing tastes index” indicates that this latter effect may be tapering off as mobile phones and internet connections reach saturation points. However, prices are projected to continue to decline which in turn will support further growth. Interestingly, households consume most of their communication services indirectly as intermediate inputs into other products. (Only around a quarter of the output of the communications sector is consumed directly by households.) Hence while the slowing in growth in this component will have some implications for output and employment in the communications

⁴⁹ The ‘changing taste’ index is probably a misnomer in this context, as the change is being driven by reduced need rather than a change in preference.

industry, the overall outlook will largely be determined by the growth of communications between business.

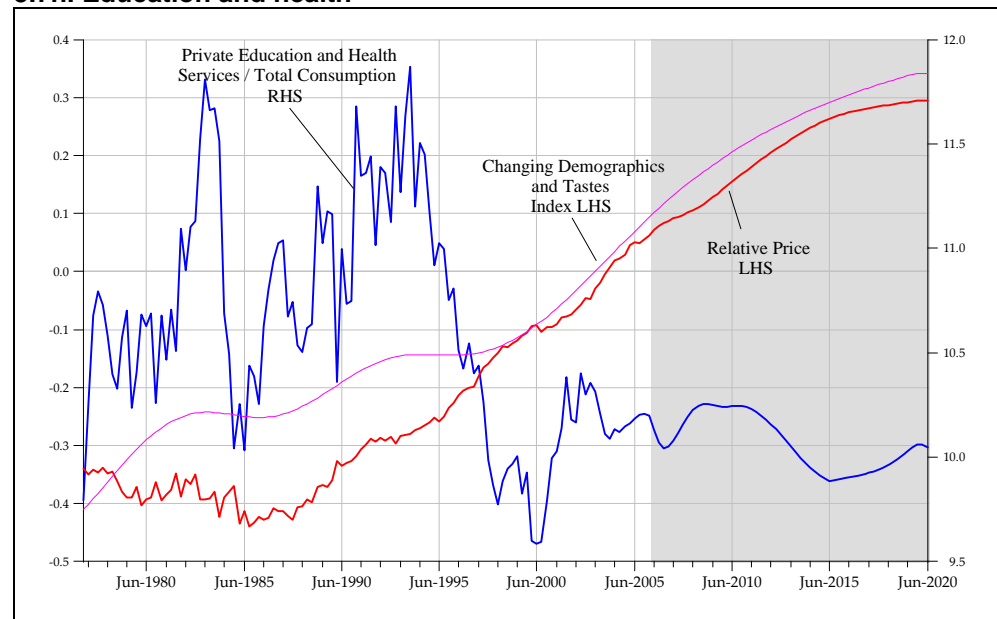
3.7g. Electricity and gas



Unlike food, the share of electricity in total consumption does not seem to fall as incomes rise. With higher incomes people buy larger houses requiring more lighting, heating and cooling, and use more appliances. Relative prices jumped by 6 per cent with the introduction of the GST in July 2000 and have risen by a further 6 per cent since. This has driven a small decline in the consumption share, but overall consumption appears to be relatively invariant to movements in prices (which in turn are largely driven by coal prices, capital costs and productivity growth in the electricity generation industry). The “changing tastes” indicator suggests that there has been a trend reduction in electricity consumption unrelated to price over the last five years. This is projected to continue into the future. Increased carbon prices, and an increased focus on energy conservation are likely to drive further reductions in consumption in future (on top of the general slowing in consumption growth). Unlike communications more than two thirds of household electricity and gas consumption is directly consumed. Hence the slow-down in household consumption growth will have significant implications for the industry.⁵⁰

⁵⁰ Consumption of water and sewerage services is counted as part of rental consumption in the quarterly national accounts. Unlike electricity consumption, consumption of water and sewerage has not grown with income, and in fact per capita consumption has fallen by more than 10 per cent over the last seven years

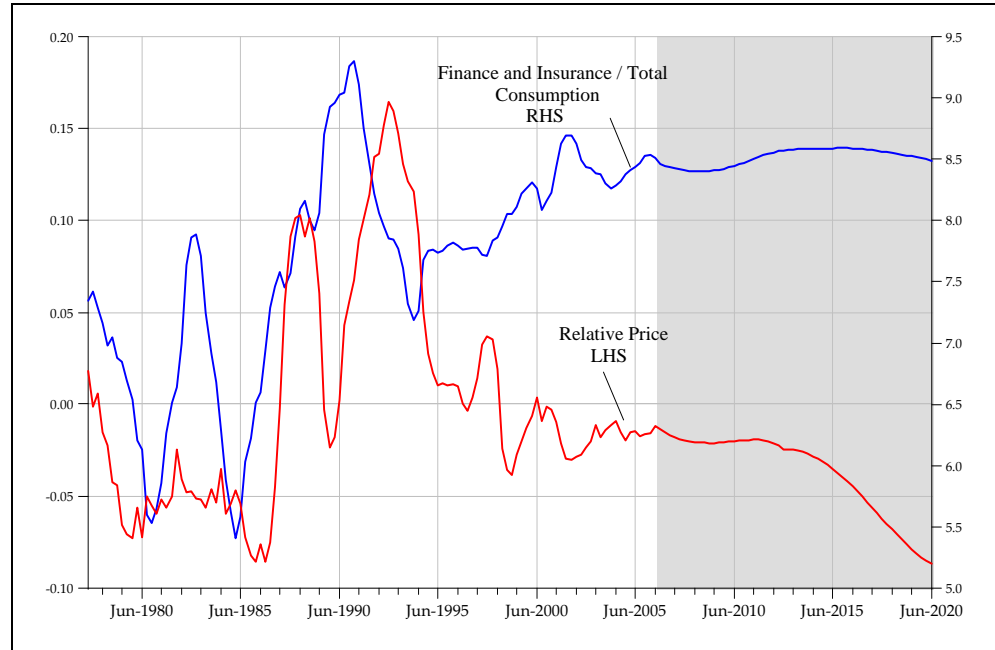
3.7h. Education and health



The bulk of education and health services are provided by the public sector and counted as public consumption. Household consumption of education and health are heavily dependent on government funding decisions. For example, the introduction of the Government's private health insurance rebate in 1999 led to a jump in private insurance and hence household consumption of health services. The share of household expenditure on education services in current prices terms has more than doubled since the early eighties (driven by the introduction of HECS and rising enrolments in private schools). However rising relative prices (education output is measured on a labour input basis in the national accounts) has meant that the constant price share has been unchanged. Looked at from another angle per capita household expenditure has almost doubled over the same period. But household expenditure is only part of the story. Given the impact that government funding decisions have on the split between household and government consumption, it is better to look at health and education trends combining public and household expenditure (see charts 2.17 and 5.11 and related discussion).

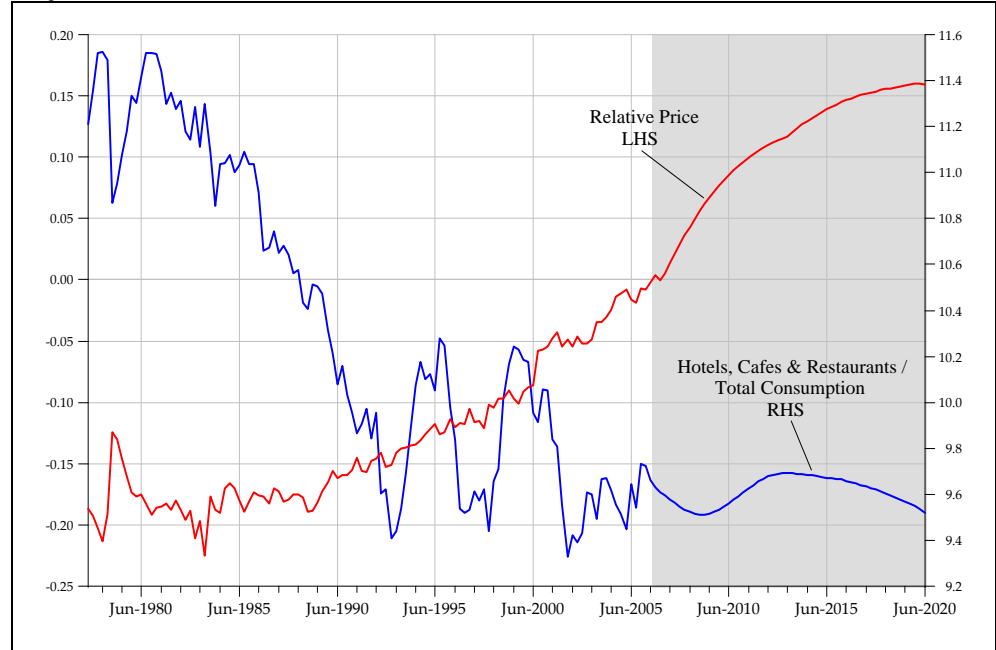
with the impact of falling storage levels and the introduction of tighter water restrictions.

3.7i. Finance and insurance services

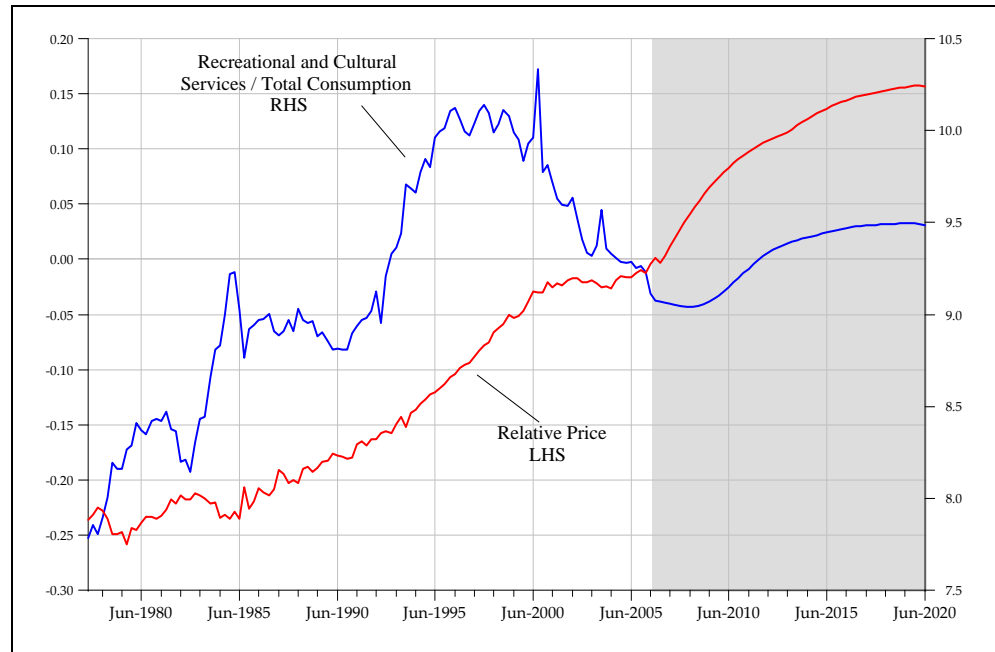


Household consumption of financial services is that component of financial service charges imputed to households depending on such things as bank interest margins on borrowing, and management fees on funds invested. Relative prices for financial services have fallen by 40 per cent since 1993-94, following from increased productivity growth in the financial services industry, and reduced margins due to increased competition in the mortgage market. Combined with higher levels of household wealth and an associated increase in borrowing, the share of financial services in total consumption has increased. Relative prices and consumption shares for insurance have been reasonably stable in comparison. With household wealth stabilising and household borrowing set to slow, the consumption share for finance and insurance is projected to be relatively stable, and hence demand for the industries output is likely to slow (compared to recent history). Roughly half the output of the industry is consumed directly by the household sector.

3.7j. Hotels, Cafes and Restaurants



Consumption of services from hotels cafes and restaurants has declined over time as a share of total consumption, partly driven by rising prices (in turn due to the inherent lack of productivity growth in the sector). Relative prices have risen by 17 per cent over the last ten years, with a jump of 4 per cent with the introduction of the GST. Household consumption on this component is relatively discretionary and tends to be more cyclical than other service components. (With consumption of alcohol increasing over the last five years it seems that more people are drinking at home.) Relative prices are projected to continue to increase over the next ten years, but despite this the consumption share is projected to be relatively stable.

3.7k. Recreational and cultural services

Recreational and cultural services consist of such things as sporting and cultural events, cinema tickets, and broadcasting services (e.g. the content component of pay TV services). The jump in consumption at the time of the Sydney Olympics is clearly visible. As with hotels, restaurants and cafes, productivity growth in this sector is inherently low leading to rising relative prices over time. Despite this, consumption of these services has tended to rise as a share of total consumption over time, indicating a strong shift in preference towards these services as incomes rise. However since 2000 the share has declined possibly due partly to increasing expenditure on home entertainment and the internet mentioned earlier, and possibly partly due to demographic effects (the aging of the baby boomers). Relative prices are projected to continue to rise and following some further falls the share in total consumption is projected to resume its upward trend.

Summary – Household consumption

The most notable development within household consumption is the boom in expenditure on consumer durables and motor vehicle keying off high levels of wealth, growing real incomes, low interest rates and falling prices for these goods. This is as would be expected given the driving factors mentioned in the previous chapter. Some of the increased expenditure on these goods will be flowing to domestic manufacturers, but the vast bulk is spilling over into imports (as discussed below). For most other components it is a case of a continuation of trends, with for example increased expenditure on communications as prices fall, and declining portions spent

on food, alcohol and cigarettes. Oil and commodity price impacts can be seen in operation of motor vehicles, electricity consumption and food. Other components, such as education and health appear relatively invariant to price. Current price expenditure on these services is increasing, but according to the ABS quantity measures the actual proportion of total consumption is relatively unchanged, something that is also reflected in the production measures discussed below.⁵¹

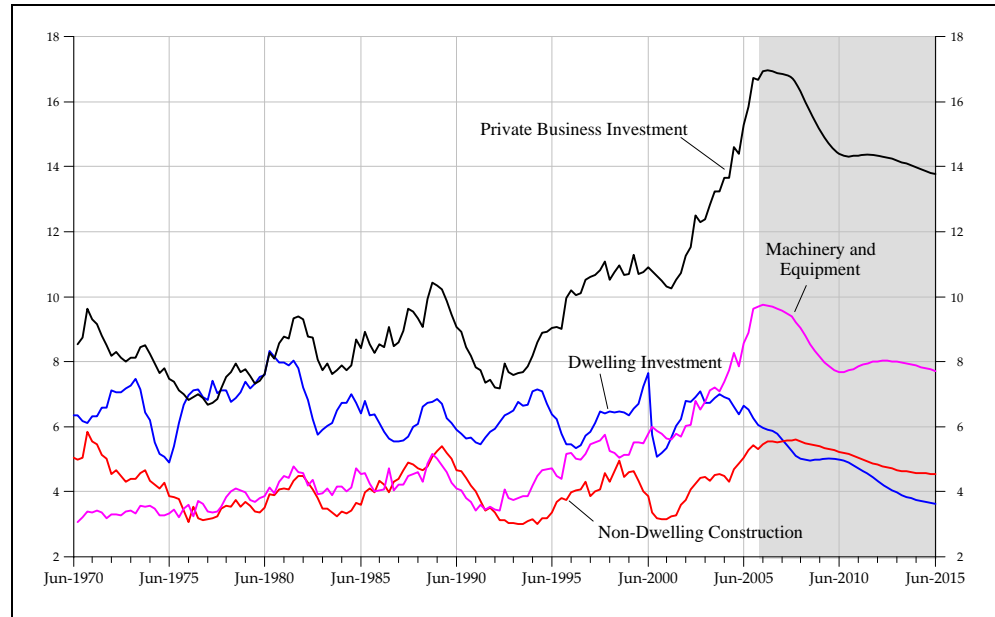
Private investment

Private investment is at record levels currently accounting for more than 21 per cent of GDP (see chart 3.8). Strong underlying growth in business investment has been driven by high profitability and falling prices of software and imported machinery and equipment (particularly computers). Mining investment began to surge in early 2005, adding to the general upward trend across industries. It is now near its peak and is projected to ease back as commodity prices fall over 2007 and 2008. There are long lead times in mining projects and increased supply from this investment surge is expected to come on line over the next four to five years boosting mining exports. Even with a return to more normal levels of mining investment, business investment in total will be much higher.⁵²

⁵¹ Another example of the Baumol Bowen effect at work. The ABS measures the output of the education sector on a labour input basis.

⁵² This partly reflects higher levels of depreciation particularly of computer equipment (greater investment is required to maintain the same growth in the capital stock due to shorter asset lives) and the impacts of lower interest rates and lower capital good prices (which are encouraging higher investment). The increase in investment shares has been much smaller in current price terms.

3.8 Components of private investment

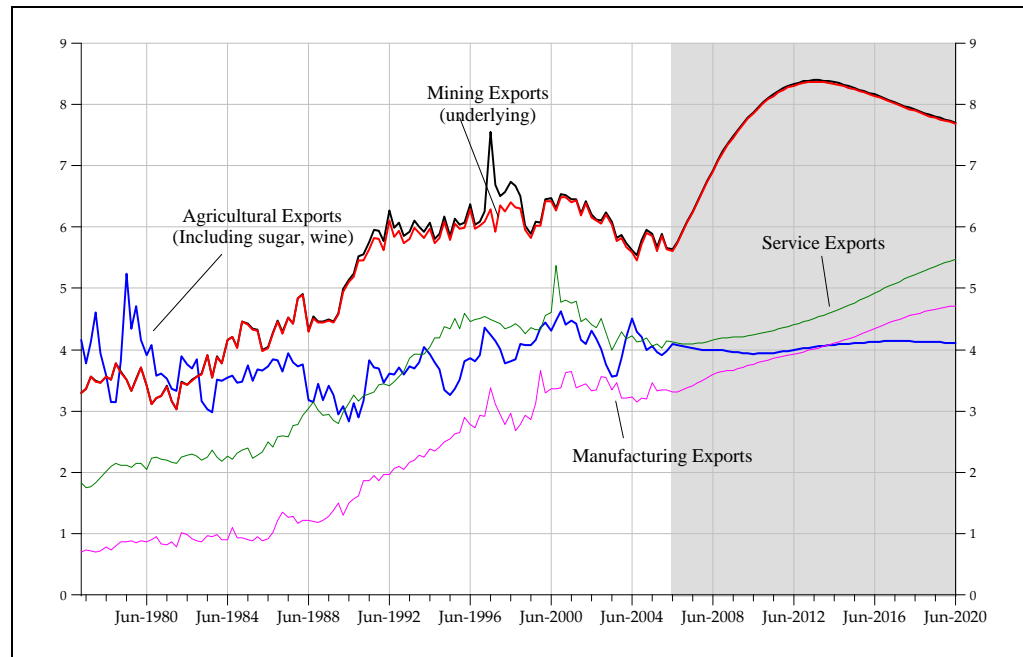


Data source: ABS Cat No 5206.0 and CIE AUSM model

Non-dwelling construction (which includes engineering construction) has surged with the surge in mining investment. More than two thirds of mining investment is in building and construction (roads, railways, ports etc.). Moreover, as employment gradually recovers in finance and insurance, and continues to surge in business services, the demand for office space is growing. This is leading to falling office vacancy rates and an increase in office building. This and other components of non-dwelling construction (e.g. hotels, shops) help to sustain construction as mining investment comes off after its peak in 2006-07. Dwelling construction however continues to decline over the projection period, falling to almost half its 2005-06 level as a per cent of GDP by 2015.

Exports

Manufacturing and service exports depend largely on external competitiveness (the price of exports relative to competitor countries on the world market) and changing income levels and demand in our trading partners. In contrast, mining and agricultural exports depend largely on internal competitiveness (the world export price in local dollars relative to local production costs) and are less dependent on trading partner growth. Large changes are occurring within categories – for example, in mining the growth of iron ore and metallurgical coal, driven by demand for steel (in turn due to booming construction and industrial production). Manufacturing exports are boosted by basic metal products, but also by a surge in machinery and equipment exports (see Chapter 4 below).

3.9 Exports as a percentage of GDP ^a

a. At constant prices. Underlying mining exports abstract from RBA gold sales.
Data source: ABS Cat No 5302.0, 5206.0 and CIE AUSM projections

External competitiveness for manufacturing and service exports was adversely affected by the rise in the real exchange rate in 2002 and 2003. Within services this impact was particularly felt in tourism.⁵³ The export of education services in contrast continued to increase. However, the real exchange rate has been relatively stable since late 2003 and much of the trade-related adjustment to the higher rate has already occurred. With strong income growth in Australia's trading partners set to continue, both manufacturing and service exports should begin to recover their previous upward trend (see chart 3.9 above). In total exports are projected to increase to more than 20 per cent of GDP by 2010.

Supply: productivity and relative output prices

Relative prices between industries and imports are the second element driving changes in industry shares. Media focus tends to be on substitution between individual industries (particularly manufacturing) and imports. But differences in productivity trends between industries probably have more important effects over time. Somewhat counter-intuitively this occurs because there is limited substitutability between industry inputs on the production side. For example, it is difficult to substitute manufacturing for

⁵³ Tourism has also been affected by concerns about security following the September 11 and Bali attacks and the outbreak of SARS and avian flu.

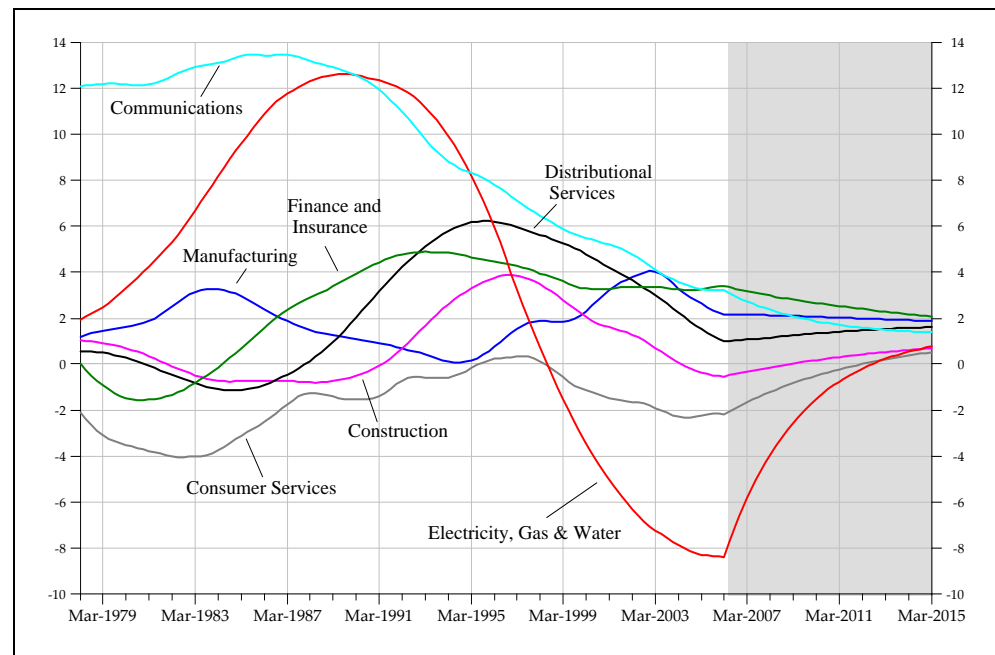
finance or transport in the production of an individual good. This means that if productivity is higher in one industry then the cost of that component of the final good will fall and less will be spent on it over time – something which is known as Baumol’s cost disease, or the Baumol-Bowen effect (see Appendix A). On the other hand, competition with imports tends to be between similar products where substitution elasticities are higher, and hence in this case lower prices tend to preserve or increase industry shares. Hence, even here there are no simple stories to tell.⁵⁴

Relative prices are mainly determined by relative productivity trends, but there are also important effects from other factors, such as relative wages, taxation treatment, and relative capital intensities. For example shortages of tradesmen have driven up wages in construction relative to other industries over the last four years raising construction output prices. At the same time as discussed earlier falling computer and capital equipment prices have favoured industries such as finance and insurance that use these goods intensively, allowing them to lower prices for a given amount of capital input.

Productivity in turn has a large number of determinants, including technological change (for example computerisation of routine clerical functions), organisational change (for example, changed work practices arising from reform of public utilities and the introduction of enterprise bargaining), capital deepening (due to falling interest rates) and increased skill and knowledge of the workforce (due to increased education and occupational change). There are also a number of difficulties involved in measuring productivity. For example an increase in real wages will lead to substitution away from labour and consequently lead to an increase in measured labour productivity. Productivity also varies across the business cycle and effects can be lagged.

The underlying productivity trends shown in chart 3.10 abstract from both substitution and cyclical effects. (Attachment C provides details on the construction of the series and trends in the underlying capital and labour components).

⁵⁴ That is the impact of higher productivity on prices, on substitution and industry shares depends on what other elements of supply the industry is competing with. Falling prices can help to preserve an industry’s share if it is competing with imports, or may lead to a reduced share over time if it leads to a reduction in the industry’s share of value added in a final product as in Baumol’s cost disease.

3.10 Productivity trends across industries ^a

a. Annual change in underlying multi-factor productivity
Data source: CIE AUSM model database and projections ⁵⁵

As discussed in Chapter 2 underlying productivity growth has fallen across most industries over the last five years, (the exception being manufacturing which has risen).⁵⁶ The largest changes have been in communications, which has shown a steady decline since the early 1990s, and electricity gas and water, which has declined following the one off boost provided by corporatisation and other reforms in the 1980s and early 1990s.⁵⁷ Both finance and insurance and distributional services have been boosted by the introduction of information technology, but in both case returns from this change appear to be declining. Construction productivity growth was boosted by the introduction of enterprise bargaining in the late 1980s early 1990s but has since declined. Productivity growth in consumer services is

⁵⁵ The projections for productivity growth depend on the extrapolation of underlying capital and labour productivity trends for each industry. In the case of electricity gas and water special allowance is made for the impact of current low dam storage levels and consequent water restrictions which are impacting on the output of the water industry.

⁵⁶ The declines are particularly surprising given the contribution of changing occupational shares to labour quality, (of around $\frac{1}{2}$ a per cent per year over the last five years compared to little contribution during the 1990s).

⁵⁷ The absolute decline in measured productivity levels in EGW in recent years is partly due to declining output and hence productivity from the water utilities due to declining storage levels in many dams and the introduction of water restrictions. Consequently the underlying productivity measure probably exaggerates the true decline in productivity in this industry.

inherently low.⁵⁸ Manufacturing productivity has increased in the last five years partly due to structural change within the industry, with for example the decline of clothing and footwear, and an almost 1 per cent per year contribution from occupational change (see Chapter 5 below).

Combined demand and supply effects on industry shares

Given the outlook for the pattern of demand (consumption investment and exports) outlined above, and the productivity trends by industry which in turn determine relative price trends, it is now possible to explain developments in industry shares. Projections by industry are shown in the charts below as shares of constant price GDP. The shares are, in turn, explained by three factors:

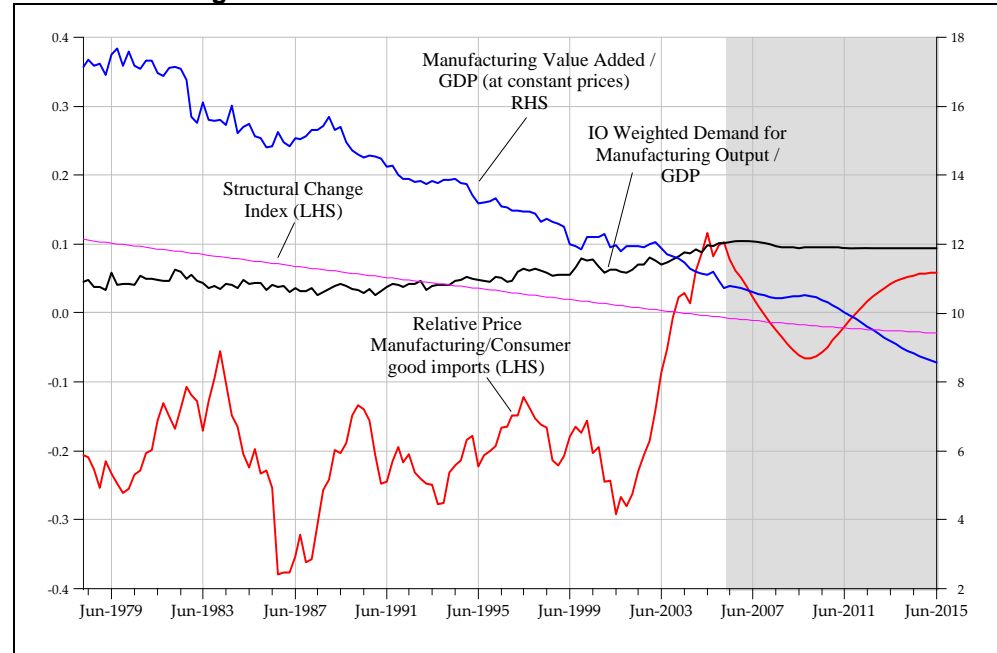
- (a) the input output weighted demand term derived from the demand components described above;
- (b) the price of the industries output relative to those of other industries and imports (i.e. supply element); and
- (c) a structural shift term (shown as a structural change index) which is treated as a latent variable (essentially derived as a residual). Structural shift is meant in a narrow sense here as that part of structural change at the industry level that is not due to changing demand patterns or changing relative prices. For example this could be due to technical change favouring one source of supply over another (e.g. polyesters replacing wool in the production of textile and clothing products leading to a decline in agriculture's share of the final product and an increase in that of manufacturing). Alternatively it could be due to compositional demand changes within categories (i.e. demand changes that are not picked up because the demand classifications are not fine enough, e.g. increasing demand for plasma screens and other products not produced locally). Changing shares over time might also reflect changing firm structures and consequent outsourcing across industry boundaries.⁵⁹ They may also reflect changing preferences for different aspects of the final product as incomes rise, e.g. the service and design component of manufactured goods leading to greater shares of services in the final product over time.

⁵⁸ The negative values shown are due to declining capital productivity, possibly suggesting problems in quality adjustment in measuring output in the sector.

⁵⁹ This for example could explain part of the rise in business services over time and decline in other industries

3.11 Determinants of industry shares in output

a. Manufacturing^a



a Industry output as a percentage of GDP is shown on the right hand scale as is demand for industry output, while relative prices and the structural shift term are shown on the left hand scale in log terms. (A .01 movement in the structural shift term is equivalent to a 1 percentage points shift in the industries share of non-commodity supply (GDP less mining and agriculture plus imports).)

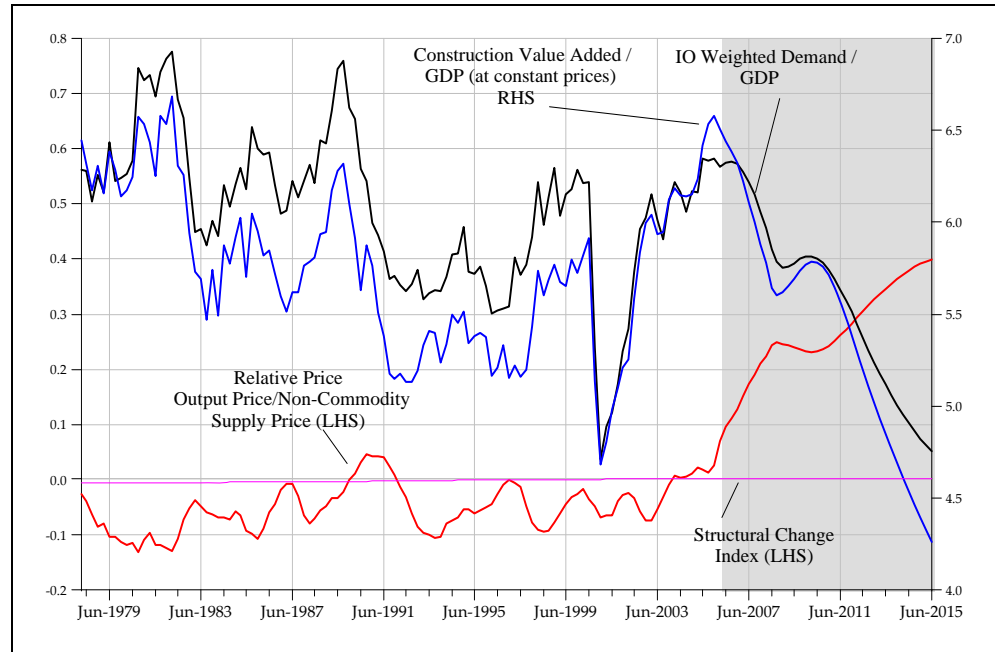
Manufacturing's share of total output has almost halved since the late seventies (falling from over 17 per cent to below 11 per cent). This has been despite increasing demand for manufactured goods as indicated by the input output demand term (in turn being driven by increased consumption of durables and increased investment – discussed earlier). This is partly because manufacturers have lost share to importers with the exchange rate appreciation. (Imported consumer good prices have fallen by almost forty per cent relative to manufacturing output over the last three years.) However the largest part of the decrease in manufactured share over time has not come from import substitution, but rather from the structural shift term. In fact 90 per cent of the decline is explained by this term. That indicates that it is not increased trade per se or falling import prices that are leading to the long-run secular decline in manufacturing's share. Rather it is a range of other things such as: outsourcing and offshoring⁶⁰; the fact that household preferences are shifting towards items not produced in Australia; and an increased preference over time for the design and service components of the final good. There are also large changes occurring

⁶⁰ For example a manufacturer who relocates physical production overseas and preserves management, design and distribution functions in Australia would probably be reclassified as part of either wholesale trade, or business services, depending on the ABS classification of the main remaining domestic activity.

within the manufacturing sector and these are discussed in more detail in Chapters 4 and 5.

Manufacturing's share of non-commodity supply is projected to recover slightly in 2007-08 as most of the effects of the exchange rate appreciation have already worked their way through. However, the recovery is relative to the secular decline, which is projected to continue. (Note this does not mean the activity around manufacturing is necessarily declining but rather the physical production share of the activity is declining).

b. Construction

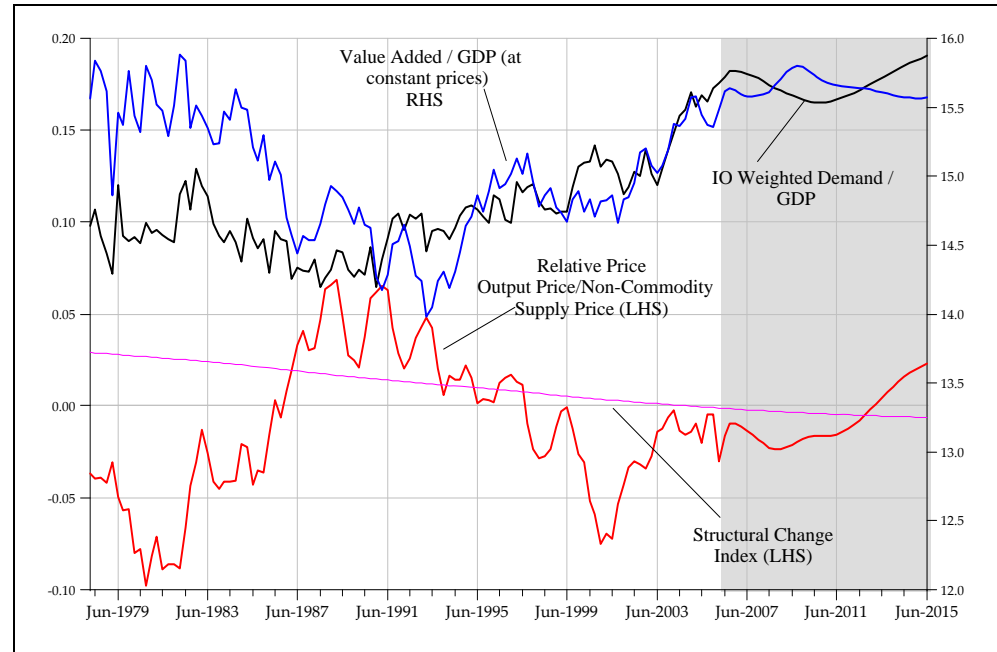


Construction is almost entirely driven by fluctuation in demand as can be seen in chart 3.11b above. The input-output weighted demand term is a close match of actual activity. Hence there is little in the way of an unexplained structural shift occurring for this industry. (Note this does not imply that there is not significant structural change occurring within the industry - only that there has been no overall unexplained structural shifts for the industries output).

Wages in the construction industry have risen over the last two to three years, while underlying productivity growth has slowed. This in turn will feed through to higher relative prices over the next year or two. The main factors driving the movements in the demand for construction output has been the surge in construction activity in the mining industry, which has taken over from dwelling construction which has declined over the last two years (see chart 3.8). The main reason for the decline over the projection

period is the decline in dwelling investment described earlier due to demographic influences (see chart 3.8 and associated discussion).

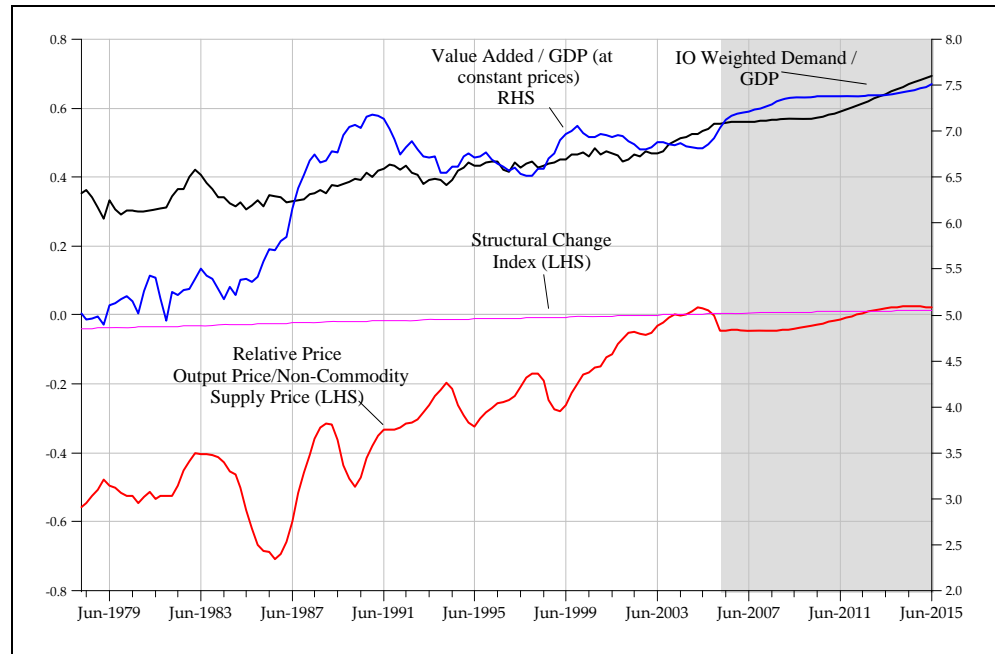
c. Distributional services



Distributional services consists of transport and storage, and wholesale and retail trade. Productivity growth increased rapidly in the 1990s with deregulation of the industry and the impact of information technology on stock management and logistics. Capital productivity in the sector increased by 30 per cent between 1992 and 2002. This period was associated with falling relative prices for these services. However productivity growth has slowed over the last few years reversing some of these price impacts.

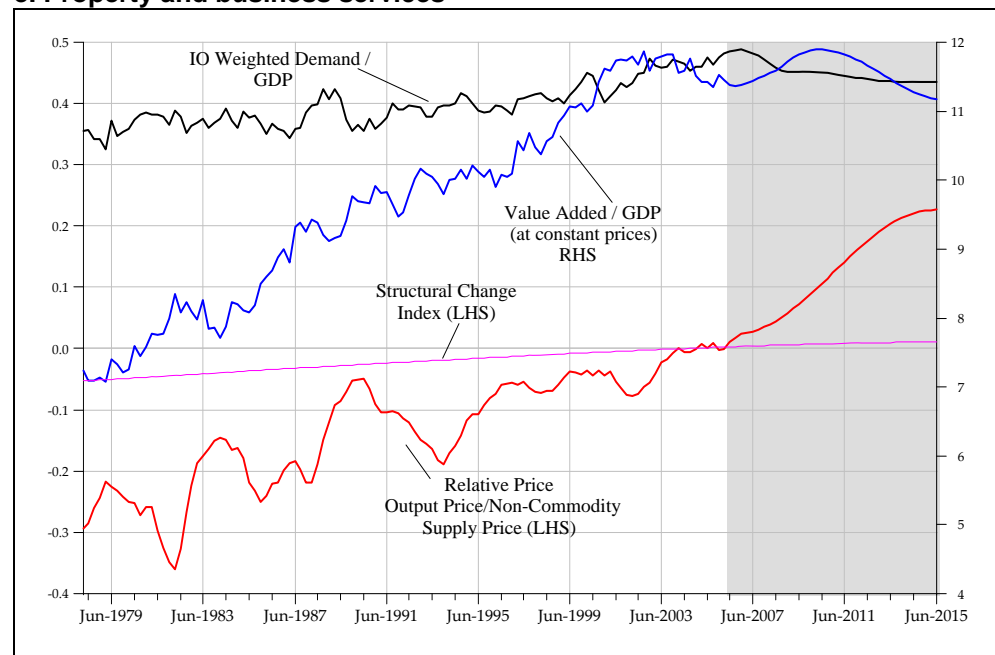
Demand for distributional services has increased over the last ten years with the surge in durables and motor vehicle expenditure, increased investment and increased trade. However the increase in the sectors share has not been as large as it should have been given the rise in demand and the fall in prices – indicating that there has been a small structural shift in production away from these services. (As with manufacturing there can be a number of reasons for this – but obviously the secular decline in manufacturing has not been due to an increasing share of distributional services in value added.) Having increased over the last ten years, the share is likely to stabilise as growth of durables, motor vehicles and machinery and equipment investment (i.e. the good components of demand) will all slow (see earlier discussion).

d. Finance and insurance



Within the model, demand for financial services is mainly driven by the consumption of financial services by households, government and business. However the input-output weighted demand term does not capture well the surge of activity following financial deregulation and the late 1980s boom. It is interesting to note that despite the surge in productivity in the 1990s, the relative prices of financial services output increased. This suggests that a part of the improved productivity was taken as profits. The gross return on capital has increased from around 5 per cent in the late 1980s to thirty per cent today. This in turn suggests that there may still be a lack of competition in the retail banking market. (Households would have had much better returns buying bank shares over the last fifteen years than from putting their money in the bank.) With productivity growth in the industry declining and the large reforms in the distant past, growth in the industry in the projection period is largely driven by the demand term, the main component of which is household consumption of financial services (discussed earlier).

e. Property and business services

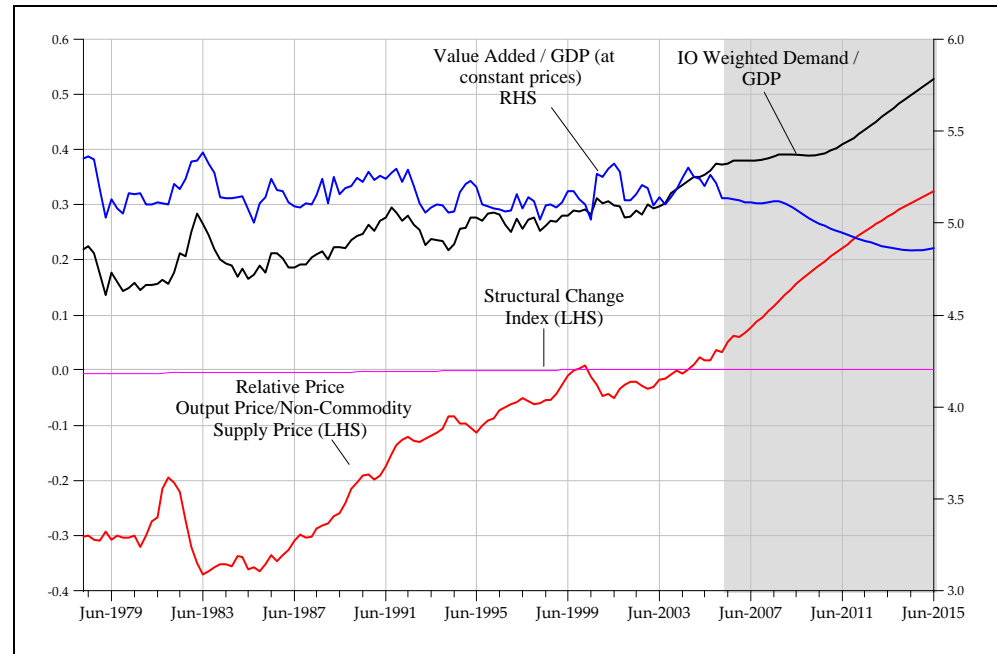


The ABS measures output in property and business services as labour inputs. Measured productivity growth is consequently inherently low (in fact negative on a multi factor basis), and consequently measured output prices have tended to rise over time. Returns in parts of the sector, such as engineering consulting and architectural services tend to be highly cyclical with particularly large price increases during the building boom of the late 1990s. Since the 1993 relative prices have increased by 20 per cent. Despite these price increases the output share has risen relative to the input output weighted demand term, indicating a large structural shift towards this industry in supply. In fact the structural shift term explains all of the trend rise of the share. This in turn is because: (a) the sector has been boosted by outsourcing from other sectors such as manufacturing; (b) design and other services are becoming more valued components of final products as incomes rise (e.g. architectural services); (c) regulatory and taxation compliance costs are rising over time (increasing demand for accounting and legal services); and (d) exports of business services are rapidly rising over time⁶¹ (although this latter would only account for a small part of the rise in the share).

The data indicates that the structural shift has slowed over the last five years. With the input-output weighted demand term also slowing the rate of increase in the share of this sector is projected to slow in coming years.

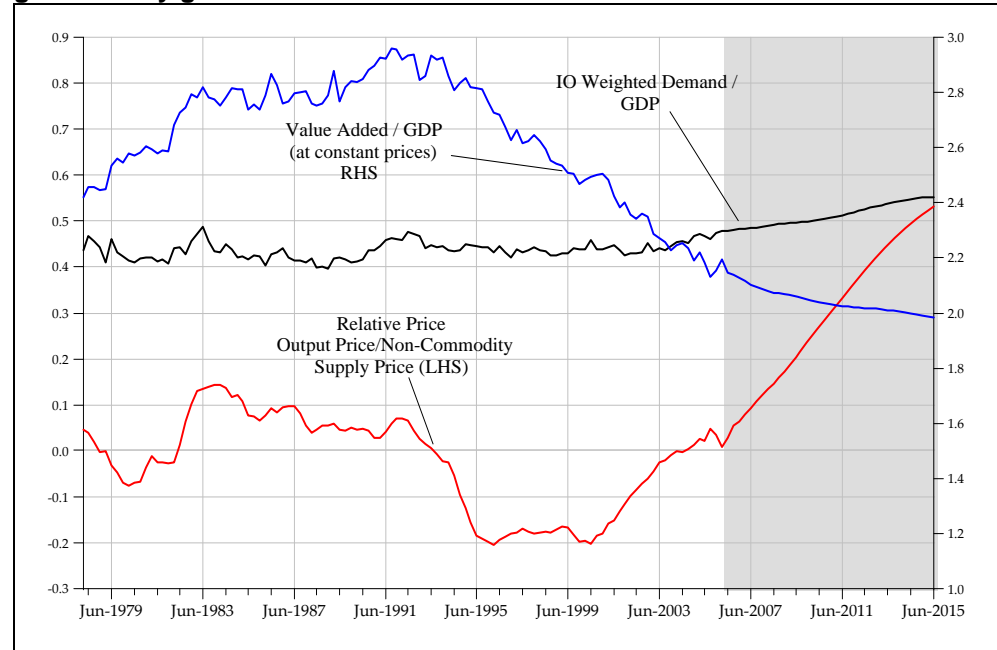
⁶¹ The effect arises because business service exports are a rapidly rising component of total service exports and tradeability has increased. (Only the aggregate enters into the input-output weighted demand term.)

f. Consumer services



The sector consists of accommodation cafes and restaurants, personal services and cultural and recreational services. Of these cultural and recreational services has shown the largest growth over the last five years reflecting the growth in consumption. The fact that the shares for the other sectors have not risen despite a rising share in consumption reflects substitution in production. For example, a greater share of the final product is coming from other categories such as communications, or service imports.

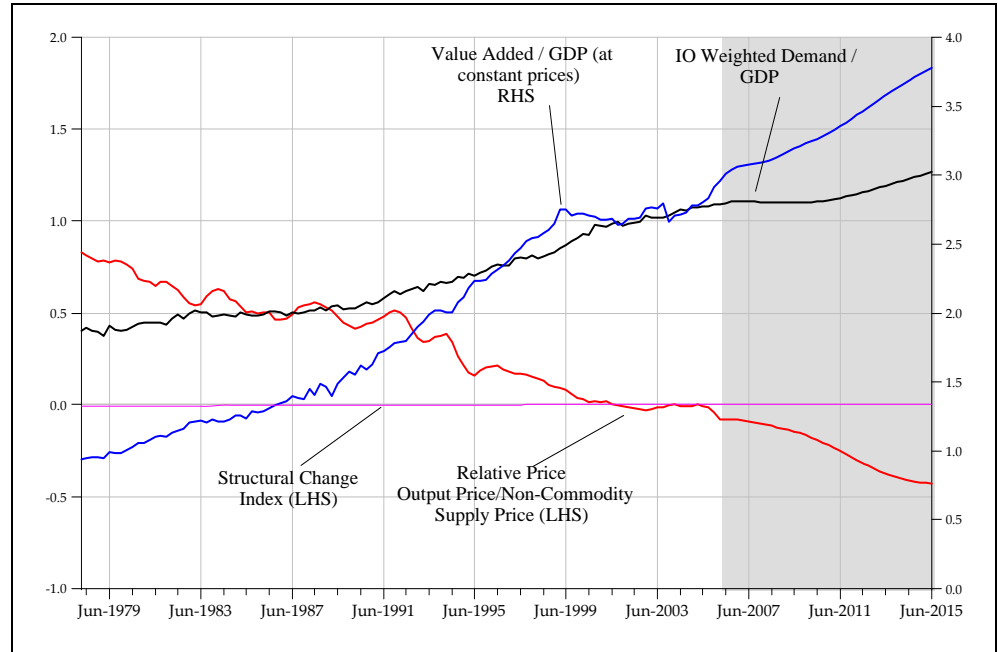
g. Electricity gas and water



Productivity growth in electricity gas and water has slowed over the last five years (see Appendix 3) leading to higher prices. However there is limited price substitution in production. Rather the electricity component of final goods and services is declining because of an increased focus on energy efficiency by business,⁶² and as the importance of other business inputs such as communications, software, accounting, and financial services increase. This decline is projected to continue over the next ten years

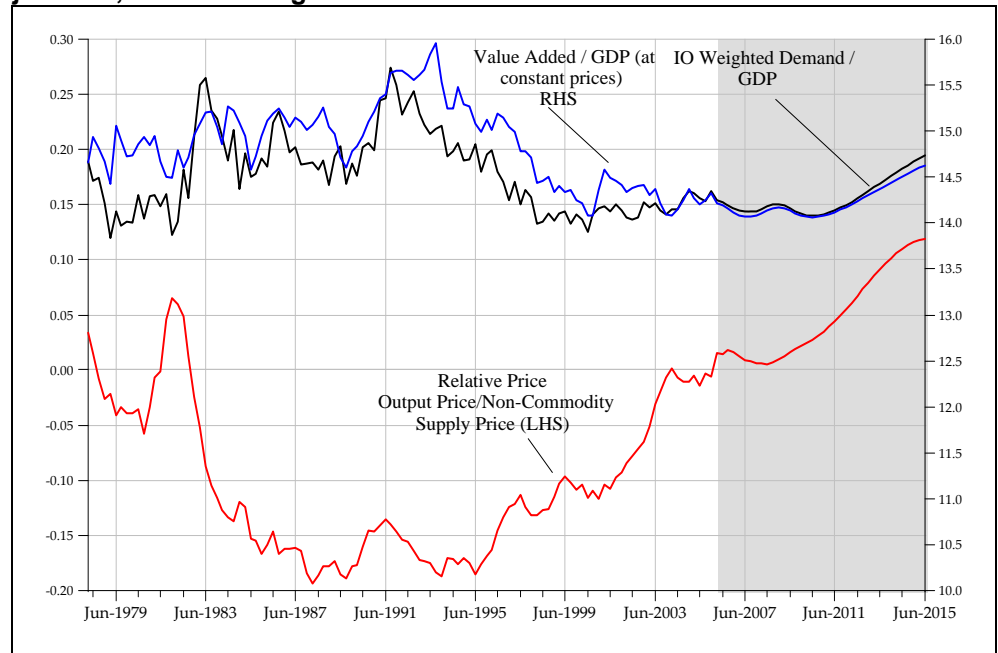
⁶² Any substitution away from electricity (energy efficiency improvements) by the household sector will show up in the input-output demand term. Energy efficiency improvements by business will show up in a declining share of electricity industry in value added (relative to the share it should have indicated by the input-output demand term.)

i. Communications



Productivity growth in communications has also declined (see Appendix 3). But at the same time relative prices continue to decline leading to some substitution within production (e.g. increased B2B communications). However, increased output shares are primarily being driven by the demand side.

j. Health, education & government administration



Health and education are dominated by demand. The output shares largely depend on household and government decisions on the amount of expenditure on health and education services. These in turn depend on demographics, medical technology and the returns to education. There is very little scope for substitution between this component and other industries and imports on the supply side).

Summary

The estimates reveal that movements in some industries such as construction, distributional services, health and education and consumer services, are dominated by demand, whereas in others such as electricity gas and water, demand is fairly steady and output movements are driven by large relative price movements. The impacts of the mining investment boom on downstream industries such as construction and distributional services can be seen with demand for construction services peaking in 2006-07 and declining after that, (by around 2 percentage points of GDP by 2015). The decline in construction post 2007-08 is largely driven by the secular decline in dwelling investment discussed above, offset to some extent in the early part of the period by a pick up in office construction. (The decline in dwelling investment also has some downstream implications for manufacturing, particularly building material suppliers).

Movements in manufacturing output are dominated not by the weighted demand term, but by the declining structural trend and responses to the large swings in relative prices (in turn due to fluctuations in the exchange rate). The structural trend, rather than import substitution, accounts for the bulk of the decline in manufacturing's share over time (around 6 percentage points of the 7 percentage point decline as a percentage of GDP since 1987). This structural terms seems likely to be picking up impacts from outsourcing of previously insourced services across industry lines to some extent, some reclassification of manufacturing firms to the wholesale sector as physical production is relocated overseas, and an increasing share of design and other services in the final value of goods as incomes rise. As can be seen the most recent fall in the share is mainly due to the relative price term and is occurring despite a pick up in the demand term. However the relative price effects are waning and manufacturing's share of non-commodity supply will actually increase slightly over the period to 2008-09 (partly due to recovering growth in manufacturing exports discussed above).

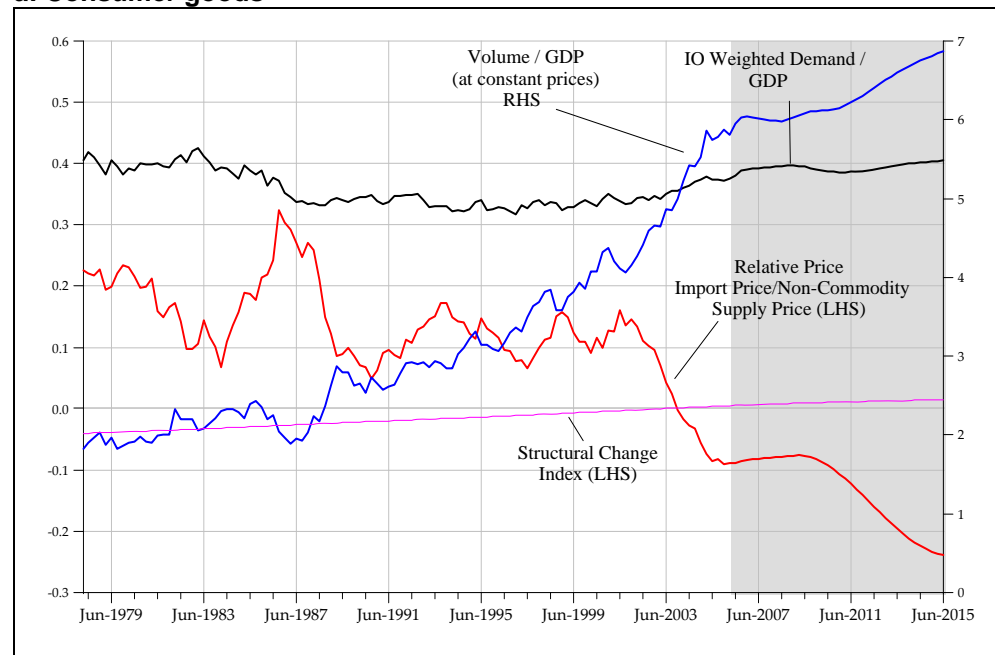
Imports as a component of supply

A look at imports is required to complete the picture drawn of industry developments above. With a high exchange rate, falling relative prices and expanding domestic demand, imports have been playing an increasing role in supply. As most imports are final goods and services they are classified by broad economic category rather than by industry by the ABS. In the CIE AUSM model these categories enter into the same system that determines industry output. The charts below show the recent developments and projections for consumption goods, capital goods, intermediate goods and service imports. Substitution towards or away from these items is the converse of the substitution towards or away from the industry outputs above.

3.12 Imports by category

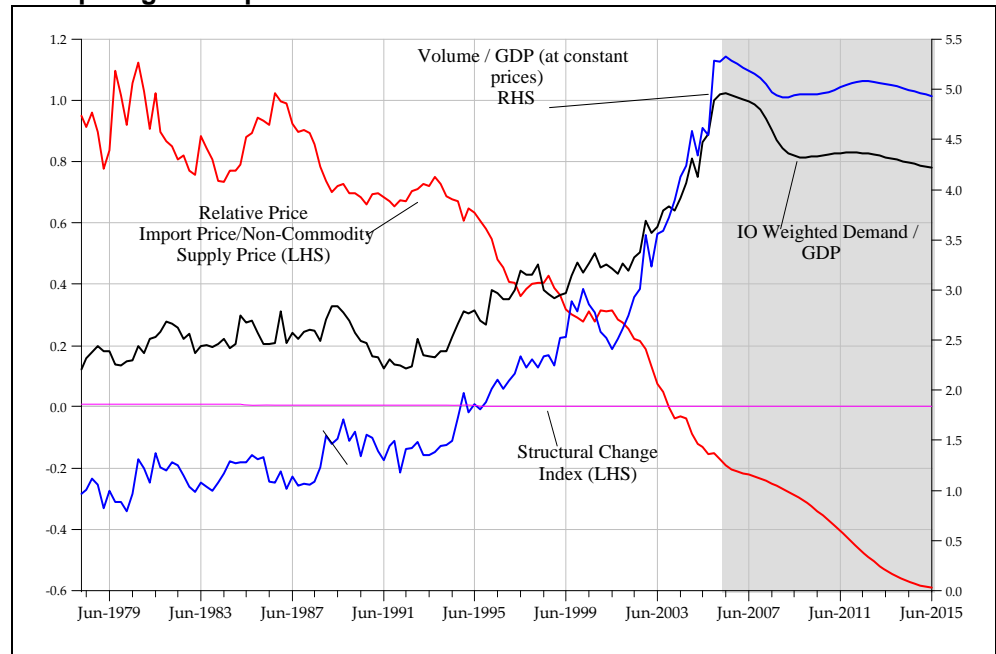
a: Consumer goods

With a rising exchange rate, and falling manufacturing prices world wide, the price of consumer imports fell rapidly between 2002 and 2005. At the same time demand has increased (with increased durable and motor vehicle consumption). In combination this has lead to a rough doubling in their share over the last ten years.



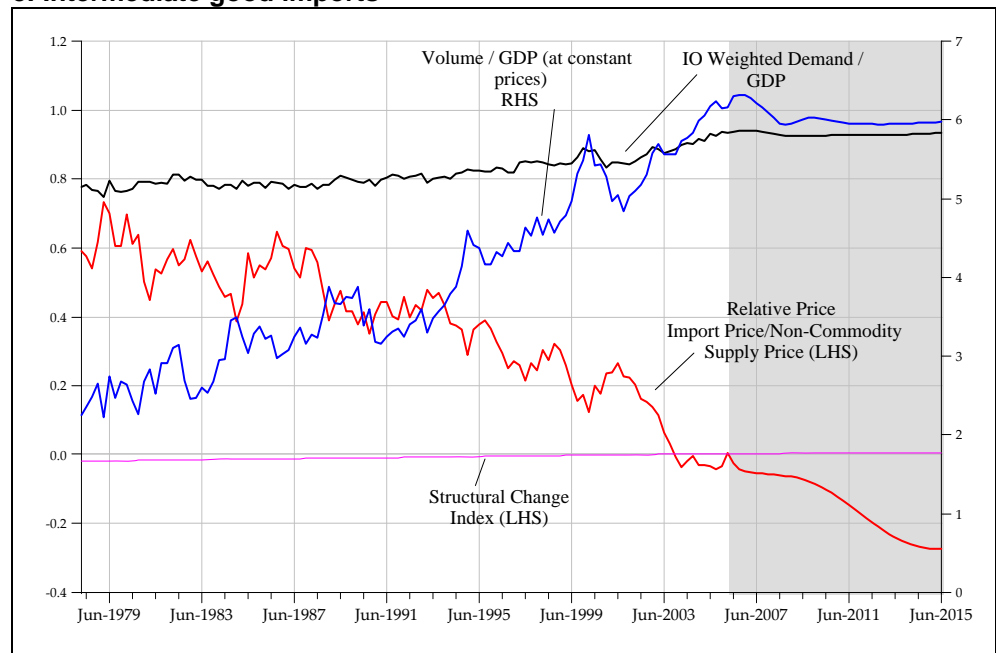
b: Capital good imports

Capital good imports largely depend on business investment in machinery and equipment (which drives the IO weighted demand term). Business investment is at record levels. In addition falling import prices are leading to a substitution away from domestic suppliers towards imports. Consequently, capital good imports have trebled as a percentage of GDP over the last fifteen years.



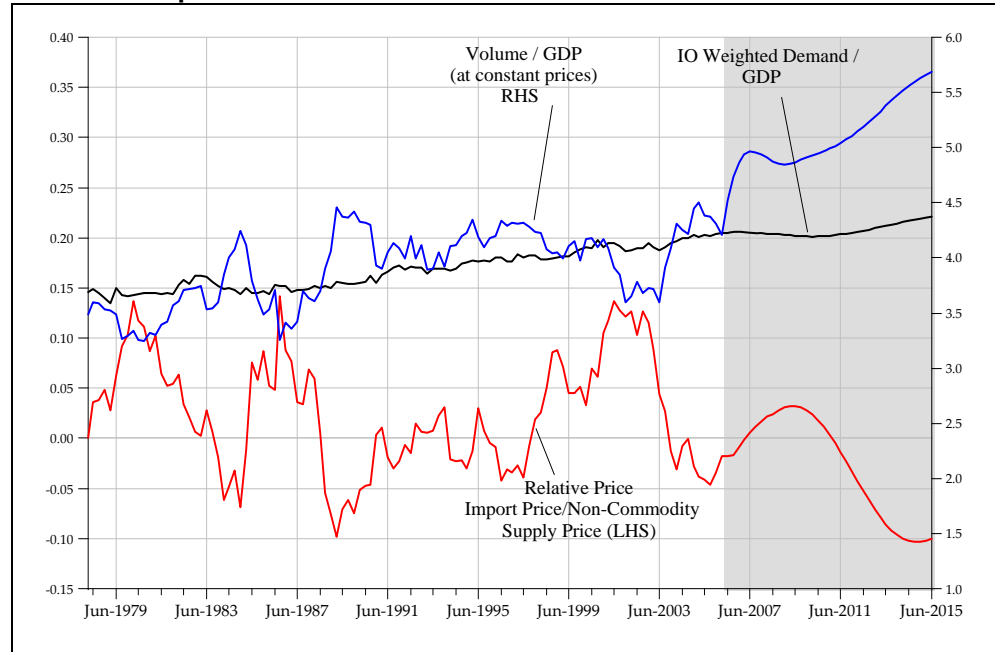
c: Intermediate good imports

Intermediate imports include parts for IT equipment, and hence have a significant downward price trend. With the appreciation of the real exchange rate, relative prices have fallen by around 30 per cent over the last five years leading to marked move away from domestic suppliers towards imports. With the real exchange rate stabilising this adjustment is largely over.



Service imports⁶³ are dominated by transportation (largely freight) and travel services (largely tourism). Freight depends on the physical volume of imports, which has risen as discussed above. Out-bound tourism depends on growth in household incomes and the exchange rate. With a high exchange rate outbound tourism has increased.

d: Service imports



In summary, increased supply of consumer, capital and intermediate good imports have contributed to lower inflationary pressures and improved business competitiveness, and made a major contribution to meeting the demand generated by booming consumer and investment demand over recent years. However, this period of strong import growth is likely to come to an end with the exchange rate and relative price effects already having worked their way through the system, with slower consumption growth, and with the investment phase of the mining boom winding down. This in turn means less substitution away from manufacturing. It also contributes to the slowdown in distributional services.

Implications for the occupational structure

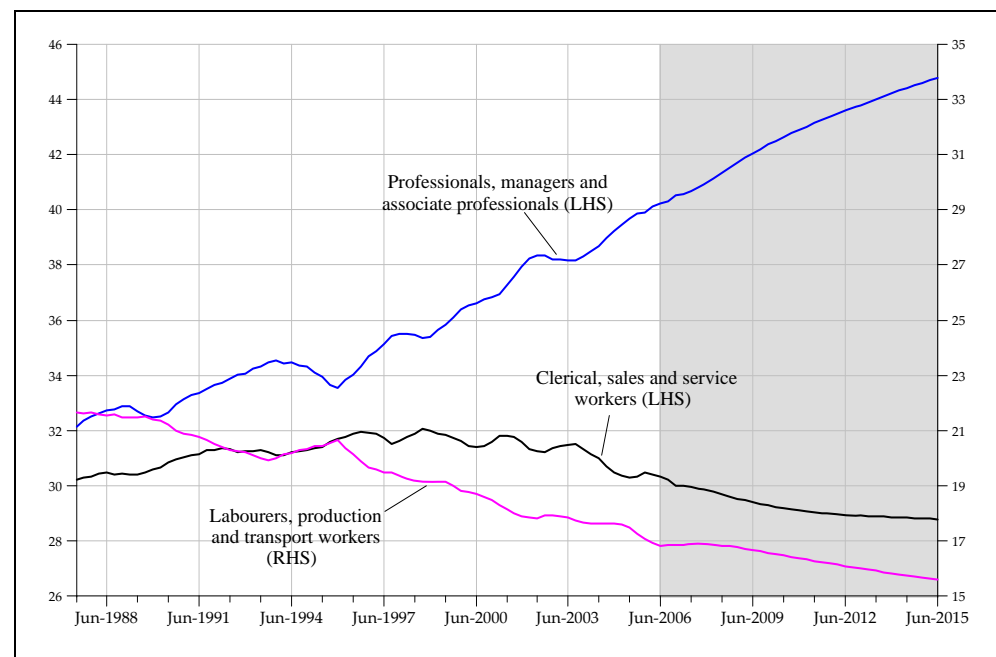
The changing structure of industry employment shown in chart 3.6 earlier, particularly the rise in health education and business services, all of which have high proportions of professional workers, is contributing to a rapid change in the occupational landscape. Over the last ten years, the number of professionals, managers and associate professionals in the workforce has increased by 45 per cent,⁶⁴ while the number of labourers, production and

⁶³ There are also a number of measurement issues with service imports – for example mode 3 imports (e.g. provision of commercial services by affiliates) is difficult to measure.

⁶⁴ Professional workers are often reported as managers or administrators in the Labour Force Survey – see ABS Cat No 6203.0 Explanatory Notes.

transport workers has barely changed.⁶⁵ Much of this change is occurring within industries such as Finance and Insurance, and Distributional Services in particular reducing clerical staff from the early 1990s onwards and with professional employment in manufacturing rising relative to production work (discussed further in Chapter 5 below). Overall occupational change since the late 1990s has been adding around ½ a per cent a year to income levels. In other words structural change is leading to a more highly skilled, more productive and better-paid workforce.

3.13 Shares of professional and unskilled workers ^a

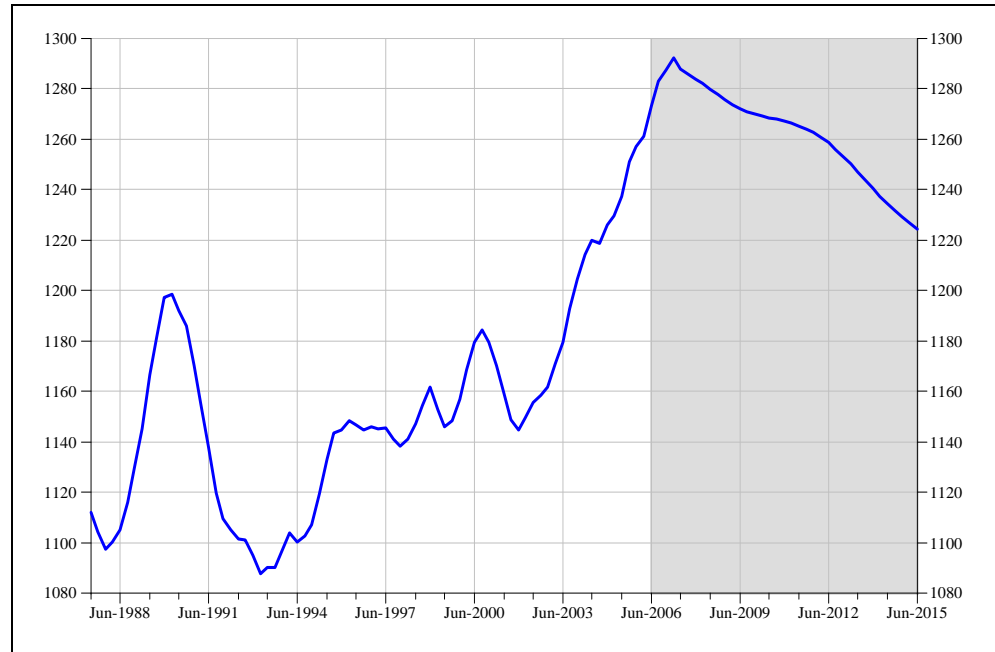


^a percentage of total employment

Data source: ABS Cat No 6203.0 and CIE AUSM estimates and projections

But perhaps the most surprising feature of the projections is the implication for the demand for tradespersons. The construction sector is by far the largest employer of tradespersons accounting for around a third of all workers (manufacturing being the next biggest accounting for 23 per cent). The mining sector as noted earlier is capital intensive and employs few workers. It accounts for only 2 per cent of employment of tradespersons. Consequently even though mining employment continues to grow rapidly it has little impact on the demand for tradespersons. Once the construction phase of the mining boom starts to wane, demand for tradesmen will peak and thereafter begin to decline (chart 3.14). The decline post 2007-08 is accentuated by the secular decline in dwelling investment discussed earlier, and in manufacturing employment.

⁶⁵ Rising by 2.8 per cent over the same period.

3.14 Declining demand for Tradespersons following the boom ^a

^a absolute numbers, thousands

Data source: ABS Cat No 6203.0 and CIE AUSM projections

Summary

As can be seen from the preceding sections, developments in industry shares reflect a diverse range of factors. Each industry has a different story and requires analysis on its own ground. At the same time changes in industry shares are well explained by predictable responses to changes in drivers in the model. Given a knowledge of the driving factors impacting on the economy and relative productivity trends across industries, the developments we have seen in industry and occupational shares should not have come as any surprise.

The impact of the driving factors such as falling interest rates, and falling prices for investment goods and durables goods (discussed in the previous chapter) can be seen in demand components such as business investment and consumer durables. Much of this demand is being met by increasing imports, but some is spilling over into increased demand for the output of domestic industries such as retailing, wholesaling and transport services. The commodity price boom is having transitional impacts on the construction industry. However other industries are relatively unaffected and are rather being driven by their own developments. For example health and education are being driven by increased expenditure on these industries with aging and increased demand for skills. Overall, abstracting from the transitional effects of the mining boom, the major structural

developments in the economy are occurring independent of the development in commodity prices.

The projections also reveal that major changes are occurring in the occupational structure. Structural change in occupational shares accelerated around the turn of this century with a pick up in the demand for professionals and declines in demand for white-collar clerical workers. Much of this change has occurred within industries, and it is these within industry developments that are discussed in the next two chapters.

4

Drivers of change within industries

In addition to the driving forces leading to changes in industry shares are those that are causing changes in the way industries operate. Changing industry shares are a measure of the amount of structural change occurring in an economy and the adjustment costs associated with it. But the main benefits of structural change (as well as many of the adjustment costs) come from processes that occur within industries. Catalysts for change within industries include: increased foreign ownership and competition; increased opportunities for diversification overseas; opportunities for innovation created by technical change (particularly computerisation); and opportunities to outsource operations and take advantage of economies of scope. Changes in factors such as these are driving large-scale changes within some industries. (For example the changing occupational structure noted at the end of the last chapter is mainly occurring *within* particular industries.) These developments are canvassed in more detail below, picking up on some of the key changes currently driving change within industries.

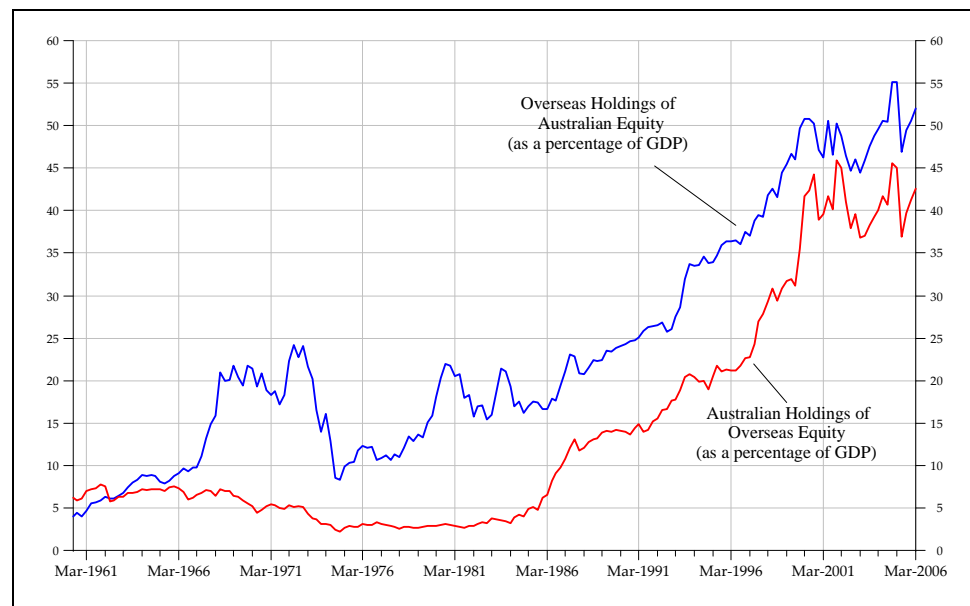
Foreign investment, diversification and trade

One of the most remarkable changes to Australian business in the period since financial deregulation has been its diversification into the international market. The increase in foreign ownership of Australian business has been widely publicised with foreign ownership of mining reaching 45 per cent in 2000-01 and manufacturing 34 per cent.⁶⁶ Somewhat less heralded has been the surge in Australian investment overseas following the floating of the exchange rate and financial deregulation in the 1980s. Australian ownership of overseas firms was equivalent to around 3 per cent of GDP in 1982 and rose to reach 44 per cent by the year 2000 (see chart 4.1), fluctuating around that level since then. Much of this dispersion of ownership reflected a worldwide increase in acquisition and merger activity. (During this period, for example, the

⁶⁶ Measured as a percentage of Mining value added – ABS, 2004a. According to the ABS a significant part of inward FDI has been directed at setting up headquarters to service the Asia Pacific region.

number of independent automotive manufacturing groups in the world has been reduced from 52 in 1964 to 12 today)⁶⁷ Most other countries experienced similar if not larger increases in cross-border holdings, with some of the largest increases occurring in Europe.

4.1 International diversification — Australian overseas equity holdings



Data source: ABS Cat No 5302.0

Australia's offshore investment is not following our trade pattern

In Europe and North America this cross-border dispersion of investment largely reflected trade patterns. As trade barriers were reduced and with the common currency area coming into force in Europe and NAFTA, cross border intra-industry trade increased and the investment patterns matched the trade flow.⁶⁸ In Australia, however, the increases in trade over the period have been with Asia, which has risen to around 60 per cent. The increased Australian investment flows however, have been mainly to our traditional English speaking trading partners. Of the \$142 billion of sales by foreign affiliates of Australian companies (equivalent to 14 per cent of Australian GDP), less than 20 per cent were made in Asia (table 4.2).⁶⁹ In contrast more than two thirds of the activity of Australian owned foreign

⁶⁷ McKinsey, 2005, P.64.

⁶⁸ See Turner and Meeci, 2002

⁶⁹ There are a number of reasons for this. The first are the cultural and language barriers (which increase transaction and monitoring costs - which in turn have been shown to be important in explaining home-bias in investment). But probably more important are the explicit border (foreign investment controls) and behind the border barriers (institutional features) to investment in many Asian countries.

affiliates were in our traditional English speaking markets, the United States, UK, Canada and New Zealand.

This suggests that the diversification of Australian investment overseas, much of it via the merger and acquisitions wave of the 1990s, was not driven by a process of integration into emerging Asian regional production chains, but occurred for other reasons, (e.g. spreading company risk, and creating value by achieving economies of scope in such things organisation, design, marketing).

4.2 Activity of foreign affiliates of Australian companies, 2002–03

	<i>Employment</i>	<i>Wages</i>	<i>Sale of goods</i>	<i>Sales of services</i>	<i>Sales of goods and services</i>
United Kingdom	38 621	2613	7092	11 426	18 518
Other Europe	26 307	1684	9679	3038	12 717
Europe	64 928	4297	16 771	14 464	31 235
New Zealand	86 763	3355	19 228	10 784	30 012
Indonesia	24 330	408	2962	1140	4102
Malaysia	10 016	89	1358	451	1809
China	8866	142	2539	1456	3995
Other Asia Pacific	56 264	1521	9815	6222	16 037
United States	48 894	3363	16 161	26 117	42 278
Canada	6948	477	3762	1288	5050
Other Americas	14 915	350	4443	3360	7803
Total	321 924	14 002	77 039	65 282	142 321
Traditional English speaking (per cent)	56.3	70.0	60.0	76.0	67.4
Asia Pacific excluding NZ (per cent)	30.9	15.4	21.6	14.2	18.2

Source: Australian Bureau of Statistics Catalogue No. 5495.0.

Overall Australian manufacturing firms are not integrating into the Asian markets

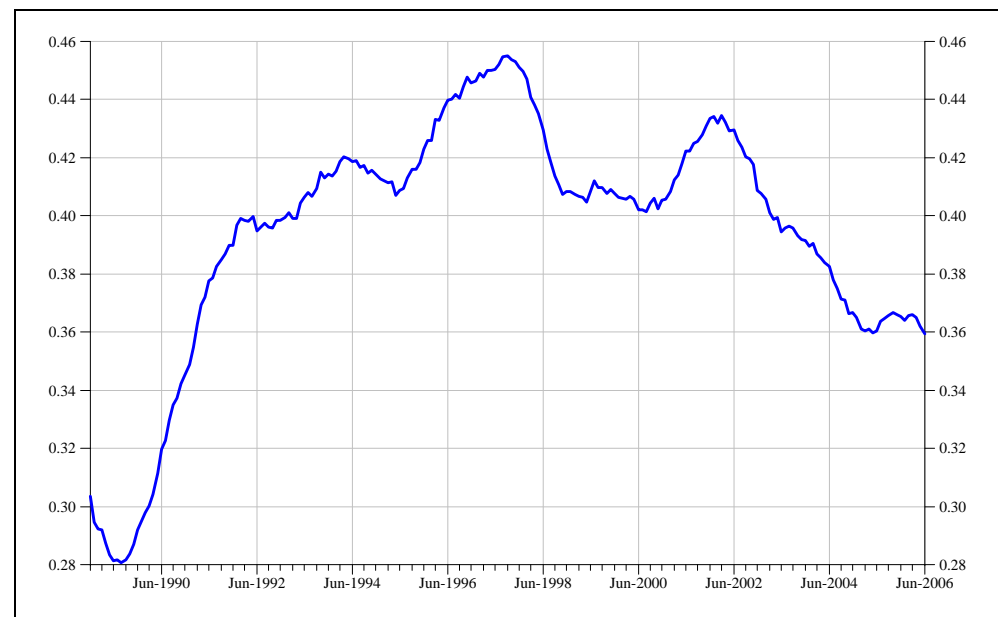
The lack of integration into Asian markets is also highlighted by data that indicate that Australian firms conduct much less research and development in emerging markets than do companies headquartered in other OECD countries. Survey results from Deloitte shows that whereas 53 per cent of foreign manufacturing firms conduct research and development within emerging markets they are involved in, only 11 per cent of Australian manufacturing firms do so.⁷⁰

⁷⁰ Deloitte, 2006. Global survey of around 400 senior executives from a broad range of manufacturing sectors on operations in Argentina, Brazil, China, Czech Republic, India, Indonesia, Mexico, Poland, Russia and South Korea.

The lack of integration into the region is also evidenced by the relatively low level of intra-industry trade in Australian manufacturing trade (in fact the second lowest in the OECD).⁷¹ The relative lack of intra-industry trade can be inferred from the input-output data presented in Table B3. While 35.4 per cent of the final value of manufacturing exports derived from imports, 14 per cent of the exports were re-exports of final consumption and capital goods. In other words, rather than being part of an international production chain, the goods were simply being redistributed to other countries.

Not only is the level of intra-industry trade within manufacturing low by international standards, but it also appears to be declining. The level of intra-industry trade appeared to expand with the diversification in foreign investment, and the declines in protection, in the 1980s and 1990s. However the trend appears to have reversed over the last eight years. After peaking at 45 per cent in 1997, the level of intra-industry trade has declined to 36 per cent in 2006 (chart 4.3).

4.3 Manufacturing intra-industry trade



Data source: ABS International Merchandise Exports Cat No 5432.0, International Merchandise Imports Cat No 5439, and CIE calculations — for definition see Appendix A.

Overall the picture painted by the aggregate data is one of a manufacturing sector that is largely directed at import replacement and which is not particularly engaged in the emerging Asian market. There are exceptions to this rule such as in ship-building and motor-vehicles and equipment.

⁷¹ Meacci and Turner, 2001, Table VI.1, P.161. In comparison the level of intra-industry trade for most European economies is around 80 per cent.

However, if the level of intra-industry trade is a guide, the level of disengagement may have increased in recent years.

But opportunities for integration are there to be seized

There is nothing necessarily wrong with this low level of intra-industry trade. Remoteness and Australia's high cost structure probably precludes much of Australian manufacturing from becoming a source to service the Asian market or to be a part of regional physical production chains. However there will be some parts of manufacturing where the potential for expansion may be significant. Recent work by Eichengreen et al (2004), for example, indicates that as China expands production mainly in labour intensive consumer good industries there will be expanding opportunities for more specialised high-end capital good industries. That is, expanding Chinese trade will tend to disadvantage other consumer good producers such as the ASEAN 4 countries, but create opportunities for more advanced countries in the region, such as Japan and Korea. Consequently the OECD is forecasting both Japanese and Korean exports to increase by more than 20 per cent in the two years to 2007. As a result of the reforms that have already occurred, Australia is far better positioned to expand into these emerging markets for equipment and capital goods.

Moreover, there appears to be increasing awareness on the part of industry of the need for manufacturing to integrate with the rest of the world and to take advantage of the rapidly expanding opportunities in Asia if it is to survive. For example, the theme of the most recent Australian Industry Group forum was 'Business without Borders'. The AIG has set out a comprehensive review of the challenges posed by global integration in its report *Manufacturing Futures: Achieving Global Fitness*. Survey data indicates that most manufacturers intend to expand their overseas activity over the next three years, either shifting production of final goods overseas or increasing sourcing of components and materials.⁷²

Success in integration will depend on partnerships

While this is laudable, the AIG strategy may be excessively manufacturing and goods production focussed. Australia's manufacturing industry is probably simply too remote from the Asian markets to ever engage with Asian *physical* production chains to any great extent.⁷³ The exceptions are where goods have a high value to transport cost ratio – i.e high value

⁷² AIG, 2005,

⁷³ Note that this does not mean Australian producers cannot integrate in other ways particularly in the design and service component of the production chain.

added knowledge intensive machinery and equipment, or where Australia is minimising shipping costs of raw materials, or taking advantage of cheap power by engaging in some basic processing of primary products (sugar, basic metal products, mineral products). As manufacturing itself becomes more design and R&D intensive, and knowledge/know how (i.e. service) intensive it would be natural to seek synergies and partnerships with other knowledge intensive industries such as education and property and business services. These latter industries seem for the immediate future the most likely to increase their engagement with the emerging Asian region.

Firms and industry composition

Size of firms

As the prospects of industries change there is an overall shift in the compositions of firms in Australia, reflecting the advantage of some firm structures over others for an industry. Mining for example, with large economies of scale and high risks, favours a few large diversified firms, while service trades as such have favoured smaller firms focussed on particular market segments. In addition to sector-wide changes, the optimal firm structures are also influenced by the changes in:

- Quantities of physical capital required for each firm and consequent economies of scale. (For example utilities and mining with intense network and capital costs, have pervasive economies of scale and are dominated by a few large firms, while construction involves fairly minimal capital requirements for individual workers and hence is dominated by small firms). With IT prices falling optimal firm size may be falling in some industries.
- Economies of scope (the ability to defray fixed costs such as in recruitment, training, marketing, over a number of different products and operations). ICT is creating opportunities for increased economies of scope across a number of sectors, for example in logistics, tending to favour larger firms.⁷⁴
- Business costs such as taxation, superannuation, and insurance compliance costs which favours larger firms.
- Labour market conditions and the ability to tap international labour markets for skills, know-how and knowledge.

⁷⁴ The same logic is leading to winner takes all markets for some professions with implications for the distribution of income

- Regulatory and other requirements (e.g. competition policy, foreign investment guidelines) that affect firm structures (payroll tax thresholds for example favour small firms).

The trends in firm concentration in industries can be difficult to measure with the focus usually on the market share of the few largest firms. It is just as important to understand the trends within an industry such as firm growth and business entry and exit. Unfortunately these factors are not well measured in Australia.

There has been steady decline in the number of employers and self-employed implying a steady increase in the number of employees per firm.

In the absence of other data, it is possible to infer changes in industry shares and firm size from the employment data. In a number of articles in recent years Paul Kelly has raised the prospect of a new entrepreneurial middle class which is forming a new middle ground in Australian politics. It is not clear what data this argument is based on but such an increase appears to be entirely imaginary. Rather than increasing as a proportion of the population, the share of employers and self-employed in the workforce has decreased substantially over the last ten years. Since late 1993 the proportion of employers and self employed in the workforce have declined by about a fifth from 15.3 per cent of the total to 12.4 per cent today (chart 4.4).

4.4 Percentage employers or self employed



Data source: ABS, Labor Force Australia Cat No 6203.0, 6204.0.

The number of employers and self-employed recorded in the Labour Force Survey corresponds closely with the number of business's recorded on the ABS business register. For example in 2000-01 the LFS records 241 000 employers and self employed in the construction industry, while the count of businesses from the survey register was 232 000. The corresponding figures for transport and storage were 73 000 and 69 000. Consequently the decline in the proportion of employers and self-employed is an indication that the average size of firms has increased.

The average size of firms is increasing

Breaking the decline down between employers and self-employed reveals that self-employed have remained fairly stable as a percentage of total employment. Employers in contrast have declined from 5.3 per cent of total employment in 1986 to 3.0 per cent today. This in turn implies that the average size of businesses that have employees has almost doubled (increasing by around 76 per cent).

An increase of this size indicates that there has been an increase in concentration on average across industries over the last 20 years.⁷⁵ The trend has accelerated over the last eight years.

There is no single explanation for the increase in the average size of business and the increase is not evenly spread across industries. (Part of the reason may be increasing regulatory and compliance costs associated with engaging employees – this would help to explain why the proportion of self employed has not fallen). The two sectors showing the largest declines (or conversely the largest increases in concentration) are retail trade and agriculture. In most other sectors the declines are much less marked.

The big changes have been in agriculture

In agriculture the phenomenon is partly a result of declining domestic consumption of food (as a proportion of total consumption). The agricultural sectors that service the local market, such as fruit growers tend to be dominated by small farms. The export sectors (such as cotton and to a lesser extent wheat) tend to have a much higher proportion of large business. As the domestic market declines and the export market expands the proportion of output accounted by large scale farms and agri-business tends to increase. Combined with advantages due to economies of scale and scope, the proportion of small business has declined by around a

⁷⁵ The increase in average number of employees per business has been larger than the total increase in employment of around 40 per cent over the same period.

fifth.⁷⁶ The decline was particularly marked in the drought of 2002-03 where agricultural employment fell by a 22 per cent.⁷⁷ Large farms with their greater financial resources and greater ability to diversify risk were able to weather the downturn better than small farms.

...and in retail

The largest changes have occurred within the retail sector where the proportion of employers and self employed has halved over the last eleven years (from 19.4 per cent in June 1995 to 10.2 per cent today). This is consistent with anecdotal reports of increasing domination of the sector by the two largest retail chains Woolworths and Coles Myer. There are likely to be a large range of reasons for the increased concentration in this sector including economies of scope in logistics and marketing. Similar changes have occurred in the United States with the increasing predominance of 'big-box' retailers such as WalMart. These changes have been associated with an acceleration in productivity growth both here and in the United States. Other factors may also have made a contribution, for example the advantage that larger firms have in accessing overseas markets and supply chains using their affiliates as local sourcing has declined.⁷⁸

Sources of productivity growth

The fall in relative prices of capital and labour is well documented in previous chapters. This has had a profound impact on the relative capital intensity across all industries. Use of IT has also expanded.

Research and development

Business research and development (BERD) in Australia has almost doubled as a proportion of GDP over the last 15 years, from 0.51 per cent of GDP in 1990-91 to 0.94 per cent in 2004-05. Much of the increase has come over the last five years with the proportion bottoming at 0.64 per cent of

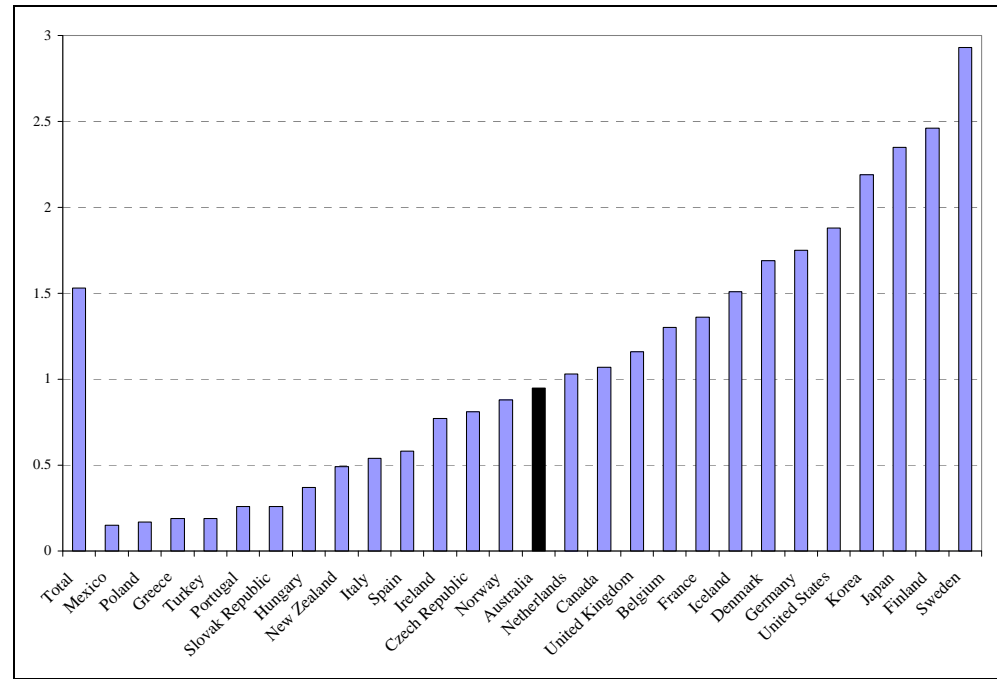
⁷⁶ Put another way, the average size of agricultural firms (employment basis) has increased by around 25 per cent.

⁷⁷ In the 18 months to March 2003.

⁷⁸ For many consistent quality products, consumers require value chain systems that among other things guarantee quality, and that may be susceptible to economies of scale.

GDP in 2000-01.⁷⁹ The increases have lifted Australia from towards the bottom of the OECD rankings to towards the middle (see chart 4.5).⁸⁰

4.5 Business expenditure on research and development (per cent of GDP)



Data source: ABS Cat No 8104.0

The increase appears to be due to the tax concessions for research and development and the rise of knowledge intensive sectors. This in turn should be expected given the structural changes occurring in the economy driven by the rise of China and other Asian economies.⁸¹

Manufacturing is becoming more knowledge intensive

The largest increases in R&D have been in manufacturing which accounts for 41 per cent of total expenditure. Of this more than half is accounted for by the machinery and equipment sector. Thus the increase in R&D

⁷⁹ ABS Cat. No. 8104.0

⁸⁰ The level of expenditure is partly a function of the size of the economy, given that the larger the economy the greater the returns captured domestically. The G7 economies spend 1.6 per cent of their collective GDP on research and development. The remaining 20 smaller countries listed in Fig 4.5 spend 0.8 per cent on average (less than Australia). As a middle size country one would expect Australia to be in the middle of the range with respect to R&D spending. The reason that the OECD total is 1.5 per cent is that the United States (with the highest weight in total) spends 1.9 per cent (although this may be biased upwards by defence R&D contracted to the private sector).

⁸¹ That is the Samuelson-Stolper effect should favour the production of knowledge intensive goods and services (see Appendix A) leading to higher levels of R&D.

expenditure has partly been driven by the expansion of this sector as manufacturing protection levels have fallen and export opportunities have opened up in Asia.⁸²

Despite these increases, Australia accounts for only a tiny proportion of global R&D.⁸³ The main productivity gains therefore do not necessarily come from the R&D Australia does itself but how it accesses the technology and knowledge that is being generated overseas. Global R&D is rapidly expanding, with growing contributions from China, India and East Asia.⁸⁴ China is now as large as Europe and the US in terms of the number of scientists and engineers being produced by its universities. The big question for Australia is how does domestic business tap into this expanding pool of knowledge, technology and human capital, when our traditional links are with the US and UK?

It is important to remember that research and development is not an end itself. There are obviously positive externalities that come from R&D expenditure that justify some government support. However, many of the spillovers and benefits are to the global marketplace – the returns are not necessarily captured domestically. The crucial thing is the effectiveness of that expenditure, whether it leads to higher productivity growth and improved quality of goods and services in the domestic market. This is not necessarily dependent on the quantity of R&D done locally, but rather on the level of competition, and the flexibility and adaptability of business. This can be seen in the fact that sectors such as wholesale and retail trade that do little in the way of their own research and development have achieved high rates of productivity growth. A similar pattern can be seen globally. Countries such as Ireland and the transition economies of Eastern Europe have achieved high rates of productivity growth with low levels of domestic R&D expenditure. Their growth comes from adapting technology rather than generating it.⁸⁵

⁸² It may also have partly been driven by increased competition in this sector as protection levels have fallen, increasing the incentive to innovate and tailor designs to meet market demand.

⁸³ For example, Australia registered 367 triadic patent families in 2002 compared to a global total of 51,502. It accounts for less than one per cent of research and development in the OECD. (Triadic patent families are patents registered across the three main patent offices – Europe, Japan and the US)

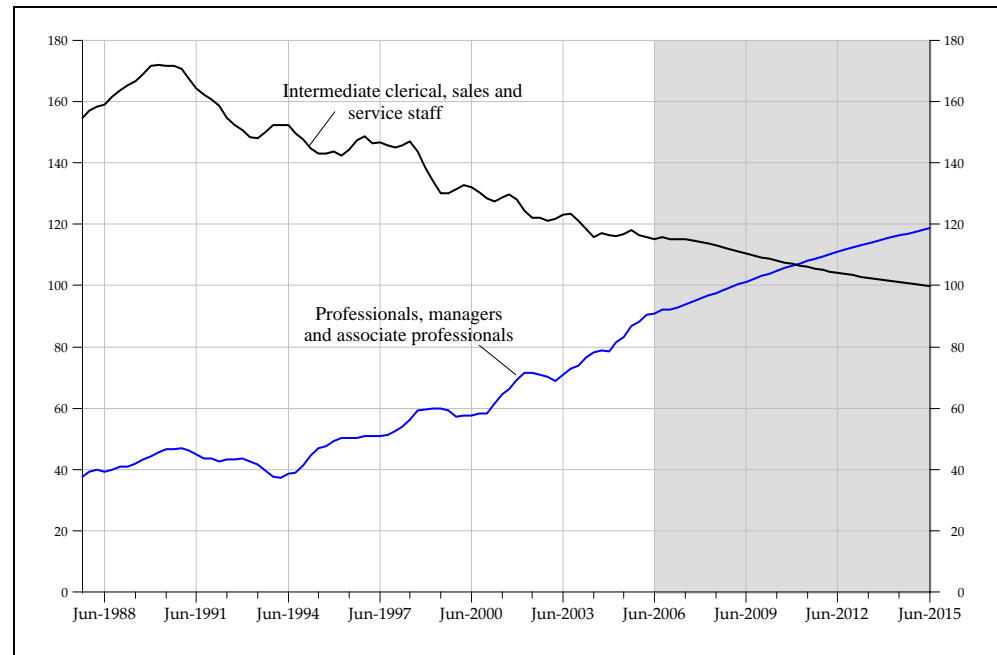
⁸⁴ Part of this increase is coming from increased R&D activity by foreign affiliates, Deloitte, 2006, P.14.

⁸⁵ At the same time, R&D activity helps generate the skills and knowledge that are needed to adapt technology.

Deregulation and competition as incentives for productivity and innovation

The Finance and Insurance sector provides a good example of the implications of changing incentives. The sector was deregulated in the 1980s with the introduction of foreign banks in particular leading to increased competition. The initial effects of this were not all positive as the sector expanded, driving the late 1980s office building boom (and a number of other excesses). But the real benefits of deregulation and competition began to appear following the 1990-91 recession. Banks and other financial institutions engaged in competitive cost cutting, increasing computer and software expenditure, automating routine functions, reorganising their operations, and cutting employment levels, particularly for clerical and service staff (chart 4.6).⁸⁶

4.6 Falling employment for clerical workers in finance and insurance ^a



^a employed persons, thousands.

Data source: ABS Cat No 6203.0 and CIE AUSM projections

The key was in adapting to opportunities offered by global advances in information technology. As a result productivity growth in the sector expanded rapidly in the 1990s with both labour and capital productivity surging (see Appendix C). The sector along with wholesale and retail trade accounted for a significant part of the surge in Australian productivity growth in the 1990s. As a result of these changes services provided by the

⁸⁶ The change also had important implications for the demand for office space, and consequently for the construction industry and the demand for tradesman. Office building went into a fifteen year slump after the 1990 boom and is now only beginning to re-emerge as employment picks up in the finance industry.

sector have improved, employment is expanding again particularly in high-end services (financial advice, investment management), and the sector is far better placed to compete in the global market place – e.g. to expand its role as a key financial centre in the Asia Pacific region.

Insourcing and outsourcing and globalisation of the labour market

As discussed earlier any firm has the choice of insourcing or outsourcing any particular activity. Those choices are a key determinant of firm size. With globalisation and the development in transport and communications this choice has extended to one of whether to outsource or insource locally, nationally or internationally. As many authors have noted, the first stage of globalisation was marked by trade moving from being exports and imports of final goods to being one of component parts along global supply chains. The second stage is likely to be marked by increased trade in services and offshoring of jobs.

According to the OECD between 18 and 20 per cent of jobs in OECD countries are of the type that could be standardised and sourced from developing countries.⁸⁷ At the same time research indicates that at least for manufacturing outsourcing services tends to be less successful than outsourcing material inputs.⁸⁸ Hence it is not clear to what extent or how quickly offshoring of services will occur. However, a number of analysts⁸⁹ agree that the offshoring of services will be a rapidly developing feature of the international landscape over the next ten years.

‘Although there are no official statistics measuring the extent of international sourcing, estimates suggest it will accelerate in most OECD countries in coming years. It generally involves functions which are easy for companies to purchase from outside due to their intensive use of information technology and low need for face-to-face contact; many such functions are no longer linked to a specific location. This includes work by clerks and computer operators, data handlers and claims processors as well as programmers and certain types of scientists and engineers, i.e. both high- and low-skilled white-collar jobs.’⁹⁰

⁸⁷ OECD, 2005b, P.7.

⁸⁸ e.g. Gorg and Hanley, 2003, and Gorg, Hanley and Strobl, 2004, cited in Olsen, 2006, P.18. Material inputs tend to be generic. Where they need to be firm specific, the firm-specific component usually can be exactly codified. In sourced services on the other hand often include firm-specific / institutional knowledge and “know-how” that is difficult to codify.

⁸⁹ See for example, OECD (2005c), Mann (2006), Blinder (2006),

⁹⁰ OECD, 2005, P.7

It is important to note that offshoring is not the same thing as outsourcing. Outsourcing can occur domestically or internationally. Offshoring, while international, can occur either within the firm or outside the firm. Firms that are confined to the local market have the choice of outsourcing either domestically or internationally, but multi-national firms can insource internationally (Table 4.7).

4.7 Outsourcing and offshoring

	<i>Insourcing</i>	<i>Outsourcing</i>
<i>Onshoring</i>	Insource Domestically Firm specific skills and requirements and economies of scope - leading to larger firms (vertical integration)	Outsource Domestically Generic skills and inputs, few economies of scope – favours smaller firm structures for given economies of scale
<i>Offshoring</i>	Insource Internationally International economies of scope – leading to large multi national corporations and intra-firm and related-party trade	Outsource Internationally Generic rather than firm-specific skills and services – lead to inter-firm trade. Involves market transactions and hence is easier to measure

If the OECD estimates of 18 to 20 per cent of jobs suitable for offshoring are correct, then it may have far reaching implications for intra-industry structures over the next ten to fifteen years. As discussed earlier, offshoring opportunities will be arising just as the domestic labour market is tightening with emerging skill shortages. As with computerisation, it is likely to lead to further large changes in occupational structure and returns to individual categories of labour.

As with other sorts of trade, offshoring will also confer considerable benefits on Australian households in terms of cheaper goods and services and higher real incomes. Opportunities for increased trade in labour services overseas are really no different from an economic point of view, to any other form of new trade opportunity. There will be adjustment costs and distributional impacts but overall the net benefits will be overwhelmingly positive.⁹¹ As with structural adjustments the keys to maximising the benefits from these changes will be flexibility, adaptability and high levels of competition.

The changes also seem likely to have significant implications for government policy on a number of fronts (e.g. education, taxation, trade, industry) and also for statistical collection. Transactions that take place within firms do not involve a market exchange or a market price. They are

⁹¹ Grossman and Rossi-Hasburg, 2006, argue that real incomes will increase even for those occupational categories most subject to offshoring.

therefore difficult to measure and as this form of trade expands it will pose problems for statistical agencies. It may be that there is already a significant volume of unmeasured services trade taking place within firms matching the expansion of intra-firm trade in goods. It also creates challenges for trade policy and taxation. For example, if there is a policy encouraging the export of goods, should there be one encouraging the export of in-sourced services?

Summary

Globalisation and computerisation are having major effects on the way business operates across a number of industries, with implications for government policy. In the case of manufacturing a lot of policy attention has been devoted to the question of the future of the industry in the face of globalisation with an emphasis on maintaining physical production locally and accessing global supply chains. However, it may be that remoteness will continue to count against the location of physical production in Australia (apart from servicing the local market). Australia's real comparative advantage increasingly lies with supplying the insourced service components of global manufacturing such as design, process management, marketing and logistics.⁹²

The fact that Australian firms that have international linkages tend to have them with traditional English speaking countries such as the US and the UK may work against taking advantage of the opportunities arising in Asia. However, attitudes of local industries seem to be changing in this regard. Similarly, computerisation is having large impacts and leading to large occupational shifts in particular industries such as finance and insurance, and wholesale and retail trade, leading to major changes in occupational shares, changing intra-industry structure, and a substantial pick-up in productivity growth. However, these effects seem to be waning (at least in terms of the rate of change).

The next wave of change, particularly in terms of its impact on occupational structure, appears likely to come from the offshoring of labour services. This again highlights the need to shift the focus of policy from physical production to services. The change will affect all industries, particularly business services, which will be around twice as big as manufacturing by 2015. While these changes will involve adjustment costs they will also potentially be a source of considerable increases in incomes

⁹² In other words Australia's comparative advantage lies in the knowledge intensive service components of the supply chain.

and welfare if Australia can take advantage of them. To do so both business and governments will need to be focussed on designing strategies to respond to the changes before they occur.

5

Individual industries

This Chapter looks in more detail at sectors subject to particularly large amounts of structural change – both those that are expanding and those that are contracting. As manufacturing has been the sector most exposed to the impacts of globalisation and the development of international production chains the chapter starts by looking at developments in that sector in detail (following on from the briefer material in Chapter 3). What is driving the overall decline in the sector’s share? What is the nature of the change? Within manufacturing, how is comparative advantage moving? Which sectors are contracting and which expanding? The chapter then looks at two other industries also experiencing significant change, namely:

- the property and business services sector, which is the fastest expanding sector in the economy and is now larger than manufacturing; and
- education and training which has a significant role to play in responding to the structural changes occurring in the rest of the economy (i.e the changes occurring in manufacturing and business services, the developing labour market shortages, the potential developments in occupational demand due to offshoring).

Both sectors are human capital intensive and appear to have large potential for development. Both will possibly have significant implications for the growth of the economy over the next five to ten years.

Overview of manufacturing trends

It is an interesting paradox that while manufacturing has been declining rapidly as a share of total output in most OECD countries, world trade in manufacturing goods has been rising as a percentage of world GDP. There are two points which resolve this seeming paradox. The first is a measurement issue. An increasing part of the value of the intermediate and final goods that are being traded is coming from services (mainly distributional – transport and wholesale trade, but also from financial services, insurance and business services). Secondly, the manufacturing production process has been globalised leading to an increasing share of

cross-border flows of components and final goods. Components are produced in one country, with materials drawn from another, then assembled in a third, before being distributed and marketed in a fourth.⁹³ Where in the past a good may have crossed a border once, it or its component parts may now cross a number of times, each time counted as trade. Hence the increase in manufacturing trade as a share of world GDP, relative to the decline in share of goods in final demand.⁹⁴

Chart 5.1 shows the decline in Australian manufacturing output relative to GDP and the share of goods in total final demand (constant price shares). While the share of goods in final demand has declined a little (from around 36 per cent in 1980 to 32 per cent in 2005)⁹⁵ the share of manufacturing value added in GDP has fallen by almost a half (from 18 per cent to 11 per cent). The decline in the manufacturing share is particularly surprising given the increase in manufacturing exports in the 1980s and 1990s. Manufacturing exports have risen by a factor of four as a share of GDP, (from around 0.8 of a per cent in the late 1970s to 3.2 per cent now)⁹⁶. With the goods share of domestic final demand being fairly stable, and exports increasing as a share of GDP, it might have been thought that the manufacturing share of GDP could have increased over time. This is confirmed by the input-output weighted demand term for manufacturing output, shown in Figure 5.1 below. If the input-output structure of the economy had been unchanged (if manufacturing's share of the value added in individual goods had been unchanged over time), then the manufacturing share would have increased slightly over the last ten years.

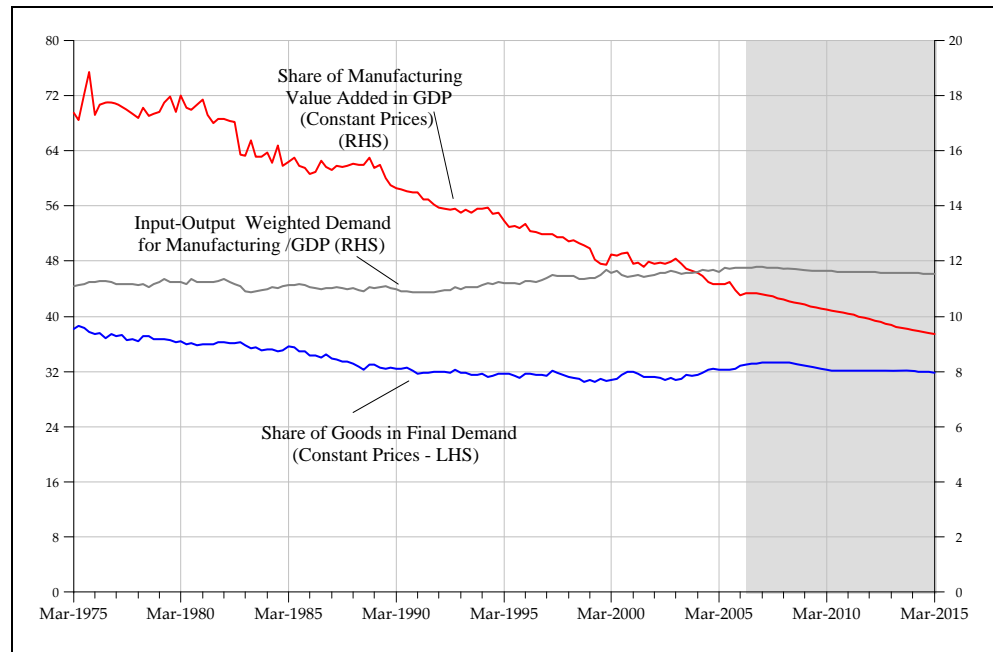
⁹³ Perhaps the classic example is the Barbie doll. The doll is designed in California. Inputs include nylon for her hair from Japan, plastic pellets for her body from Taiwan, cloth from China, and plastic moulds, paints and packaging from other parts of the US. The dolls are assembled in Malaysia and Indonesia, tested in California and marketed around the globe. (For other examples see

⁹⁴ In fact the ratio of manufacturing trade to GDP relative to the share of goods in final demand provides an indicator of the degree of globalisation of production chains.

⁹⁵ At constant prices. Goods in Figure 5.9 refer to the goods components of household consumption, and the machinery and equipment component of investment (both business and government). The building construction component of investment, which also requires significant manufacturing input, is not included. Arguably investment in dwellings and other buildings is more of the nature of a purchase of a good than a service.

⁹⁶ The figures quoted and those shown in Fig 3.9 exclude basic metal products, which are allocated to mining, and sugar and beverages (mainly wine) exports, which are allocated to agriculture.

5.1 Goods share of demand and manufacturing share of output



Data source: ABS Cat No 5203.0, CIE AUSM model

There are a number of reasons for the decline in manufactures share. One is that while manufacturing exports have increased, this has been more than offset by a larger increase in final good imports.⁹⁷ However, while the increase in imports captures a lot of media attention it is not the primary reason for the decline in manufacturing's share. For example, in net terms, the increase in final good imports relative to manufacturing exports is equivalent to around 2 percentage points of GDP since 1970.⁹⁸ This is a much smaller amount than the decline in manufacturing's share.⁹⁹

One reason manufacturing value added is decreasing as a share of GDP is its higher rate of productivity growth relative to service industries. With limited substitutability within production between services and manufacturing production the amount spent on the manufactured proportion of the final good declines.¹⁰⁰ Moreover this also occurs within

⁹⁷ The relative increase in imports has been due partly to substitution effects as import prices have fallen, and partly to composition effects as demand has expanded for IT equipment and consumer durables not produced in Australia

⁹⁸ Measured in current price terms. Increased trade has led to the expansion of some sectors such as machinery and equipment and the contraction of others such as clothing and footwear. However, on balance the impact is smaller than many people imagine.

⁹⁹ Particularly considering that manufacturing only accounts for part of the final value of the goods been replaced.

¹⁰⁰ A good example of this process is computers just over the last year or two. At the retail outlet the computer is almost always sold incorporating an operating

manufacturing, where activity can be considered to consist of part physical production and part insourced services (accounting, process management, logistics, marketing and design). As time goes on, the insourced service share has increased while the physical production share has declined.¹⁰¹

Adding to this has been a trend towards outsourcing of non-core functions, the fact that consumer preferences are shifting towards goods that are not produced in Australia, and the fact that as incomes rise household tend to value the design and service components of final goods more highly. In fact these three factors appear to account for the majority of the decline (see Chapter 3.)

This secular decline has been accentuated in recent years by globalisation. The movement of low cost parts of the production chain to countries such as China, and increasing competition from imports is accentuating a decline that would already be taking place.

The changing structure of Australian manufacturing

Australian manufacturing has had to deal with two other shocks in addition to the factors leading to a declining share of manufacturing in other OECD countries. They are the reductions in protection that occurred through the 1980s and 1990s, and, of particular importance over the last five years, the increase in the real exchange rate that has accompanied the most recent surge in commodity prices. The latter has led some to talk about the rise of China and India leading to a 'hollowing out' of Australian manufacturing with a combination of low import prices and a high exchange rate leading to a dramatic decline in competitiveness.

However, with every change comes opportunity, and while falling import prices have led to a rapid decline in some industries such as textiles, clothing and footwear, there have been advantages to others, particularly those that are capital intensive, reliant on imported inputs, and those positioned to take advantage of burgeoning Asian markets. While commodity prices and the real exchange rate have risen, it needs to be remembered that the improvement in the terms of trade represents a boost

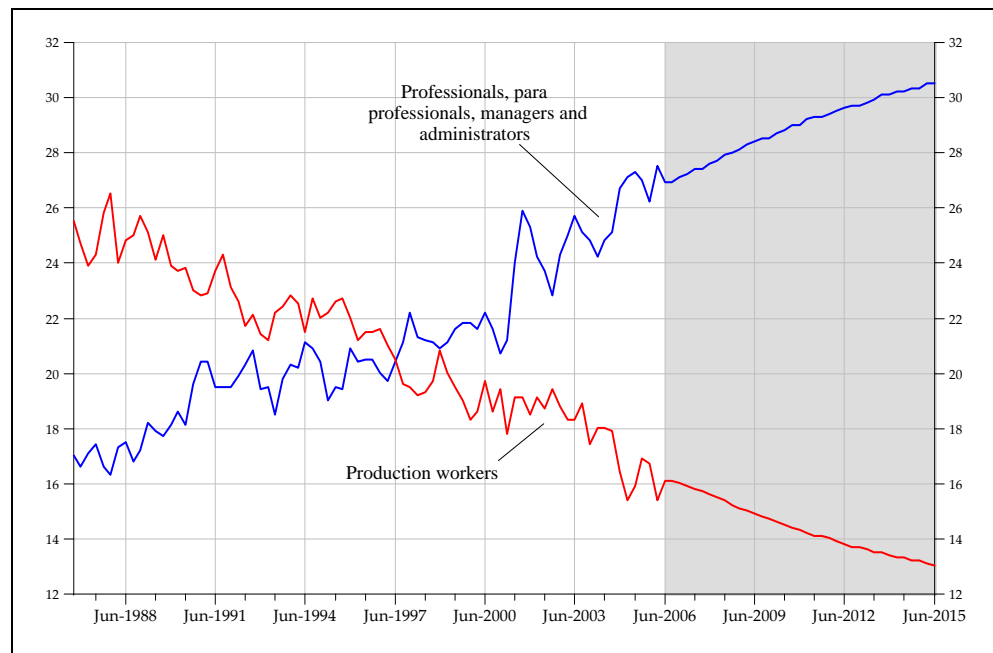
system. In early 2005 the operating system was worth around 20 per cent of the value of the computer. However, as low cost production has ramped up in China, the price of hardware has fallen relative to software, the value of software in the total package has risen to around 33 per cent (Mann, 2006, p 69). (That is, there is limited substitutability between the operating system and the processor and related hardware)

¹⁰¹ That is the Baumol-Bowen effect applies within manufacturing as well as between manufacturing and other industries. See Pilat and Wolfl, 2005 for data on the insourced service share across countries

to domestic real incomes, which in turn sustains higher levels of demand. This, in turn, adds to the demand for the output for domestic manufacturing as does the increase in demand for intermediate inputs of the mining sector itself.

As discussed below structural change within manufacturing appears to be favouring the knowledge intensive sectors. This is reflected in the changing occupational structure of manufacturing. While low skill jobs are being eliminated high skill jobs are being created. Since the early 1990s, while total manufacturing employment has been relatively unchanged, the number of professionals has increased by 30 per cent, while the number of production workers has fallen by around 34 per cent over the same period. These movements are reflected in the occupational shares shown in chart 5.2 below. These changes mean that manufacturing is becoming more like a service industry with more of its value added being generated by insourced design and other services and less by physical production.¹⁰² The compositional change has also boosted labour productivity and wages. For example, the greater concentration of employees in the higher paid occupations has added 4 per cent or around \$2,000 to the average annual wage for manufacturing employees since the late 1990s.

5.2 Occupational shares in manufacturing employment



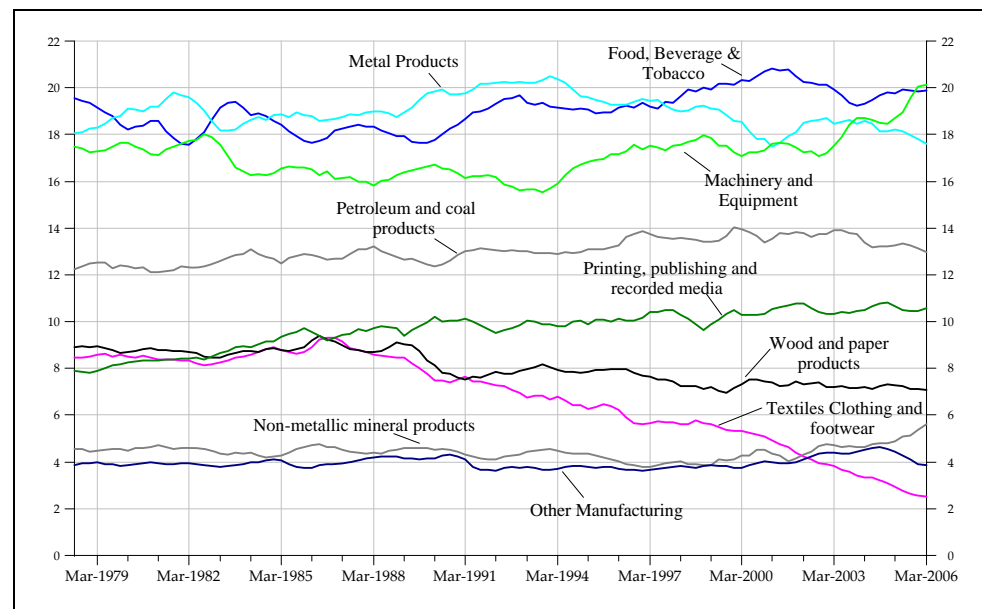
Data source: ABS Cat No 6203.0 and CIE AUSM projections

¹⁰² Moreover the value added of professional workers is higher and increasing faster than that of production workers (at least as valued by the market).

Structural adjustment within manufacturing

Within manufacturing two sectors stand out as having undergone significant structural shifts, namely, textiles clothing and footwear, which has decreased by around 4 percentage points since 1993 to the point where it is roughly a third of its previous size, and machinery and equipment, which has increased by an equivalent amount (4 percentage points) over the same period of time (chart 5.3). Other sectors have had relatively stable shares of manufacturing production, (although the pharmaceutical and medicines sub-component of petroleum, coal and chemicals – not shown- is also growing strongly).

5.3 Manufacturing sub sector shares of production



Data source: ABS Cat No 5602.0

Despite the decline in manufacturing's share in total output, employment in most manufacturing sub sectors has been relatively stable. While employment has not grown with the rest of the economy neither has it fallen. There are exceptions to this of course, textiles, clothing and footwear where employment has halved, and iron and steel (with the closure of the Newcastle steel works in 1999). Adjustment will continue in textiles clothing and footwear, but at a much reduced pace – even including out workers there is simply too few employees left in the industry for it to generate further large reductions in employment.

With high levels of turnover and mobility, and with now a tightening labour market, labour adjustment costs are likely to be much smaller over the next five years than they have been in the past. The main labour

adjustment problem will not be in workers finding jobs, but rather in firms finding and retaining the right employees.

Manufacturing – textiles, clothing and footwear

Since 1990 employment in textiles clothing and footwear has declined by more than half, from average levels of around 120,000 in the late 1980s to 54,000 today. Output has undergone even larger declines falling from \$1.6 billion in the late 1980s to slightly less than \$600 million today.¹⁰³ (The largest part of this fall has occurred over the last five years with output falling by almost half). Profitability in the industry has remained low for some time leading to low levels of capital investment. As a consequence productivity on a heads basis has declined. Combined with falling import prices the outlook for the sector would seem to be for further labour shedding and further declines in domestic output.

A number of factors have driven the decline. Firstly, on the demand side, textiles clothing and footwear have been a declining share of total consumption, declining by around a fifth since the late 1980s.¹⁰⁴ At the same time the industry has undergone significant changes in protection. Until the late 1980s the sector was protected by a combination of a high level of tariffs and tariff quotas. Productivity Commission estimates indicate that the effective rate of assistance peaked at 157 per cent in 1984-85.¹⁰⁵ Tariff quotas were abolished in 1993 and tariffs rates gradually reduced to a maximum of 25 per cent in 2000, with further reductions to be phased in by 2015 following the Government's response to the Productivity Commission (2003) Report on the industry.¹⁰⁶

However, by far the greatest part of the decline of the sector has come from external developments - the increased availability and falling price of Asian produced goods (chart 5.4). Suppliers to the domestic market have increasingly shifted to external sources, while at the same time local producers have relocated production facilities offshore. Real landed import prices for clothing textiles and footwear have fallen by half since the late 1980s with most of the fall coming in two waves, the first in 1989-90 and the

¹⁰³ In 2003-04 constant prices

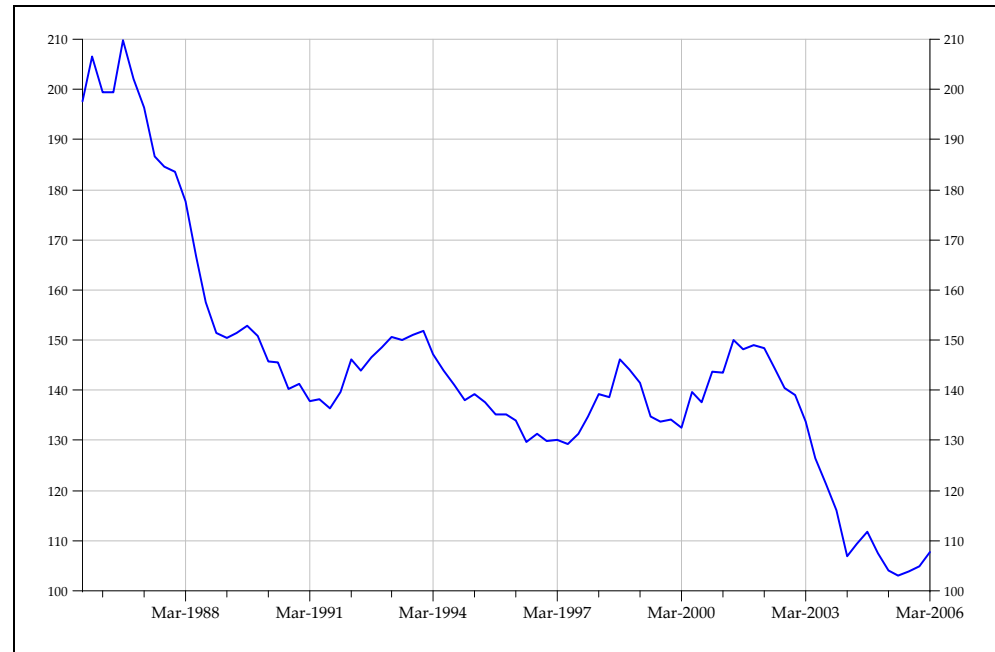
¹⁰⁴ Share of total consumption at constant 2003-04 prices. The decline has been larger in nominal terms, which in turn implies that the price elasticity of demand is less than one.

¹⁰⁵ PC, 2003a, P.148.

¹⁰⁶ For most items tariffs will fall to 5 per cent by 2010 with current higher rates for clothing and some finished textiles falling to 5 per cent by 2015.

second over the last three years driven in part by the rising Australian dollar exchange rate.

5.4 Real price of clothing, textile and footwear imports



Data source: ABS Cat No 5206.0 and 5302.0.

It is interesting to note that despite the significant overall decline there have been some parts at the design and fashion end of the industry that have been expanding. As quotas and protection were dismantled through the 1990s a small export sector emerged – with exports rising to around 4 per cent of total sales (chart 5.5). As the Productivity Commission notes:

‘Notwithstanding the recent significant falls in sectoral output and employment, some firms have adapted successfully to the more competitive market environment. An emphasis on innovative and high-value, capital intensive and niche products and on brand development, customer service and market development, have been among the hallmarks of the firms that have made a successful transition or are capable or doing so in future.’¹⁰⁷

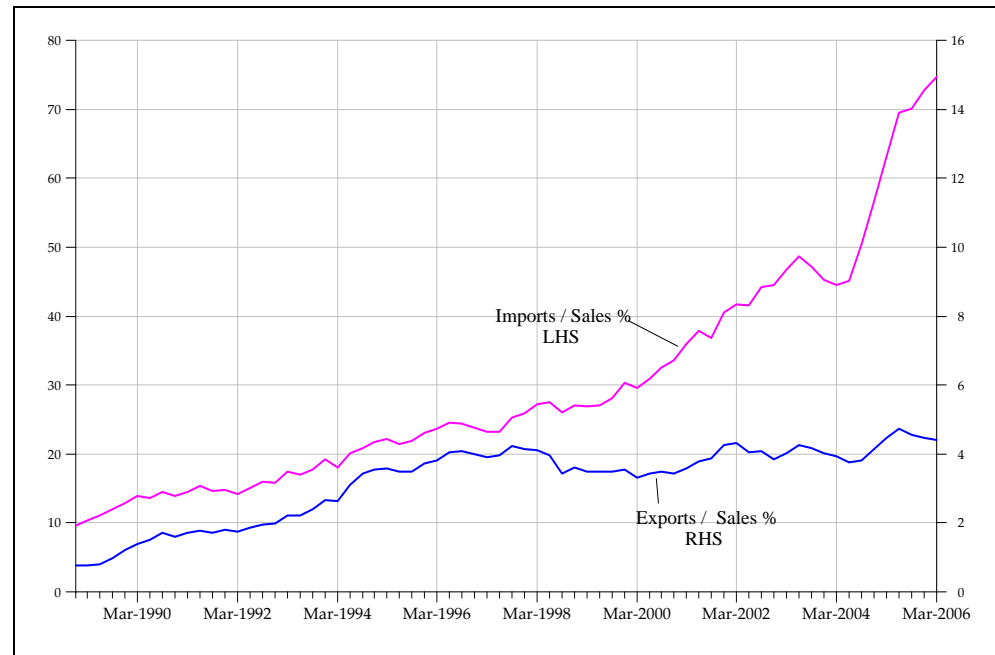
While the adjustment process has been painful, with particular effects on non-English speaking outworkers, the official statistics may overstate the decline in the industry and understate some of the beneficial effects. For example the Productivity Commission notes that as some companies have relocated production overseas the companies involved have been redefined by the ABS as being primarily involved in distribution despite the fact that the companies have retained some local production.¹⁰⁸ Similarly some

¹⁰⁷ PC, 2003a, P 54.

¹⁰⁸ PC, 2003a, P.61.

small design oriented producers have been redefined as part of business services. A company relocating production overseas would be defined as exporting design and managerial services and importing the final good. The process is another example of how the division between manufacturing and services is blurred in production.

5.5 Exports and imports of textiles, clothing and footwear



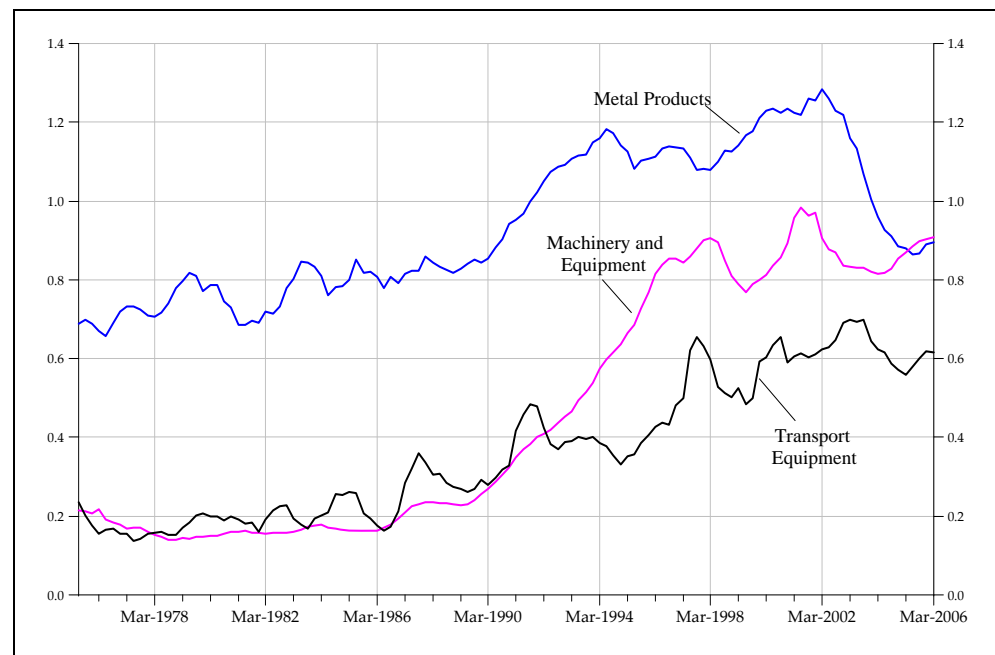
Manufacturing – equipment and machinery

The equipment and machinery sector provides a stark contrast to the structural adjustments occurring in textiles, clothing and footwear. Rather than declining, output in the sector has roughly doubled since the late 1980s. In contrast to the declining profitability, productivity and investment in TCF, the sector has been characterised by high levels of investment, taking advantage of falling investment good prices and lower interest rates.¹⁰⁹ It has consequently become much more capital intensive and more productive, with labour productivity on a heads basis roughly doubling over the equivalent period. The sector which accounts for around a fifth of total manufacturing, was responsible for more than half of multi-factor productivity growth in manufacturing in the seven years to 2000-01.¹¹⁰

¹⁰⁹ Investment levels in machinery and equipment have been roughly 8 to 10 times those in TCF over the last ten to 15 years.

¹¹⁰ PC, 2003a, P.168.

5.6 Exports of machinery, transport equipment and metal products



^a Exports chain volume measures at 2003-04 prices as a percentage of GDP – four quarter average. Data source: ABS Cat No 5302.0.

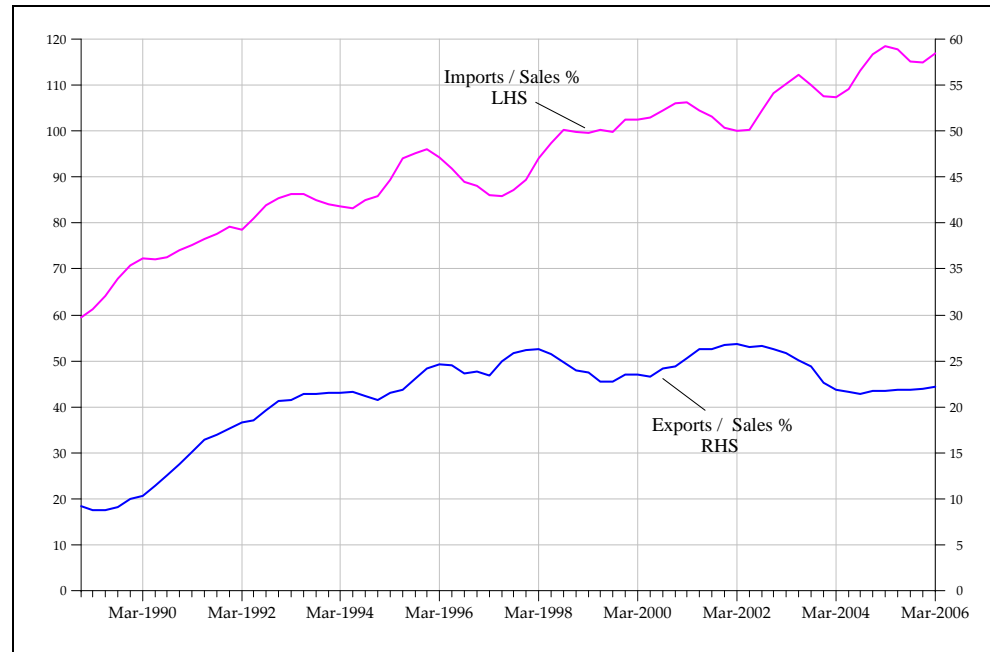
The sector has accounted for the major part of the increase in manufacturing exports (chart 5.6). The performance of the sector has been boosted by: deregulation of the motor-vehicle¹¹¹ and ship-building industries, the globalisation of the sector with motor-vehicle production in particular linking into global production chains, and the expansion of export opportunities for machinery and equipment as investment boomed in the ASEAN economies and China.

However, even with these improvements exports remain a relatively small proportion (about a quarter) of total sales. In addition, the exchange rate appreciation through to 2003 reduced the external competitiveness of the sector relative to other machinery and equipment suppliers such as Korea and Japan. Broadly speaking, following the dramatic improvements that occurred in the 1990s the sector's export performance has stabilised over

¹¹¹ The effective rates of protection for the motor vehicle industries peaked at around 130 per cent in the mid 1980s. Quotas were abolished in 1988 and tariffs were gradually reduced to 10 per cent by 2005 with further reductions to 5 per cent scheduled by 2015, with impacts offset with support provided by the government's Automotive Competitiveness and Investment Scheme (ACIS). Arguably protection of the industry is still relatively high. Effective protection is maintained via regulations relating to the importation of second hand cars from Japan and Korea. Also expenditure under ACIS seems high with \$4.6 billion originally budgeted for the period 2006 to 2015, or around \$74,000 for each employee in the industry.

the last five years. The sector as a whole is still largely focussed on servicing the domestic market (chart 5.7).

5.7 Exports and imports of machinery and equipment



Data source: ABS Cat No 5432.0 and 5676.0 and CIE calculations

Property and business services

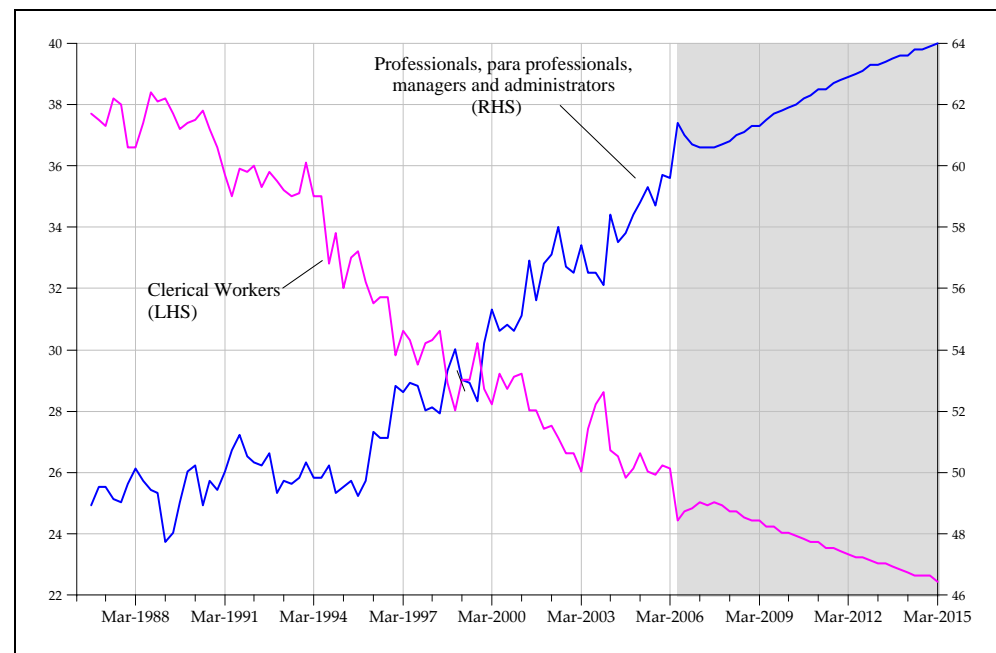
Property and business services are dominated by business services, which account for 86 per cent of employment in the sector. It also represents the most dynamic part of the sector (in fact the fastest growing sector in the economy) with employment more than doubling over the last 15 years. Property services in comparison have been a relatively stable part of the total economy, rising and falling with the building cycle and turnover in the property market.

Business services consist of the accounting and legal services, engineering and architectural design services, information technology and software services (and economic consultancies such as the CIE). The sector has a relatively high level of foreign investment, for example accountancy services are dominated by international firms such as Arthur Anderson.¹¹² The sector is dynamic and competitive and yet until recently the ABS measured output for the sector in terms of labour inputs (and hence by definition measured it as having no productivity growth). However, it seems likely that the sector has shown significant productivity growth over

¹¹² Foreign owned firms accounted for 21 per cent of activity in the sector in 2000-01.

the years. It is an intensive user of information technology and, like finance and insurance, was rapidly automating routine and clerical functions during the 1990s (chart 5.8). It would be surprising therefore if it did not have a similar level of productivity to finance and insurance. Given the sector now constitutes 12 per cent of total production, the measurement problems could be causing aggregate productivity growth to be underestimated by around 0.1 to 0.2 per cent a year, (and inflation to be overestimated by around the same amount).¹¹³ Given the emerging size of the sector it should arguably be the subject of more detailed collections by the ABS, and the focus of more attention on the part of policy makers.

5.8 Decline of clerical work in property and business services ^a



^a Per cent of total employment in the sector
Data source: ABS Cat No 6203 and CIE AUSM projections

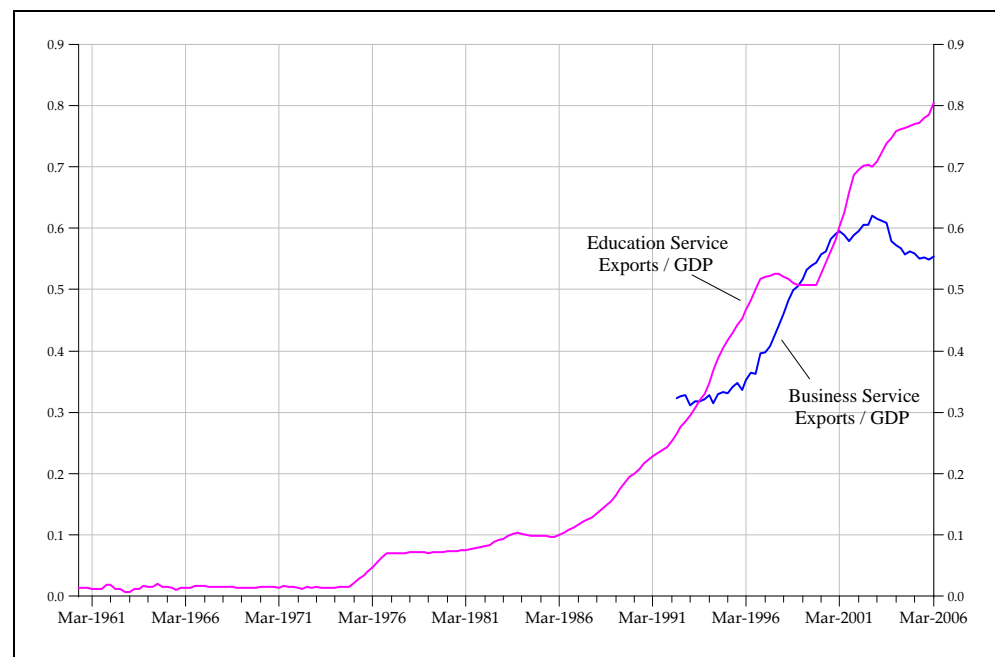
The sector is mainly directed at servicing the local market. However, some parts, particularly engineering, building design and accountancy, have significant international connections through their foreign affiliates. This and the comparative advantage that Australia has in skill intensive services in the Asian region is leading to a rapid growth of exports of business services. These have doubled as a percentage of GDP since the early 1990s (chart 5.9). With property and business services now larger than manufacturing in terms of both employment and value added, it seems

¹¹³ If productivity is underestimated, then measured constant price output grows more slowly than current price output, meaning that the price of output is rising faster than it should, i.e. measured inflation is higher by around the amount of the underestimation of productivity growth.

likely that the sector will be an important source of future growth of both exports and output.

However, while exports are expanding, it is also a sector that faces intensive international competition from the rapidly expanding skilled labour forces in India and China. Not all professional services are capable of being outsourced. The areas most subject to it are those that are either rules based or systems driven. Engineering design and computer programming for example are both high on the list of occupations that are liable to be outsourced to developing countries.¹¹⁴ It is difficult to predict but the development will have important implications for the comparative advantage of the sector and also for the demand for individual occupations. Hence, the linkage between manufacturing, business services and other industries with the education sector, particularly in research and development, is likely to become increasingly important.

5.9 Knowledge-based exports



Data source: ABS Cat No 5302.0, 5602.0

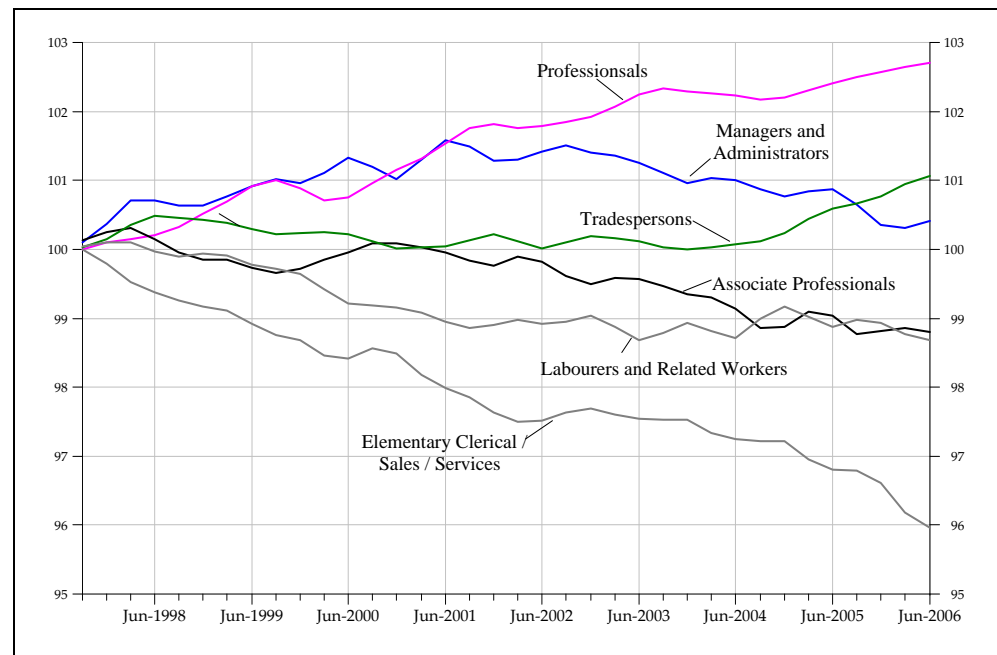
Education

As argued in Chapter 3 globalisation, computerisation and structural change is leading to significant shifts in the demand for skilled labour and the occupational structure of the workforce. This has important implications for the education sector. The rising demand for skilled relative

¹¹⁴ See for example OECD, 2005c; McKinsey, 2005; Blinder, 2006; Mann, 2006b..

to unskilled labour has led to a 10 per cent additional premium for professionals relative to unskilled workers since the late 1980s (chart 5.10). This in turn means that there are greater returns to education and training that should be driving increased demand for education services. Adding to this trend towards increased demand are two demographic factors, increased longevity and the retirement of the baby boom generation. Education participation rates increased in the early 1970s as many of the baby boomers were entering university. As they retire they will be taking with them a life-time of education and experience. This will add to the requirement for firms to find and train up appropriately qualified employees. At the same time increased longevity, and lower mortality rates are increasing the returns to education, particularly as participation rates for older workers increase (for example as educated retirees start to supplement their incomes with part time work). All of these developments, plus Australia’s emerging comparative advantage in knowledge intensive export industries, put an increased focus on the education and training sector and its interaction with other sectors of the economy as a key to the nation’s future economic performance.

5.10 Relative wages — a widening gap ^a

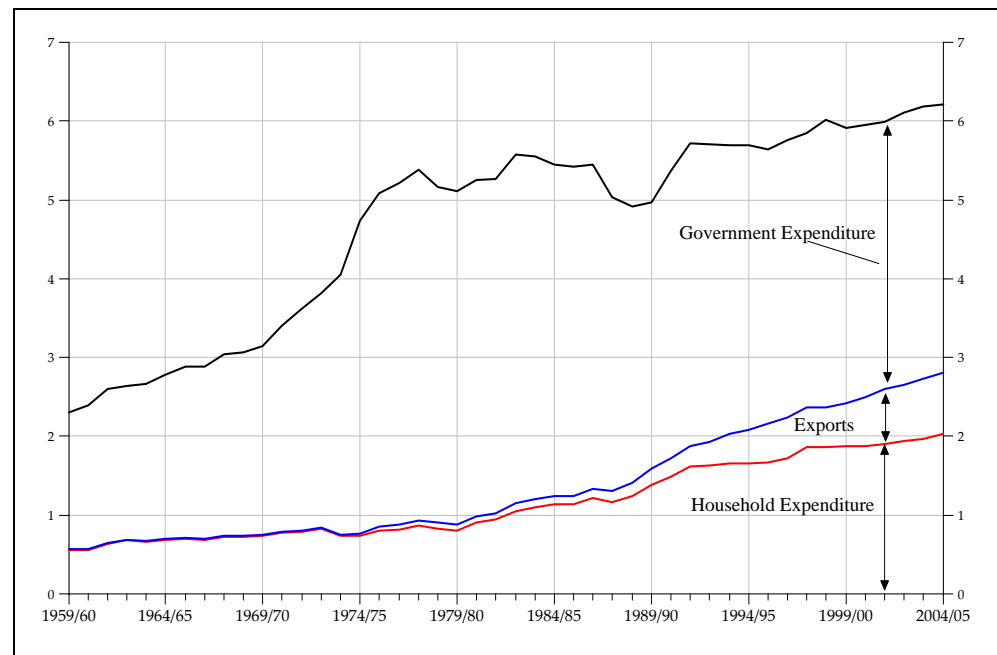


^a Hourly wage for occupation divided by total hourly wage - Index September 1997 =100. Data source: ABS Cat No 6345.0 and CIE calculations

The developments mentioned above have indeed led to increased private expenditure on education services. Private expenditure on education and training (household expenditure plus exports) has increased by a factor of three since 1980 (as a proportion of GDP – Figure 5.7 below). However, at

the same time government expenditure on education as a percentage of GDP has declined. Private expenditure on education is now almost as large as government expenditure. Yet at the tertiary level supply of education services is dominated by public institutions. Given the growing linkage of this sector to Asia and the need to establish stronger connections with knowledge intensive business, there may be a case for further reform in this area.¹¹⁵

5.11 Expenditure on education and training (per cent of GDP)



Data source: ABS Cat No 5204.0, 5206.0 and 5302.0 and CIE calculations.

Summary

Major changes are occurring within the manufacturing sector, with the relative decline in the labour intensive textiles, clothing and footwear, and a shift in comparative advantage towards knowledge intensive sectors such as machinery and equipment and pharmaceuticals and medicines. This is witnessed by the major changes occurring within the occupational structure. By 2010 there will be more than twice as many professional workers and managers in manufacturing as there are production workers.¹¹⁶

¹¹⁵ For example despite the high level of private expenditure, there is little in the way of application of competition policy (competitive neutrality) to tertiary institutions.

¹¹⁶ See chart 5.8.

Physical production is declining as a share of activity within manufacturing, in addition to the decline of manufacturing's share of total GDP itself. Yet government policy tends to be focussed on the location of physical activity and employment adjustment costs if individual plants close. Adjustment costs should now be much lower than in the past with low unemployment, high turnover and other sectors expanding rapidly. It is arguable that more focus should be given to the service component of the sector (and those services that are inputs to manufacturing from other sectors) given that this is the component of the sector which is most likely to be the source of future growth.

At the same time as manufacturing is becoming more knowledge intensive, business services are expanding rapidly and by 2015 will be about twice as large as manufacturing in terms of both employment and activity. Business services is also a sector that is faced with major global challenges, and is one that is likely to be an important source of both future growth in incomes and exports. Yet in comparison to manufacturing it receives little attention from either the ABS or government policy makers.

Similarly the education and training sector is facing major challenges such as the rapid increase in demand for professional and skilled workers, the growing export market in education services, and the development of skilled workforces in China and India and a global market in some labour services. Like business services, developments in this sector and how it responds to the challenges and interacts with other sectors seems likely to be a key to future economic growth.

6

Implications for policy and Australian business

The contemporary changes in any modern globalised economy are enormous. Some are internally generated, others externally so. Each change affects the structure of the economy at three different levels: within firms, within industries and across sectors of the economy. Some of the changes are big, others small. Some are reinforcing in their effects on structural change, others offset each other.

Technology changes but the principles of economics still apply

There are so many constantly occurring changes that it is difficult to attribute one structural change to any particular cause. Globalisation and rapid changes in information and communications technology in the late 1990s led some to talk of a new paradigm in economics, that the old principles no longer applied (among other things justifying market prices many times those of conventional valuations). These views received a reality check with the tech crash in 2000. Rather than requiring new rules, developments in the new economy turned out to require an extension of old ones. To paraphrase Shapiro and Varian (1999), while technologies, demographics, regulations, incomes, tastes and overseas developments can all change, the laws of economics do not. People still desire to become better off, they still respond in predictable ways to price signals, they still seek the best value-for-money goods and services, and they still make intelligent choices about where and how they work that reflect the opportunities around them. In this study, we have taken these known principles of economics and analysed the effects of various drivers of structural change. This analysis has been done through a consistent economy-wide economic model to explain what has occurred in the past and to project the possible make-up of the Australian economy and industry a decade out.

The drivers of structural change are themselves changing

Whereas the main drivers of structural change over the last five years have been the IT revolution, competition policy, low interest rates and rising asset prices, high mineral commodity prices, falling investment good prices, falling prices for imported consumption goods, etc., the mix of factors affecting Australia's economy over the next decade will be different.

In particular, demographics and an ageing population will exert a much bigger influence on the economy, and external developments in China and India will shift Australia's comparative advantage to higher technology and knowledge intensive sectors in addition to the already solid base in resource industries. Demographics alone will mean low levels of unemployment and a skills shortage of professional people – not just in Australia, but worldwide. Demographics also means that the rate of dwelling construction may fall by as much as 30 per cent over the next decade and, with it, the current shortage of tradespeople will likely peak in 2007. Business services are expected to grow by around 30 per cent over the next decade, as will 'exports' of education services to a strongly growing China and India demanding higher skills themselves. The declining underlying labour productivity in mining is expected to reverse once the current construction phase in response to higher commodity prices has worked its way through. The growth in finance and insurance will continue, but will not come from introducing IT like it has over the last ten years. Just as the introduction of IT had large impacts on the occupational structure over the last ten years, the potential for offshoring labour services may have large impacts over the next decade.

The economy is now better placed as a result of restructuring to take advantage of the opportunities offered by the rise of China and India

The restructuring of the Australian economy associated with deregulation and the removal of trade barriers is now largely in the past. So too are many of the changes associated with the introduction and exploitation of information technology, and the changing industry structures associated with increased foreign investment and international diversification of equity portfolios. The economy is far more flexible as a result of these changes. It is far better placed to deal with the challenges and take advantage of the opportunities presented by the rise of China and India and the other Asian economies, than if reform had been delayed or change resisted.

New challenges are being presented to some industries by falling import prices for some goods, and a higher exchange rate associated with higher commodity prices. However, it needs to be kept in mind that even after the recent increases, Australia's real exchange rate is still lower than it was in the 1970s and 1980s and only marginally higher than it was in the late 1990s.

China and India and other Asian countries present far more of an opportunity than a threat to Australian industry. Our economic structure is complementary to these developing economies rather than rival to them.

Australia has a massive resource base. It also has rapidly expanding knowledge-based industries such as business services and education, and an emerging comparative advantage in knowledge based service exports and knowledge intensive manufactures such as pharmaceuticals and machinery and equipment.

Implications for business

The factors driving structural change described in the previous chapters will continue to present challenges and opportunities to Australian industry. The most prominent of these include:

- *Continued adaptation to the opportunities provided by the advances in information technology.* As discussed, a considerable part of the initial adjustment to information technology may already have taken place. Finance and insurance after undergoing a period of labour shedding associated with the computerisation of routine clerical functions and the introduction of ATMs and EFTPOS, is now again expanding employment to offer quality high-end services to customers. Similarly, the wholesale and retail trade sectors have already largely digitised their logistic and sales operations, and productivity improvements in these sectors seem to be tapering off. But, at the same time computers and other IT equipment continue to fall in price, as does software – leading to yet more possibilities for cost savings or enhancements of production. Consequently it will continue to have impacts in distributional services, property and business services, communications and finance and insurance, which together now make up almost 40 per cent of GDP, and which are all projected to grow faster than GDP over the next ten years.
- *Obtaining, training and retaining professional and skilled workers.* These will be required to compete in an increasingly globalised market. As outlined in Chapters 2 and 3 the demand for professional and skilled labour will grow rapidly over the next five to ten years, while at the same time unemployment will be lower, job vacancies higher and new entrants to the workforce fewer. It will also be a period in which the baby boomer generation will start to retire and in which a very large skilled labour force will be emerging in India and China. Firms that can attract and manage skilled labour will have a competitive advantage, as will firms that can access both the sourcing opportunities and the market opportunities emerging in Asia. Industries such as business services, and pharmaceuticals and machinery and equipment in manufacturing, have much to gain in this regard.

- *Accessing the Asian and global market.* For selected sectors, particularly manufacturing and business services taking advantage of the opportunities emerging in Asia will be a major challenge. Currently these sectors are mainly focussed on servicing the local market and where international connections exist these tend to be with other English speaking countries rather than our emerging trading partners. However, attitudes are changing rapidly as indicated by business surveys and the recent “Business without Borders” conference.
- *Dealing with slower growth due to slower population and productivity growth.* Productivity growth has slowed in recent years and seems unlikely to return to the high levels experienced in the 1990s. The consequences of this slowdown have so far been disguised by the commodity boom. With the growth in the working-age population to slow rapidly in the next five years, and without another wave of productivity boosting microeconomic reform, Australian GDP growth is likely to be much slower than in the last ten years. At the same time the Asian market will be growing rapidly. Firms that are able to shift their exposure to the growing market relative to the slowing market will have an advantage over firms limited to the local market.
- *Exchange rate risk and volatility.* While the business cycle has been relatively stable over the last ten to 15 years, Australian business has continued to be exposed to large fluctuations in exchange rates. With our exports set to be more dependant on commodities than in the past, and with likely fluctuations in financial flows and the business investment cycle, this looks likely to continue. In part the volatility explains the diversification of portfolios and operations overseas. Having overseas operations allows business to engage in operational hedging. Firms that are able to invest in the developing Asian market may also find the exchange rate moving in their favour in the medium term. After having risen over the last five years, the Australian real exchange rate is likely to revert to its secular decline, particularly when measured against the currencies of the fast growing Asian countries.¹¹⁷ This means that any company with investments in these countries is likely to do well over time.¹¹⁸ It also means that there will be increasing demand for Australian goods and services (for example tourism, business services) as Asian purchasing power over Australian goods increases over time.

¹¹⁷ Due to the Balassa-Samuelson Effect – see Appendix A. These countries also provide greater risk diversification benefits as their equity markets are much less correlated with the Australian market than US and European markets (IMF, 2005b)

¹¹⁸ Assuming the basic investment is sound.

These challenges represent changes that will tend to favour large firms with international connections particularly those with operations or affiliates in the rapidly growing Asian markets. Small local firms will face a slowly growing domestic market, labour shortages and a volatile exchange rate.

Implications for Government Policy

Several policy implications follow from these findings. First, the skills shortage will require careful management and improvements in the efficiency of skills formation in the economy will be an obvious boost to the economy. This effect, and the implications for our education and training system, will reinforce another trend – the prospect for significant ‘export’ earnings from educating and training foreigners. Together, these effects imply policies to ensure our education system is as efficient and responsive to changing demands as possible

Hence, perhaps the greatest challenge for government, as with business will be in responding to the continuing rapid growth in demand for professional and highly skilled workers. This growth is being driven by the shift in comparative advantage towards knowledge intensive goods and services,¹¹⁹ and the impacts of falling capital good prices and computerisation mentioned above. Private expenditure on education and training¹²⁰ has doubled as a proportion of GDP over the last twenty years reflecting these changes while that of the public sector has declined. It seems likely that further reform of this sector, will be required with improved coordination between State and Federal governments. It seems likely that improving the linkages between this sector (with its links into Asia) and other rapidly developing knowledge intensive sectors such as business services and sectors within manufacturing will be a key to taking advantage of opportunities arising in Asia and developments in international trade in labour services.

By 2015, property and business services will be contributing twice as much value added and employing twice as many workers as manufacturing. Yet both government policy and statistical collection seem to be lagging behind the change. Within manufacturing numbers engaged in physical production seems likely to continue to decline relative to those involved in design, process management and other insourced services. With

¹¹⁹ Taken together knowledge intensive exports have added 3 ¼ percentage points to exports as a per cent of GDP over the last twenty years (education services, business services, pharmaceuticals and medicines, machinery and equipment, and transport equipment).

¹²⁰ Including exports of education services.

manufacturing also declining as a proportion of GDP the physical production component of employment and value added is continuously diminishing. This means that the potential for productivity gains and trade in the activity is shifting towards the insourced and outsourced service components of the activity. Yet industry policy seems mainly to be focussed on the physical production aspects. Arguably some shift in focus may be required.

At the same time, the changes outlined above will be creating challenges which will probably require a coordinated response across a number of portfolios and levels of government. International experience suggests that adaptability, flexibility and competition are the keys to gaining the benefits from change, while a supportive macroeconomic environment helps to minimise the adjustment costs.

The OECD has recently developed a best practice guide to structural adjustment policy drawing on its in-depth research and extensive review of experience across countries (box 6.1). The economic framework in Australia already conforms with many of these recommendations. Much has already been done through the late 1980s and 1990s with the dismantling of industry protection, establishment of competition framework, and through the process of successive Productivity Commission inquiries and Government responses. This base of sound principles already adopted serves as a good platform to expand the supply-side of the economy by addressing issues of the availability of human skills, infrastructure and ensuring the regulatory burdens on business are the most efficient possible. It is not possible to predict every adjustment pressure and structural change likely to arise over the next decade. The most helpful thing governments can do for business is to provide an economic framework that is flexible and stable where transaction costs are low as possible so firms can respond quickly to the new opportunities as they arise and redeploy their resources into the highest valued uses.

6.1 OECD findings on policies for structural adjustment

A recent study by the OECD drawing on its extensive peer review processes and research in the area of micro reform and structural adjustment arrived at the following recommendations (paraphrased below):¹²¹

1. *Rely, on generally available measures* to address adjustment costs, including through the social security and tax system.
2. *If assistance is targeted make it transparent and time bound.*
3. *Foster macroeconomic stability and growth.*
4. *Adopt sound labour market policies* that facilitate the reallocation of workers towards higher productivity employment to reap the gains from trade.
5. *Foster a sound regulatory and competition environment* which permits transformation within firms as well as entry and exit across sectors, keeping regulatory barriers on enterprises to the necessary minimum and reducing the trade-distortive effects of domestic regulation.
6. *Foster a strong institutional and governance framework* that will favour structural reform via effective ex ante policy evaluation, independent review and effective dialogue
7. *Adopt liberal trade and foreign investment policies*, that support structural adjustment by contributing to economic growth, fostering competitiveness and innovation, improving access to essential imports and encouraging synergies between countries with different areas of comparative advantage:
8. *Undertake reforms across different policy areas in a complementary way*, in order to maximise cross-policy synergies and to reduce resistance to structural change, by encouraging those adversely affected by one reform to benefit from another.

The Australian experience over the last decade has provided a good example of the benefits of applying many of these principles in practice. Productivity growth has been high, inflation has been low, and unemployment has fallen despite what appears to have been an increased pace of adjustment in the labour market. The approach to structural reform via Productivity Commission inquiries and reviews is highly transparent, and macroeconomic and microeconomic policy have been highly complementary. More remains to be done as new challenges emerge particularly in relation to foreign investment policy, areas where the Commonwealth and States have overlapping responsibilities and in human up-skilling. However, as opposed to early decades, and as compared to many other OECD countries unemployment is now low, and the focus on adjustment has moved from how to preserve declining sectors, to how to facilitate new areas of growth. Business attitudes have also changed and are now more outward oriented. As a recent survey of attitudes of manufacturers by the Australian Industry Group found ... 'companies believe improving competitiveness through better incentives for innovation; encouraging export market development; reducing regulatory burdens, promoting skills development, building our infrastructure of transport and other business facilitation; further tax reform; environmental sustainability; and enhancing competitive business practices' are the way government can best help industry.¹²²

¹²¹ OECD, 2005c.

¹²² AIG, 2006, P15.

Appendixes

A

Glossary of effects

Baumol–Bowen effect

Also sometimes known as ‘Baumol’s cost disease’. Productivity growth tends to be lower in some service industries compared to that in primary and secondary industries. This leads to rising relative prices for services over time, and a tendency for the share of services in employment and expenditure to rise, while those of manufacturing fall – the Baumol–Bowen effect.¹²³

While true as a general proposition there are many exceptions. A string quartet was Baumol and Bowen’s original example of an activity where productivity has not changed much over the centuries. In retrospect, it wasn’t a great example. Even for a string quartet, there are CDs and broadcasts – where once it would entertain a few thousand (or a handful in the case of chamber music) a single performance can now reach millions.¹²⁴ Likewise productivity growth has been quite rapid in some of Australia’s service sectors over the last 20 years. The finance sector has benefited from rapid computerisation, while the costs of communication services have fallen dramatically. Wholesale and retail trade have benefited from deregulation and digitisation.¹²⁵

Traditional consumer services such as accommodation and cafes and restaurants are however inherently lacking in productivity growth as are some personal services, such as hairdressing, house cleaning, legal services, prison services. It is useful in thinking about productivity trends within services to distinguish between personal and impersonal services. Those services that require person to person contact tend to lack productivity growth, (or where it occurs it is in terms of improved quality of services). In contrast, impersonal services such as communications, and finance and insurance can be characterised by rapid productivity growth.

¹²³ Baumol and Bowen, 1966.

¹²⁴ Obstfeld and Rogoff, 1996, P 209.

¹²⁵ For US examples see Triplett and Bosworth, 2003.

It is important to note that the Baumol–Bowen effect requires the price elasticity of demand for services to be less than one. If the elasticity were one the share of services in nominal expenditure would not change with a rising relative price. If it were greater than one the services share of output would fall over time. The fact that the service share is rising is consequently likely to be due to a combination of factors. For example a low elasticity combined with the fact that the income elasticity for some goods such as food is less than one (the Engel effect). As countries develop the share of durables and manufactured goods in expenditure rises rapidly as household cross income thresholds which allow them to afford refrigerators, televisions, washing machines, cars and so on. However once saturation points are reached, there is less point in each additional purchase, and the income elasticity of demand falls below one. Hence changing preferences as incomes rise over time is probably often as important a factor in explaining changing trends in industry shares as differentials in productivity growth across industries.

The Baumol–Bowen effect is a far more dominant factor in explaining changing employment shares over time.

Gregory effect (Dutch Disease)

An idea first put forward in the Australian context by Bob Gregory and hence known as the Gregory effect. Elsewhere the same phenomenon is known as the Dutch Disease, or the booming sector problem. An increase in commodity prices or an expansion of mining capacity due to resource discoveries will lead to a higher real exchange rate crowding out other export and import competing industries, particularly manufacturing. Subsequent general equilibrium studies pointed out that many Australian manufacturers rely heavily on imported inputs and capital equipment, and to the extent they do the effect would be ameliorated. Moreover as incomes rise so does local demand for manufactured products. Some manufacturing sub sectors consequently expand as a result of higher commodity prices.

Stolper–Samuelson effect

One of the central results of the Heckscher–Ohlin model of international trade. Put simply: if there is an economy with two sectors, one capital intensive and one labour intensive, producing distinct goods, an increase in demand for the labour intensive product will lead to a rise in demand for labour in the economy, and an increase in return to labour (rising real wages). In its original form Stolper and Samuelson (1941) demonstrated

that if the export sector was capital intensive and the import competing sector labour intensive, then the impact of increased tariffs on the import competing sector (raising demand for its product) would increase demand for labour and raise real wages.

It is important to note that the theorem does not contradict the basic tenet of the Heckscher-Ohlin model that for countries which are price takers on the world market, tariff reductions increase national welfare. Rather the theorem points out that the gains from such change may not be evenly shared.

The converse of the theorem is that reduced levels of protection for labour intensive manufacturing and increased competition from countries such as China will lead to a fall in the returns for unskilled labour. However, it is important to note that the Stolper-Samuelson effect is a comparative static result. In a dynamic context, relative wages of unskilled workers also depends on the supply side – as returns to unskilled work falls the incentive to invest in training increases. So long as the education and training system are responsive and forward looking enough, and people are aware of the prospects for employment in various occupations, there is no necessary impact of increased labour-intensive imports on unemployment or relative wages. The clear implication though is that, in the absence of significant international labour flows, increased trade with countries that are abundant in unskilled labour will increase the returns to education and training in the home economy.

Rybczynski effect

Rybczynski's effect is similar in some ways to the Stolper-Samuelson effect but approaches the problem from the supply side. If there are two products one labour intensive and the other capital intensive, an increase in the supply of capital will lead to a reduction in the absolute output of the labour intensive product, even though production of the economy as a whole increases¹²⁶ (In essence as the capital intensive sector expands it draws labour away from the labour intensive sector, reducing output in that sector.) However, the effect depends on relative factor prices, if the increase in supply of capital is due to falling relative prices, then the impact

¹²⁶ The result assumes that relative factor prices are fixed. A falling relative price of capital, or conversely a rising relative price of labour, associated with the increased supply of capital would tend to neutralise the impact (both sectors becoming more capital intensive).

on the relative output of the labour intensive sector would be much smaller.

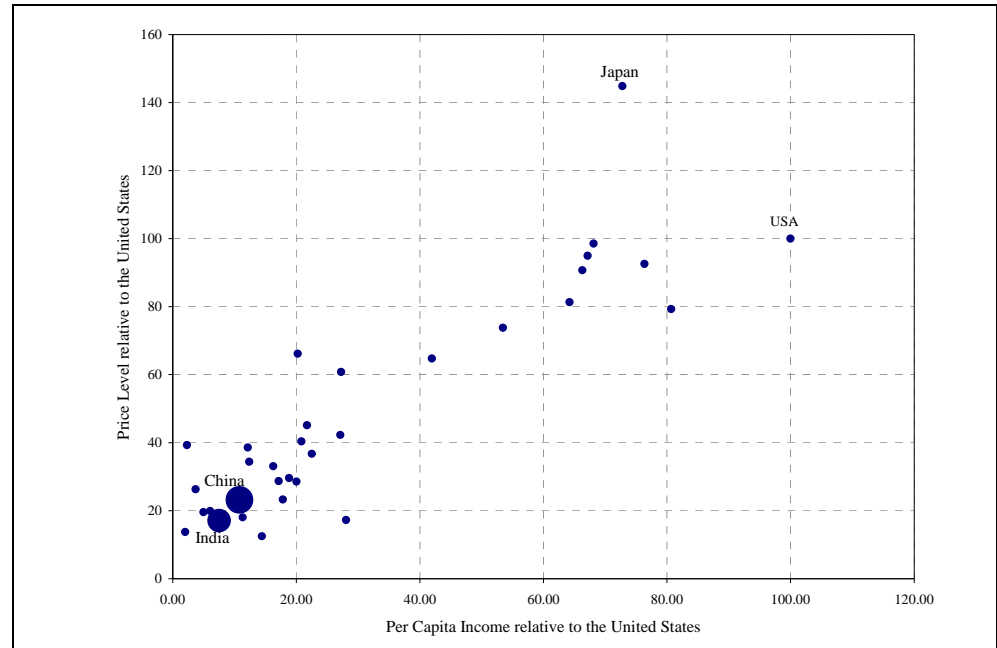
The integration of China and India into the world economy, could be represented as an increase in global labour supply, which, other things being equal would draw on global capital, and reduce output and wages in OECD economies. However two points need to be kept in mind. Firstly, like the Stolper Samuelson effect, Rybczynski's effect is comparative static. Secondly, savings rates are high in China and other Asian economies, and there has been little net flow of capital from the West. Rather the flows have been the other way around. Capital has been flowing uphill to the developed countries. Hence China and other Asian countries have also increased the world supply of capital.

Balassa-Samuelson effect

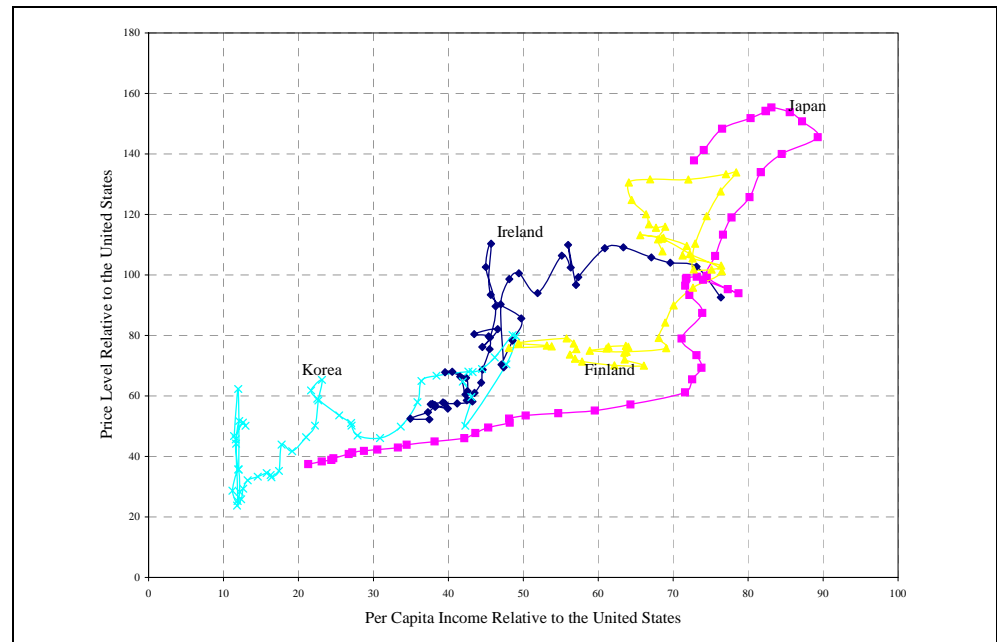
The Balassa-Samuelson effect refers to the effect on the measured real exchange rate of higher productivity growth in the tradeables sector relative to the non-tradeables sector. The theory provides an explanation for two inter-related empirical phenomena. The first is the widespread finding that international price levels are positively related to the level of real income per capita. The second is the observation that the exchange rates of rapidly growing countries such as Japan up to 1990 or South Korea or Ireland more recently tend to rise in real terms against the \$US. For example, between 1950 and the late 1980s the Yen/US real rate appreciated by a factor of three.

Figure 1 and figure 2 below show cross sectional data and the time series data on these two points respectively. The vertical axis on the two charts can be interpreted as the real exchange rate. It is the surveyed price of a standardised basket of goods and services measured in local currency converted to US dollars using the market exchange rate and divided by the US dollar price for the same basket in the United States. It can also be interpreted as the deviation of the market exchange rate from purchasing power parity, or the degree to which poor country currencies are undervalued.

A.1 Price levels and per capita income: across countries 2000



A.2 Price levels and per capita income: over time 1950-2000



Data source: Penn World Tables 6.1 Notes: The price level relative to the United States is measured using the PPP surveys benchmarked for 1996. That is, the price of a standardised basket of goods and services is measured in local currency, converted to US dollars using the market exchange rate and divided by the equivalent US dollar prices. Figure 1 shows the relativities for those countries with populations higher than 30 million. Figure 2 shows the relationship in time series form for OECD countries that have displayed convergence in the post war period.

Balassa (1964) and Samuelson (1964) explained these related empirical observations by reference to developments in the traded versus non-traded good sectors. In developing countries wages and labour productivity are low in both the traded and non-traded good sectors. With development the most rapid productivity growth occurs in the traded good sector. Wages in the traded good sector rise. Factor price equalisation spreads these wage rises to the non-traded good sector (the traditional services sector where productivity growth is much lower). Hence non-traded good prices rise relative to traded goods. (Put another way, it takes a cook the same time to prepare a meal in a poor country as a rich country but in the rich country his or her wages are much higher. As development progresses the wages of the poor country cook become more like those of the rich country cook despite the fact that his or her productivity is unchanged.)

As exchange rates move over time to broadly equate traded good prices across countries, the increase in non-traded good prices means that the real exchange rate (the price of one countries goods and services relative to another expressed in a common currency) rises over time.

The importance of the Balassa Samuelson effect for Australian industry is that as China and India and the ASEAN countries develop, not only will their real incomes be increasing rapidly, but also their purchasing power over Australian goods and services will be rising with a rising real exchange rate. As real incomes double the real exchange rate will rise by a similar amount, so that the size of the market rises not by two, but by a factor of three or four. It also means that companies that have diversified into these economies will gain a handsome return on their investments when converted back to Australian dollars.

Measures of structural change

Two different indexes of structural change are used in the literature, one due to David Lillien and the other the OECD. The two measures are reasonably similar with the Lillien Index using the variation in growth rates across industries while the OECD measure looks directly at changing shares. As the construction of the Lillien index involves using the shares to weight the growth rates, the movements in the resulting indexes tend to be fairly similar.

- The Lillien index for structural change in industry employment is calculated as follows:

$$I_{Lillien} = \sum \frac{e_i}{e_T} \times (\Delta \ln(e_i) - \Delta \ln(e_T))^2$$

where e_i is employment in industry i and e_T is total employment.

- The OECD index by comparison is calculated as follows:

$$I_{OECD} = \sum \left| \Delta \frac{e_i}{e_T} \times 0.5 \right|$$

Intra-industry trade indexes

The extent of intra-industry trade is commonly measured by Grubel-Lloyd indexes based on the extent of within industry transactions. Thus, for any industry i , an index of the extent of intra-industry trade is given by the following ratio:

$$I_i = 1 - \frac{|X_i - M_i|}{X_i + M_i}$$

This index takes the minimum value of zero when there are no products in the same industry that are both imported and exported, and the maximum value of 1 when all trade is intra-industry (in this case X_i is equal to M_i).

This index is then aggregated across commodity classes using the share of each commodity in total trade.

$$I_T = \sum \frac{X_i + M_i}{X_T + M_T} \times I_i$$

A degree of caution must be used when comparing and interpreting intra-industry indices because their measurement crucially depends on the level of disaggregation chosen for the analysis. Intra-industry trade may arise because of vertical differentiation within the classification (an example would be industrial chemicals, Australia might import one type of chemical and export another). Or it may arise as a result of related party trade of a distributional sort (for example a business in one country might export a good to another country which acts as a distribution centre for other countries in the same region). Linkage into global physical production chains would involve a firm either exporting intermediate goods to be processed elsewhere, or importing intermediate goods to transform them into final goods for export. Unfortunately insufficient data exists to develop these indexes for services. As discussed in the text it may be this service component that is the most important aspect of Australia's future linkage into region trade networks.

B

Model system to decompose structural change

The CIE Australian Macroeconomic (AUSM) Model

The CIE Australian Macroeconomic Model is a quarterly time-series structural model of the Australian economy. It is essentially an outgrowth of the Treasury Macroeconomic (TRYM) model. It is an evolution of that model towards a CGE style model incorporating input-output based demand systems and far greater industry and commodity detail than the original model, but retaining the same overarching design philosophy. Like the original TRYM model it has three broad sectors (the household sector, the business sector and the public sector) and three markets: the product market, the labour market, and the financial market. Systems of equations link each sector and each market. Like TRYM each equation has a long run representation. The long run components are combined to form a steady state version of the model that is simulated to provide forward values for expectational variables. The parameters in AUSM are entirely estimated off the historical time series data. The model is updated quarterly and used for detailed forecasting and sensitivity analysis. It is meant as a practical tool to be used in day to day forecasting and applied economic analysis. The comparative advantage in a model of this type is that it is honed by being constantly tested against the data.

Analysing structural change using AUSM

To obtain some sense of the balance of effects across industries we use the CIE's AUSM model of the Australian economy. No model provides a perfect rendition of reality, but AUSM has the advantage of combining a theoretically consistent internal structure with a close fit of the historical time series data. It therefore provides a detailed explanation of how the factors outlined in Chapter 2 have affected the structure of the economy over the last five years, and a means of projecting those changes into the future. It doesn't answer all questions, particularly those that involve

qualitative assessment, but it does provide a way of balancing the various effects to arrive at an aggregate outcome.

There are a large number of different aspects to structural change. Drivers can be external or domestic. They can have their initial impacts on supply or demand. They can work through various agents in the economy; households, business or government. It can manifest itself through interactions in different markets: the financial markets, the labour market and the market for goods and services. Some of these are summarised in chart B.1 below.

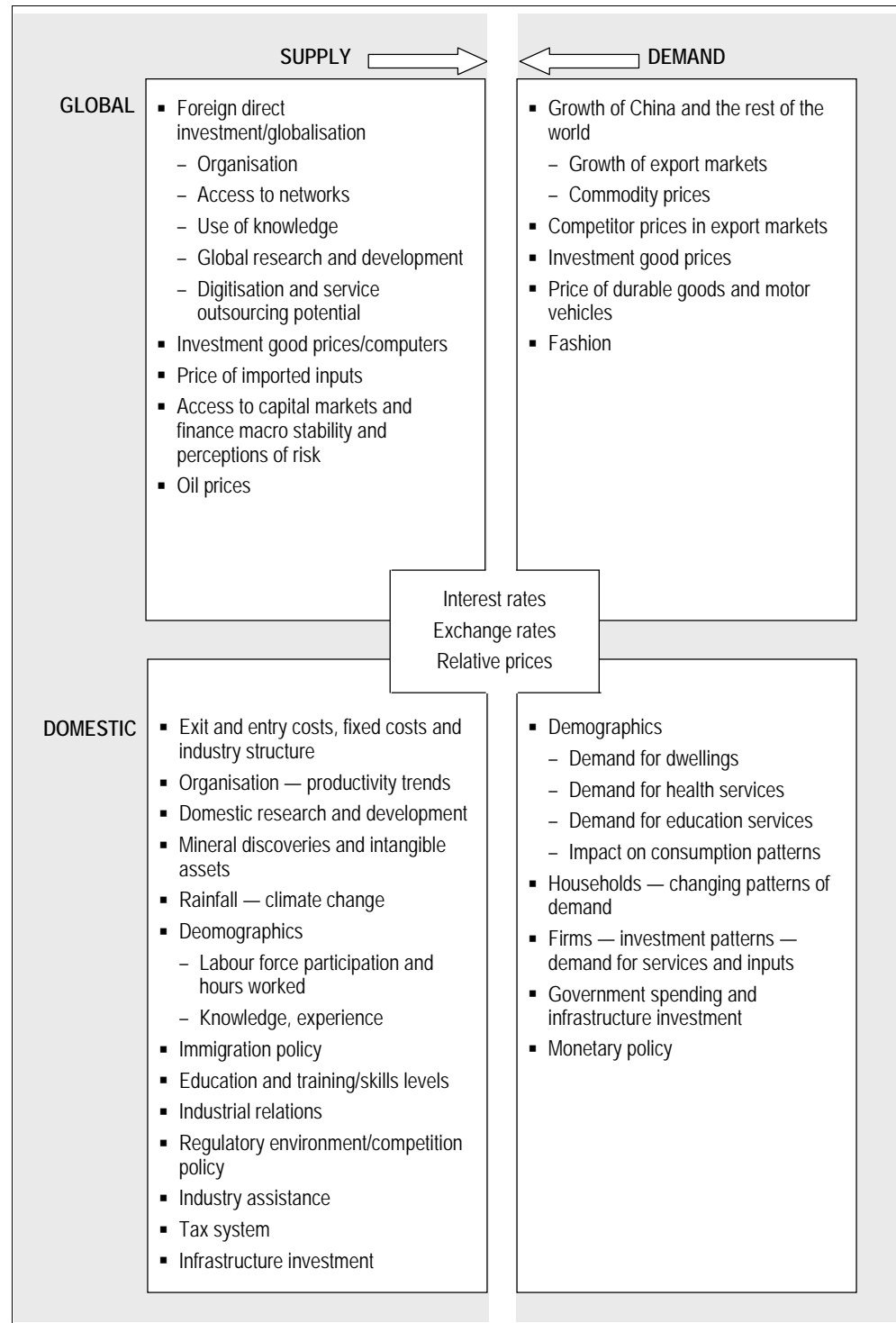
It is clear that, apart from the global factors, which are truly exogenous, each domestic factor feeds back to influence each other domestic factor. But to answer the question of what is driving structural change we need to start somewhere. The approach we take in Chapter 3 of this report is to use the internal structure of the CIE's AUSM model to trace through the impacts of the global factors and decompose structural change into its demand side and supply side components.

The model is designed for forecasting and policy analysis and therefore needs not only to have a coherent internal structure, but also to fit the data – to be able to explain recent history. To do so it has a set of interlocking systems of equations to explain behaviour in various markets and by various economic agents. The points of interest in this study are the factors that primarily determine the structure of demand and supply for industry outputs.

Chart B.1 provides a stylised representation of how supply and demand are linked in the model. The key to the system is what is known as the primary input content of final demand table.¹²⁷ This provides a way of mapping components of demand across to the components of supply. Components of demand (shown across the horizontal axis in chart B.2) consist of the various categories of consumption, investment, government expenditure and exports. Components of supply (shown along the vertical axis) consist of individual industry value added, the output from dwellings, and imports. Structural change can occur as a result of changes across either axis.

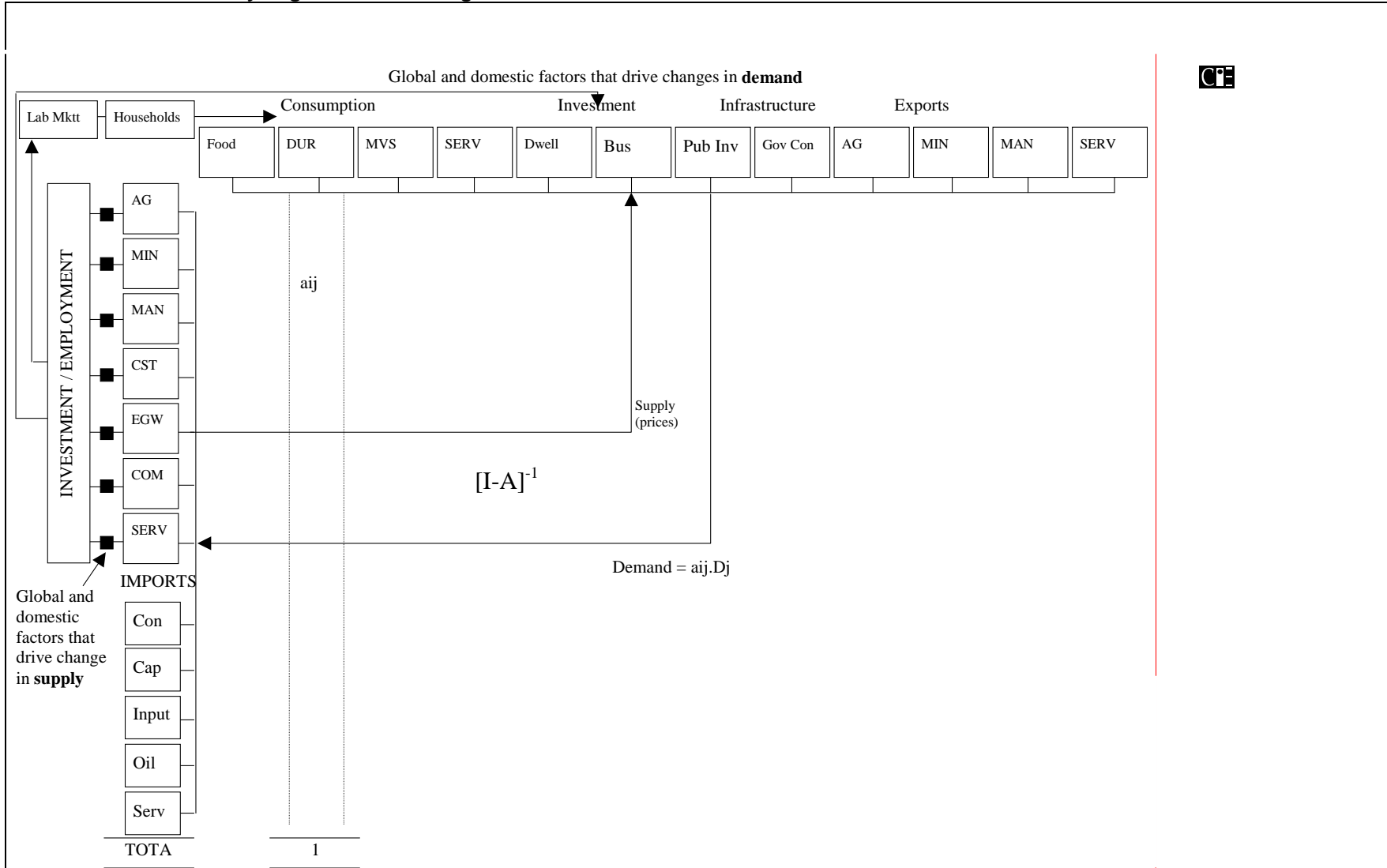
¹²⁷ The primary – input content of final demand table is derived from the input-output tables. In the ABS national accounts input output tables - the supply-use table shows the amount of each industries gross output (and imports) that feeds into other industries as inputs (intermediate inputs), and the amount that goes to final demand (final demand including exports). If we denote the former as [A] and the latter as [D] then the primary input content of final demand table is: $[I-A]^{-1}[D]$. (Within this $[I-A]^{-1}$ is known as the inverse Leontief matrix.)

B.1 Factors driving structural change



Source: The CIE.

B.2 Framework for analysing structural change



There are a large range of factors that can lead to changes in demand. These range from: demographics, impacting such things as the demand for dwelling rents and health, education and travel services; to changing consumption preferences of households as incomes rise, or new products or services become available (such as plasma screens); to factors that change the size and composition of dwelling and business investment (availability of finance, falling computer and software prices); to factors that influence exports (critically the exchange rate, commodity prices, growth in our export markets.)

For the household sector these factors are captured within a consumption demand system. The system embodied in the model uses stochastic trends to capture changing patterns of demand unrelated to income or price. The system is set up in such a way that these trends add up to one. That is they offset each other. If there is an increasing preference for one type of good, decreased preference across other goods is implied. Similarly for relative price effects, the system captures own price and cross price effects, and the cross price effects are symmetric. Again the logic is the same, when you substitute towards something you substitute away from something else.

On the supply side structural change (as measured by changing employment or output shares), can be driven by such things as changing relative prices due to exchange rate movements, or changing productivity trends within industries. Productivity in turn depends on a wide range of factors, such as organisation, technology, skill levels, and the price of capital and labour inputs.

Figure 3 overleaf shows the primary-input content of final demand coefficients underlying the AUSM industry demand system. The table essentially provides a snapshot view of the structure of the economy. In the first panel reading down the rows show the proportions of each item that come from each individual supply source. Reading across the rows in the second panel indicates where the value added from individual industries ultimately ends up. For example, 43 per cent of manufacturing value added goes to consumption (mainly durables and processed food, while 25 per cent feeds into exports.

B.3 Primary Input Content of Final Demand

	Private Consumption												Private Business Investment								Exports				
	Food	Cigarettes & Alcohol	Durables and Other Goods	Motor Vehicles	Operation of Transport	Electricity, Gas and Water	Communications	Private Health & Education	Other Services	Rental	Total Non-Rental	Total	Gov	Dwelling Investment	Non-dwelling Constr	Machinery and Equip	Intangible Fixed Assets	Total Private Bus Inv	Pub Ent Inv	General Gov Inv	Agricultural Exports	Mining Exports	Manufacturing Exports	Service Exports	
Agriculture (A)	13.1	1.1	1.9	0.4	0.2	0.2	0.1	0.2	1.5	0.1	2.9	2.4	0.5	0.4	0.3	0.2	0.3	0.9	0.4	0.3	27.0	0.8	2.6	1.3	
Mining (B)	1.2	0.3	0.9	0.7	3.2	13.9	0.7	0.4	0.8	0.4	1.4	1.2	0.8	2.3	2.4	1.3	11.4	2.6	2.4	1.8	1.2	47.5	2.8	1.4	
Manufacturing (C)	23.3	7.3	14.8	13.2	5.9	2.9	5.1	3.1	5.6	2.5	10.8	9.2	4.7	17.6	12.2	14.4	5.3	12.9	13.4	12.0	18.1	10.5	31.8	8.8	
Construction (E)	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.3	1.3	0.2	0.4	1.7	38.9	45.2	0.1	0.6	10.4	32.6	30.5	0.4	0.4	0.2	0.5	
Distributional Services (F,G,I)	21.7	8.5	24.0	20.2	41.5	6.9	7.6	8.1	11.5	1.6	19.2	15.9	7.7	9.7	7.7	16.3	6.3	13.3	9.3	10.4	21.0	9.4	14.3	26.4	
Finance & Insurance (K)	2.7	1.2	2.5	1.9	1.7	1.5	1.5	1.5	20.4	4.0	7.0	6.4	2.5	2.6	2.2	1.5	3.4	1.9	2.1	2.2	3.0	3.1	2.0	6.3	
Property & Business Services	8.1	3.6	8.8	7.2	6.6	4.5	5.0	4.2	10.2	2.4	8.0	6.9	6.6	9.4	11.2	6.7	47.8	11.8	10.2	12.2	8.0	7.3	4.4	14.7	
Consumer Services (L)	1.6	1.5	5.8	1.1	0.9	0.6	0.9	0.8	21.1	0.3	7.7	6.3	7.0	1.1	1.0	0.9	3.1	1.2	1.0	1.5	1.3	1.1	0.7	7.3	
Electricity Gas and Water (D)	1.7	0.6	1.3	1.0	0.9	53.6	0.9	1.0	1.8	4.4	2.8	3.1	1.4	1.3	1.4	0.9	1.5	1.1	1.7	1.3	1.7	3.4	1.7	1.6	
Communications (J)	1.8	0.8	1.9	1.4	1.2	0.8	60.1	1.1	2.2	0.3	3.1	2.6	1.6	1.3	1.2	1.2	2.2	1.3	1.2	1.3	1.8	1.5	0.8	4.6	
Human and Administrative (M, N)	1.0	0.3	0.8	0.6	0.6	0.6	0.9	69.1	5.3	0.2	7.0	5.7	55.2	0.8	0.6	0.5	2.5	0.7	0.8	0.9	1.0	0.9	0.5	9.4	
Dwellings	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.5	0.0	14.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Indirect Taxes less Subsidies	2.7	65.0	6.4	15.5	14.6	6.9	2.8	1.4	8.3	1.2	10.1	8.4	1.5	2.4	2.2	8.5	2.0	6.4	2.3	2.5	4.6	5.0	2.6	3.2	
Consumer Good Imports	12.4	5.9	20.6	30.8	4.3	0.6	0.9	3.8	1.6	0.1	10.1	8.2	1.3	0.6	1.0	2.4	0.6	1.9	1.1	1.3	2.0	1.2	4.4	1.2	
Capital Good Imports	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.8	0.0	25.0	10.6	11.3	0.0	0.0	9.8	0.0	
Intermediate Imports	6.1	3.0	8.1	4.4	5.0	4.4	6.9	3.5	4.8	2.2	5.7	5.1	5.6	10.0	9.9	5.7	6.3	6.7	9.2	8.6	6.2	5.0	17.8	6.4	
Service Imports	1.8	0.7	1.8	1.3	8.7	1.0	6.2	1.8	4.2	0.5	3.2	2.7	1.7	1.3	1.3	1.4	6.2	1.9	1.4	1.6	1.9	1.0	2.6	5.7	
Total Imports	21.0	9.7	30.8	36.8	22.5	7.5	14.4	9.1	11.0	2.9	19.8	16.6	8.8	12.4	12.5	47.4	13.6	35.7	22.6	23.0	10.9	8.8	35.4	14.5	
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Agriculture (A)	32.9	1.0	8.3	0.4	0.3	0.1	0.1	0.3	6.8	0.2	42.1	50.3	3.4	0.8	0.3	0.5	0.1	3.5	0.4	0.3	35.8	1.7	4.2	1.9	100.
Mining (B)	2.0	0.2	2.5	0.4	3.7	4.1	0.2	0.3	2.4	1.0	4.6	16.7	3.3	2.8	1.4	2.4	3.0	6.9	1.4	1.0	1.0	66.5	3.0	1.3	100.
Manufacturing (C)	13.0	1.4	14.5	2.5	2.4	0.3	0.5	0.9	5.7	2.1	28.8	43.1	7.0	7.4	2.5	8.7	0.5	11.8	2.7	2.3	5.3	5.0	11.4	2.8	100.
Construction (E)	0.3	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.7	2.5	0.6	4.0	5.8	38.1	21.7	0.2	0.1	22.0	15.2	13.6	0.3	0.4	0.1	0.4	100.
Distributional Services (F,G,I)	9.3	1.4	18.1	2.9	12.6	0.5	0.5	1.7	8.8	1.0	28.8	56.9	8.8	3.1	1.2	7.5	0.4	9.3	1.4	1.5	4.7	3.4	3.9	6.5	100.
Finance & Insurance (K)	3.5	0.5	5.7	0.8	1.6	0.4	0.3	1.0	48.4	8.0	9.8	70.3	8.7	2.6	1.1	2.1	0.7	4.1	1.0	1.0	2.1	3.5	1.7	4.8	100.
Property & Business Services	5.9	0.9	11.4	1.8	3.5	0.6	0.6	1.5	13.4	2.6	18.2	42.2	12.8	5.2	3.0	5.3	5.7	14.1	2.7	3.1	3.1	4.6	2.1	6.2	100.
Consumer Services (L)	2.0	0.6	12.7	0.5	0.8	0.1	0.2	0.5	46.7	0.5	15.2	64.5	23.0	1.0	0.4	1.2	0.6	2.3	0.4	0.6	0.8	1.2	0.5	5.1	100.
Electricity Gas and Water (D)	4.4	0.5	5.9	0.8	1.7	24.8	0.4	1.2	8.4	17.3	10.9	65.5	9.5	2.6	1.3	2.4	0.6	4.4	1.6	1.1	2.2	7.4	2.8	2.4	100.
Communications (J)	5.1	0.7	9.6	1.4	2.4	0.4	27.3	1.5	11.0	1.4	15.4	60.8	12.2	2.7	1.2	3.5	1.0	5.9	1.2	1.2	2.7	3.6	1.5	7.4	100.
Human and Administrative (M, N)	0.5	0.0	0.7	0.1	0.2	0.0	0.1	16.8	4.6	0.2	1.2	23.2	71.9	0.3	0.1	0.2	0.2	0.6	0.1	0.2	0.3	0.4	0.2	2.6	100.



The table is of interest in itself. Among other things it shows that the distinction between what we define as goods and what are defined as services is blurred in production.¹²⁸ For example around half the final value of durable and other goods consumed by households comes from service industries. (Further blurring the distinction is the fact that roughly a third of manufacturing employees are providing white-collar, professional or clerical “insourced” services).¹²⁹ Similarly, slightly less than half of the value of mining exports come from mining itself, (something that has significant implications for the second and third round effects of the present mining boom). For manufacturing exports, more than a third of the value is sourced from imports. Households consume more than half of their electricity, indirectly as inputs into the price of other products. The same is true for the consumption of petroleum imports. It is also interesting to note that mining output accounts for a greater proportion of final consumption than imported petrol. (Controlling for exchange rate effects the commodity boom has significant indirect implications for consumer good prices.) In considering the impact of the new economy it is interesting to note that the main source for intangible fixed assets in investment (which largely consists of software assets) is domestic industry, particularly business services.

When structural change is decomposed using the model it becomes clear that the main source of change at the industry level over a five or ten year period is coming from the demand side. For example, the changing shares of construction in output are clearly driven on the demand side by changing demographics and short-term movements in interest rates and affordability. Supply-side influences come from moving relative output prices leading to changing relative prices of final goods and substitution across both supply and demand items. These have a dominant influence in the long run, driven by different productivity trends across industries. They tend to be less dominant in the short term, although there are exceptions.

¹²⁸ Input output analysis had its starting point in Leontief’s seminal [1941] paper ‘The Structure of the American Economy’.

¹²⁹ Pilat and Wolff, 2005, provide a discussion for other OECD countries.

C

Broad industry indicators

The attached charts show productivity and relative prices for capital and labour by industry. Productivity is shown both in actual levels and in derived underlying change terms. Underlying labour and capital productivity abstracts from substitution effects due to changing relative price and from cyclical effects due to adjustment costs in the face of fluctuations in industry demand. These underlying productivity components are derived as part of the estimation of the industry production functions (which are derived via joint econometric estimation of industry employment, investment and price equations).

Industry production functions are defined as follows:

$$Y = [\alpha(Le^{\lambda_1 t})^\rho + \beta(Ke^{\lambda_2 t})^\rho]^{1/\rho}$$

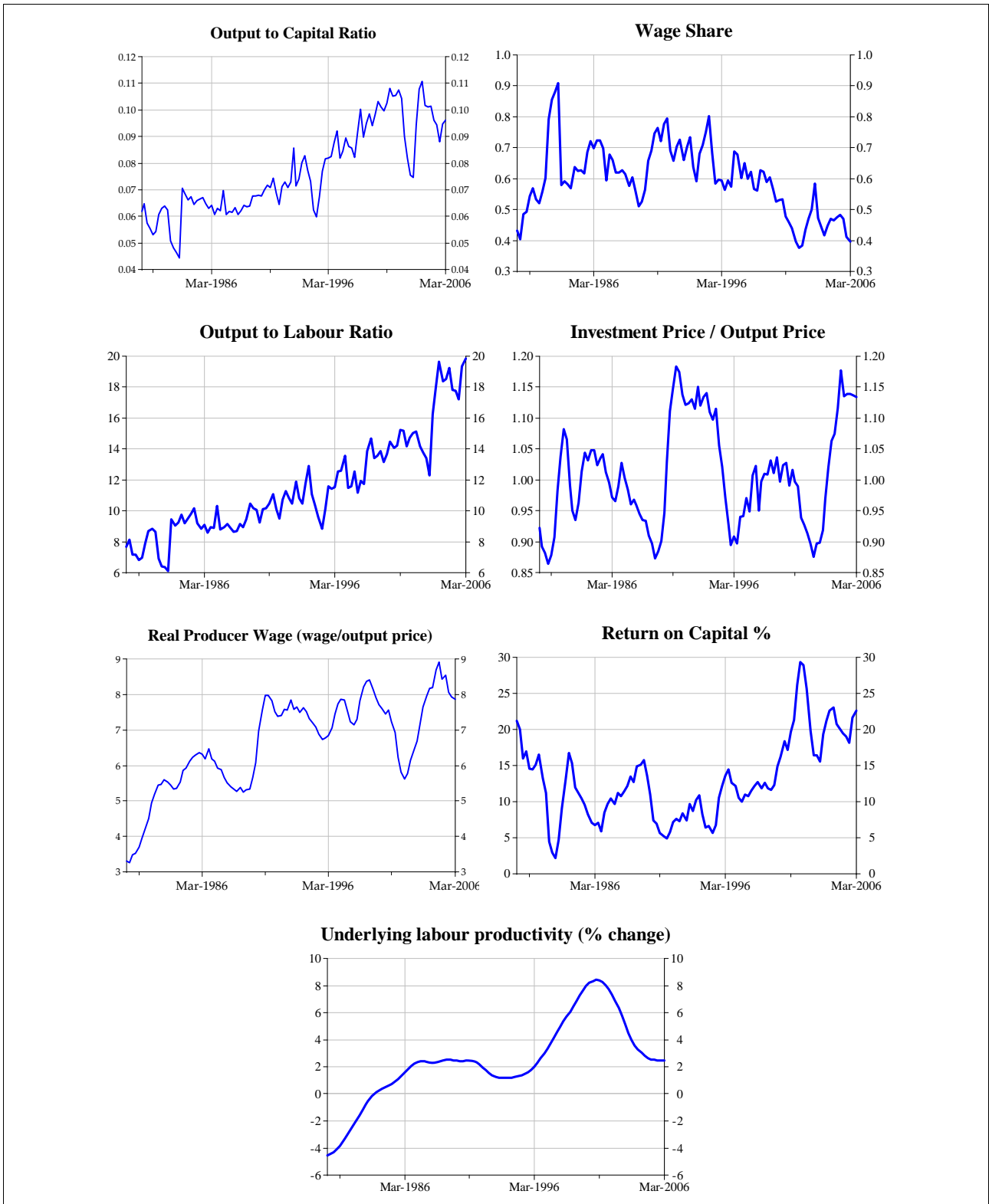
where λ_1 and λ_2 represent trend growth in labour and capital productivity respectively

Underlying productivity shown in charts in the body of the document is a combination of capital and labour productivity and is defined as follows:

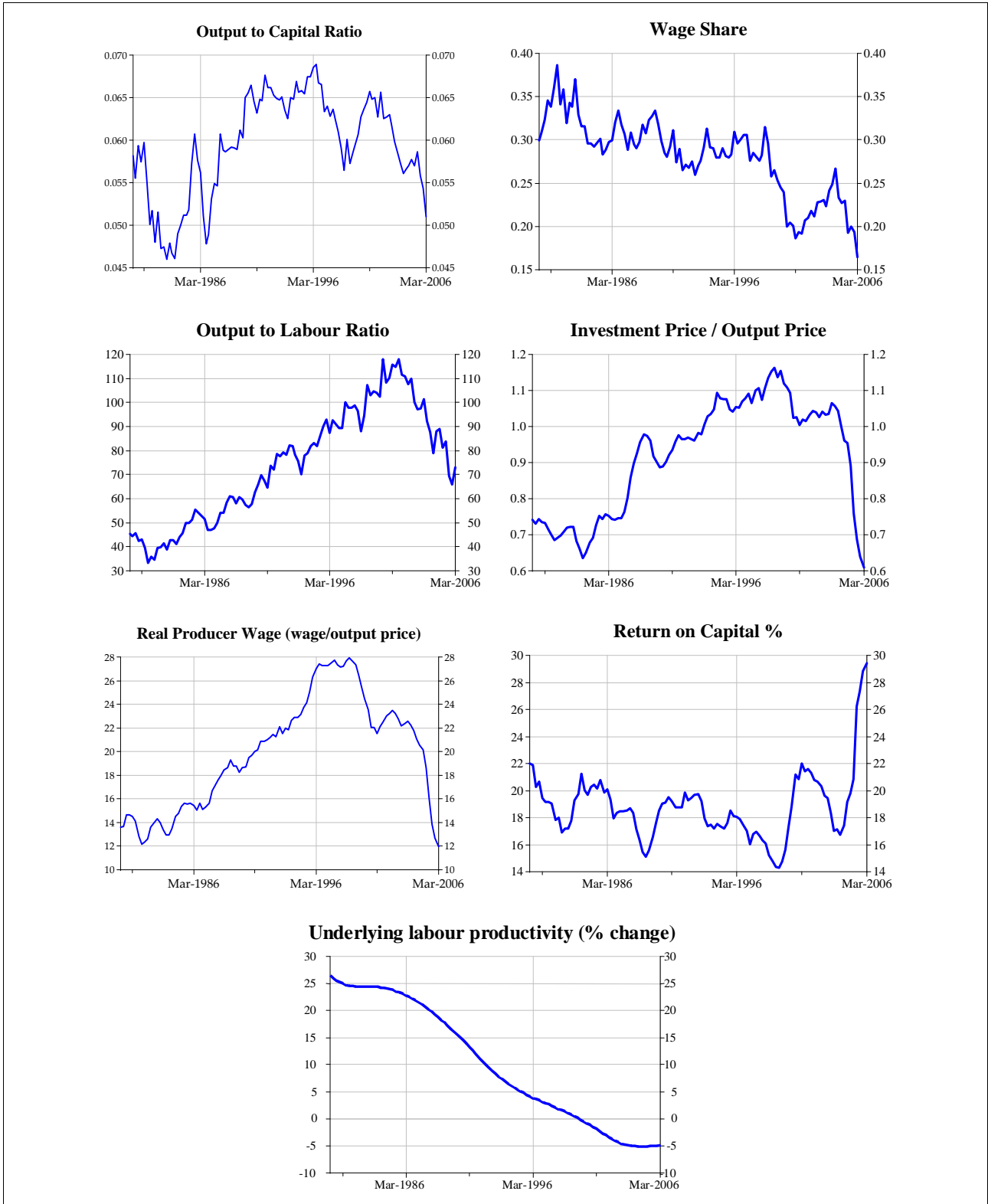
$$GRP = \lambda_1 + \left[\frac{1}{\beta} \left(\frac{Y}{Ke^{\lambda_2 t}} \right)^\rho - 1 \right]^{-1} \lambda_2$$

where GRP stands for the growth rate of productivity(4)

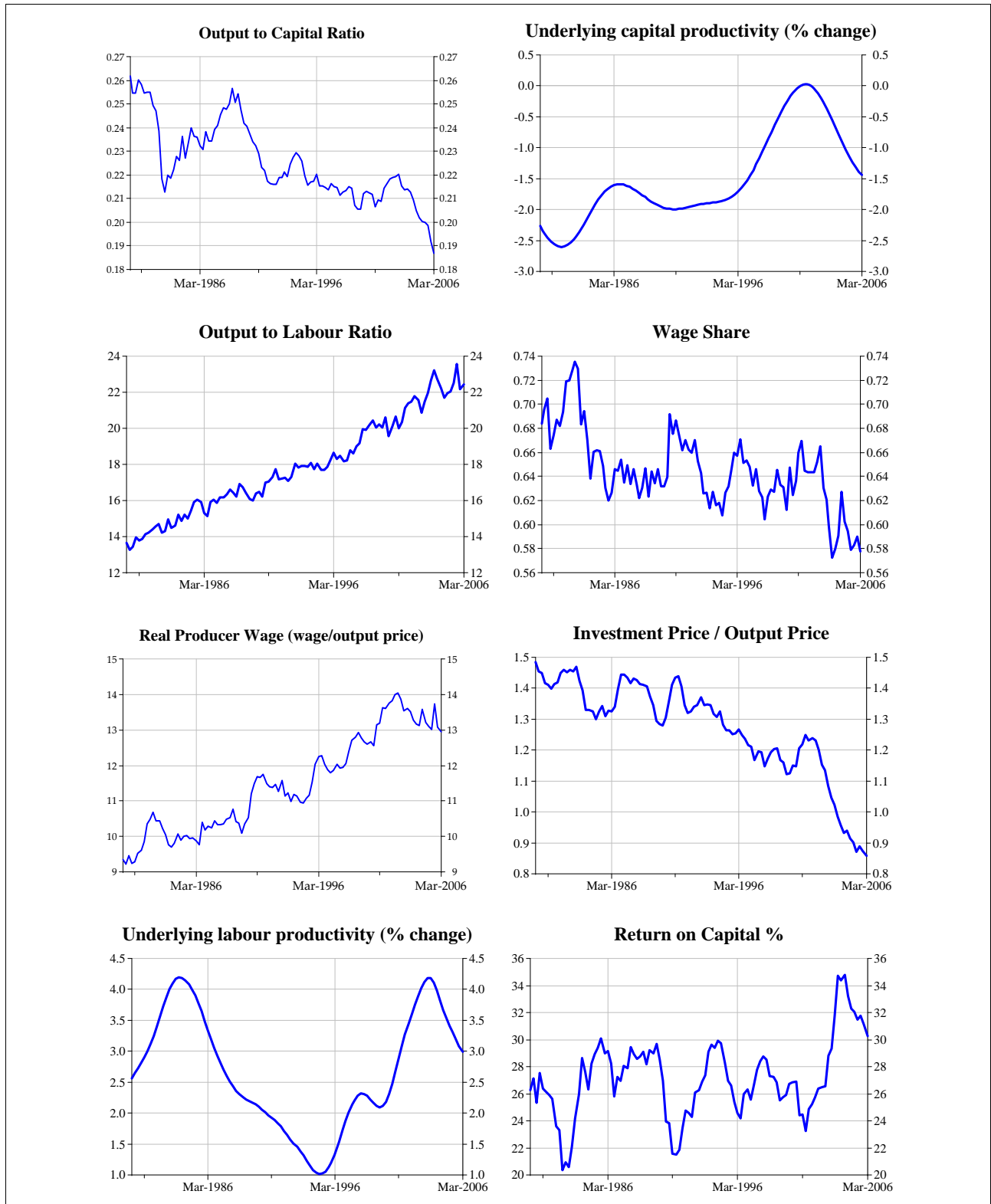
C.1 Agriculture



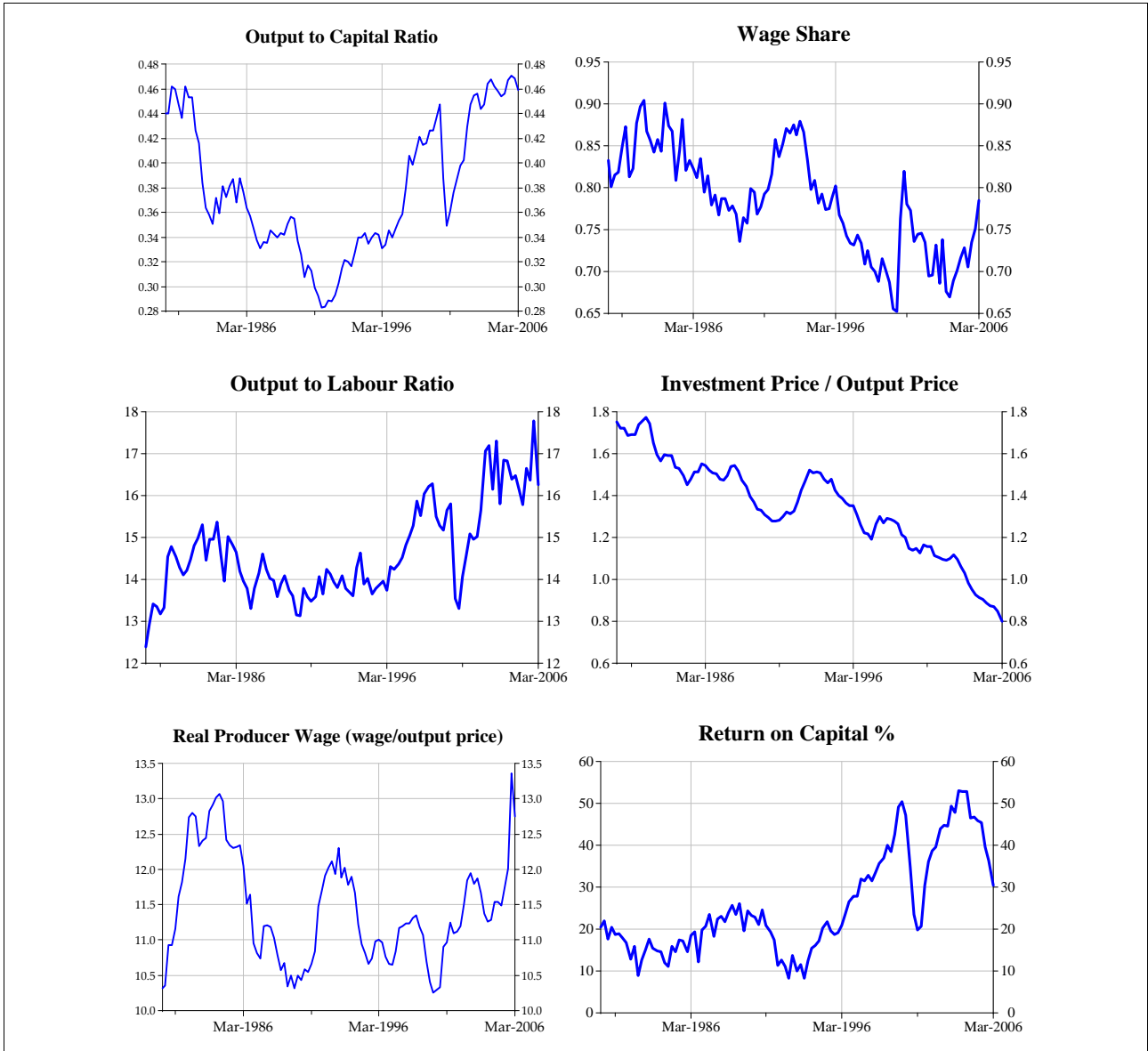
C.2 Mining



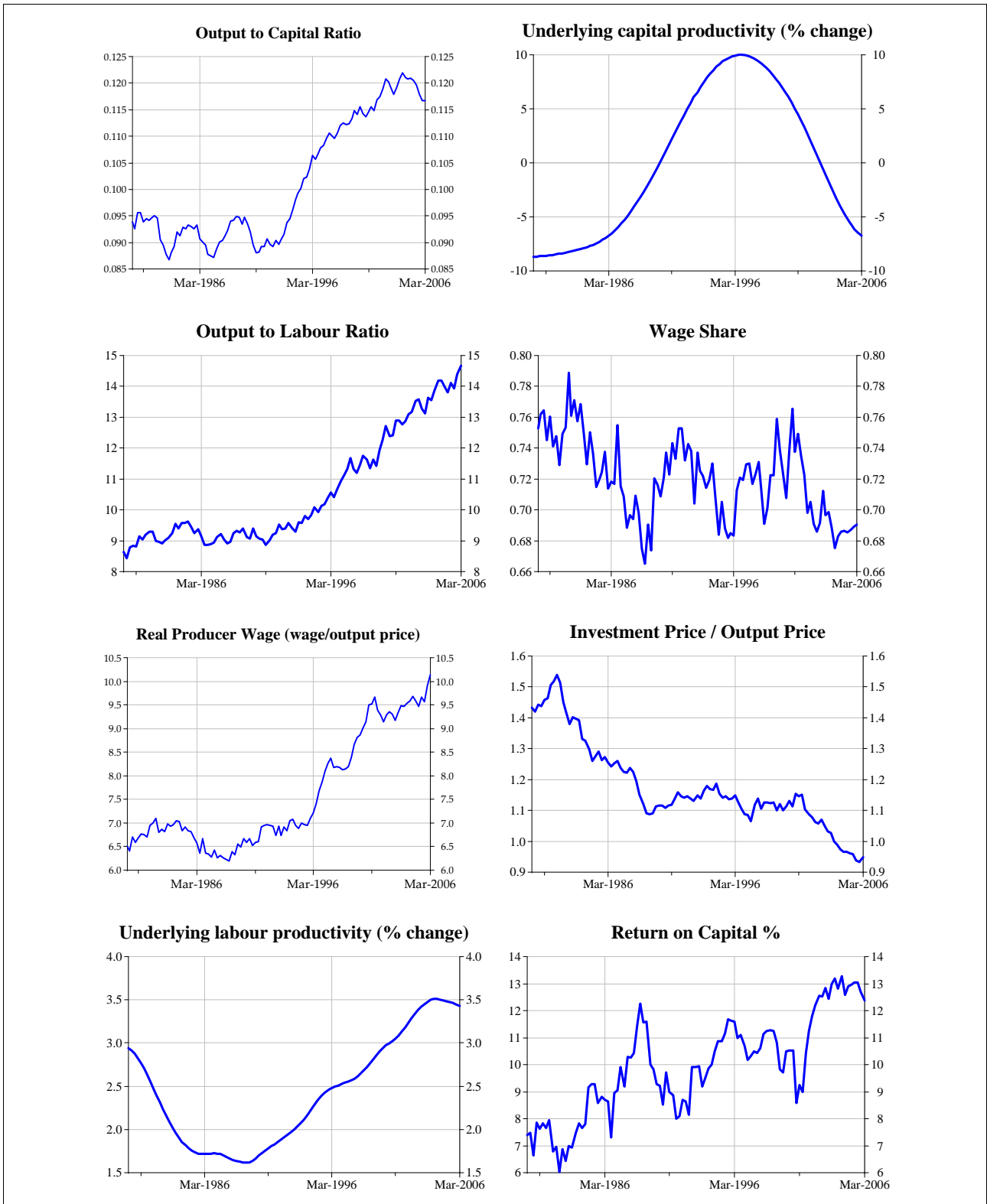
C.3 Manufacturing



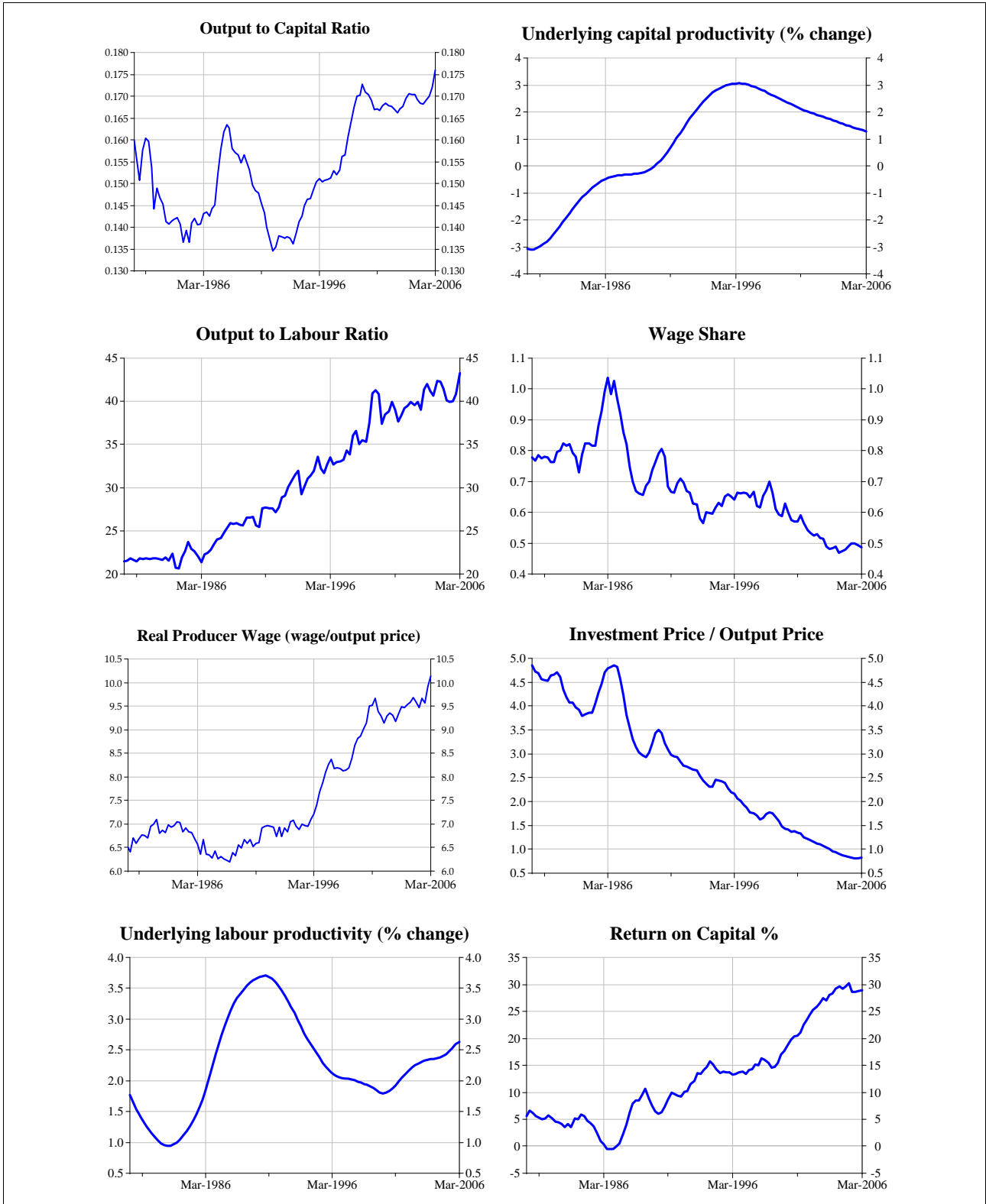
C.4 Construction



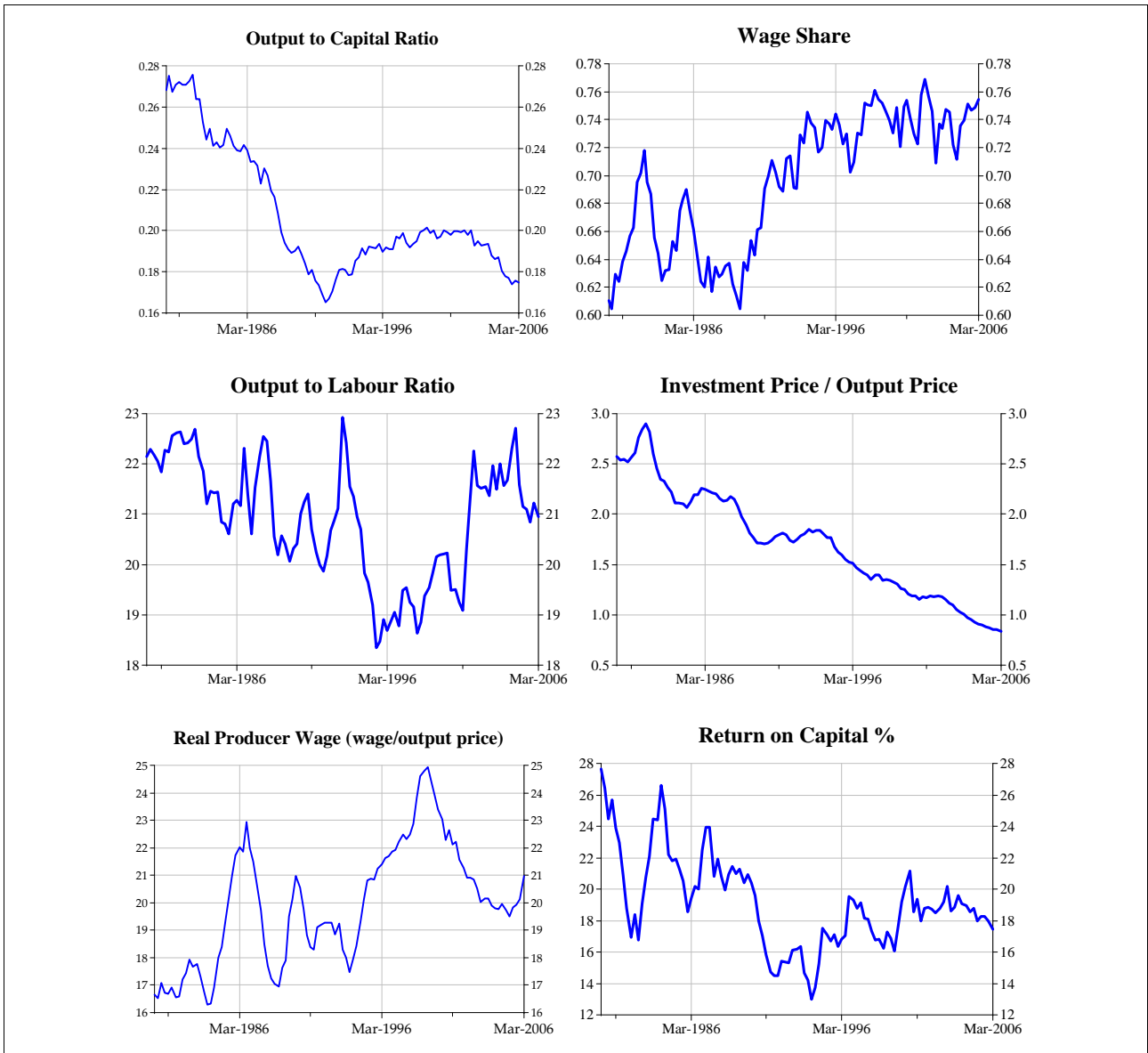
C.5 Distribution services



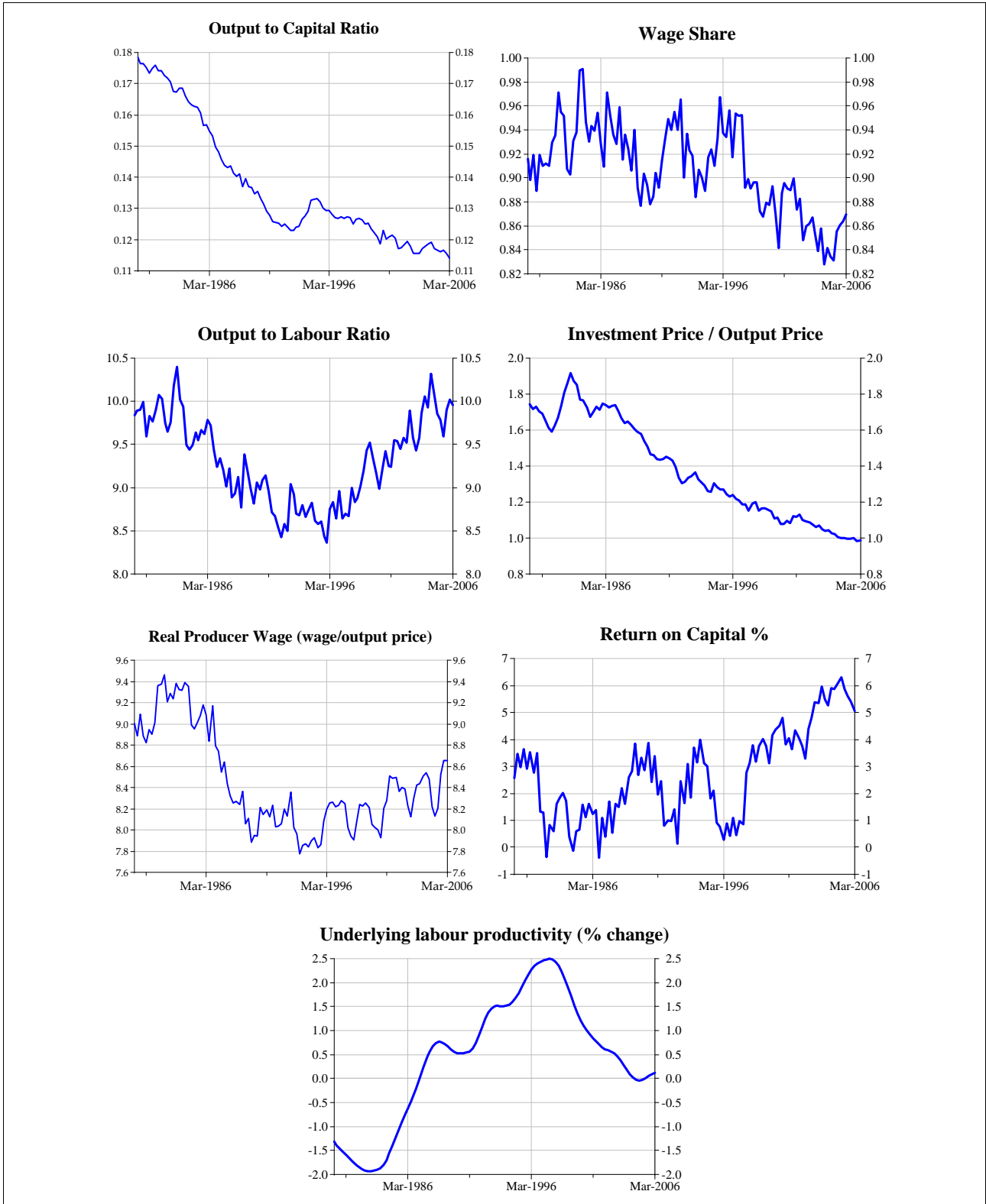
C.6 Finance and insurance



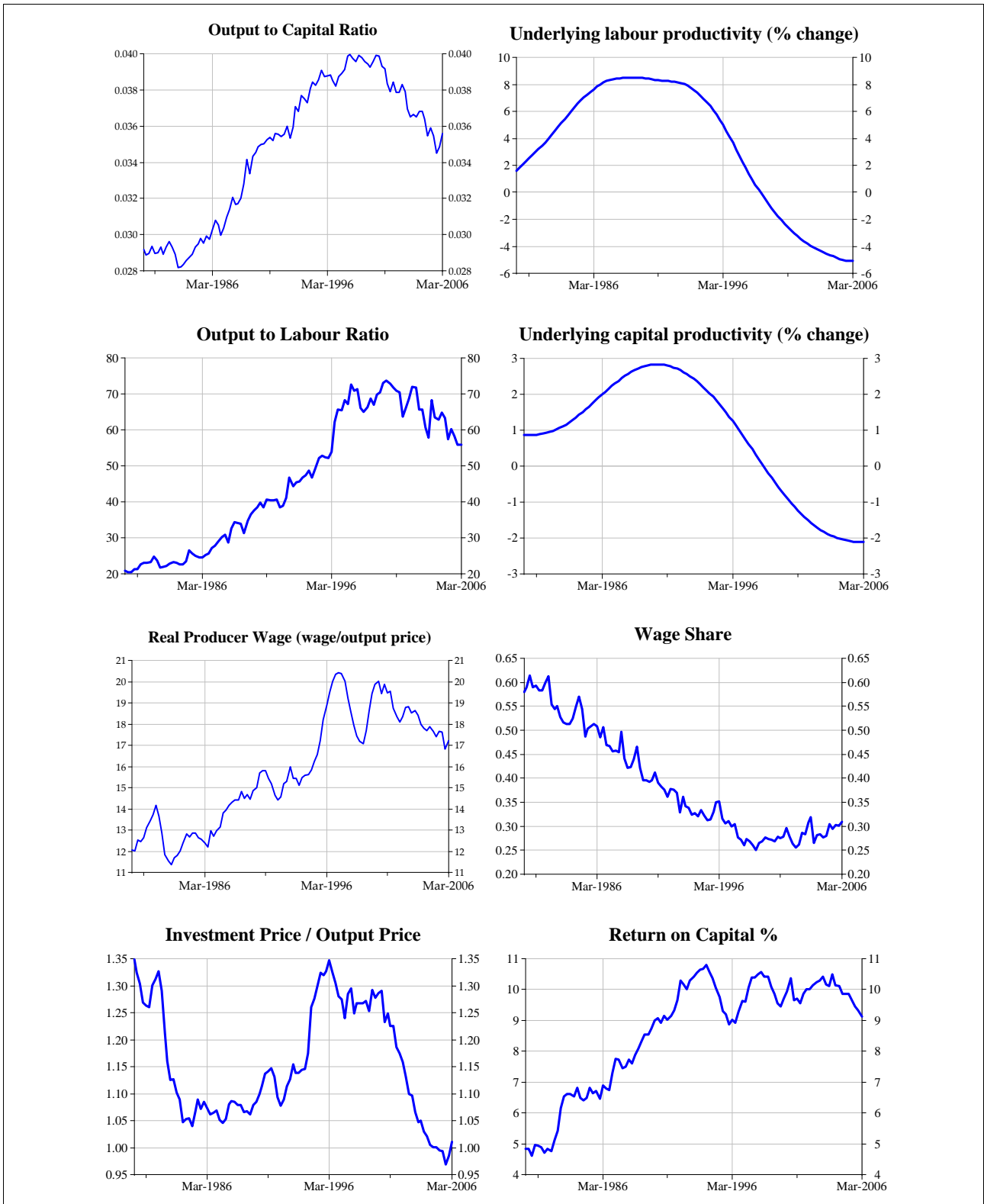
C.7 Property and business services



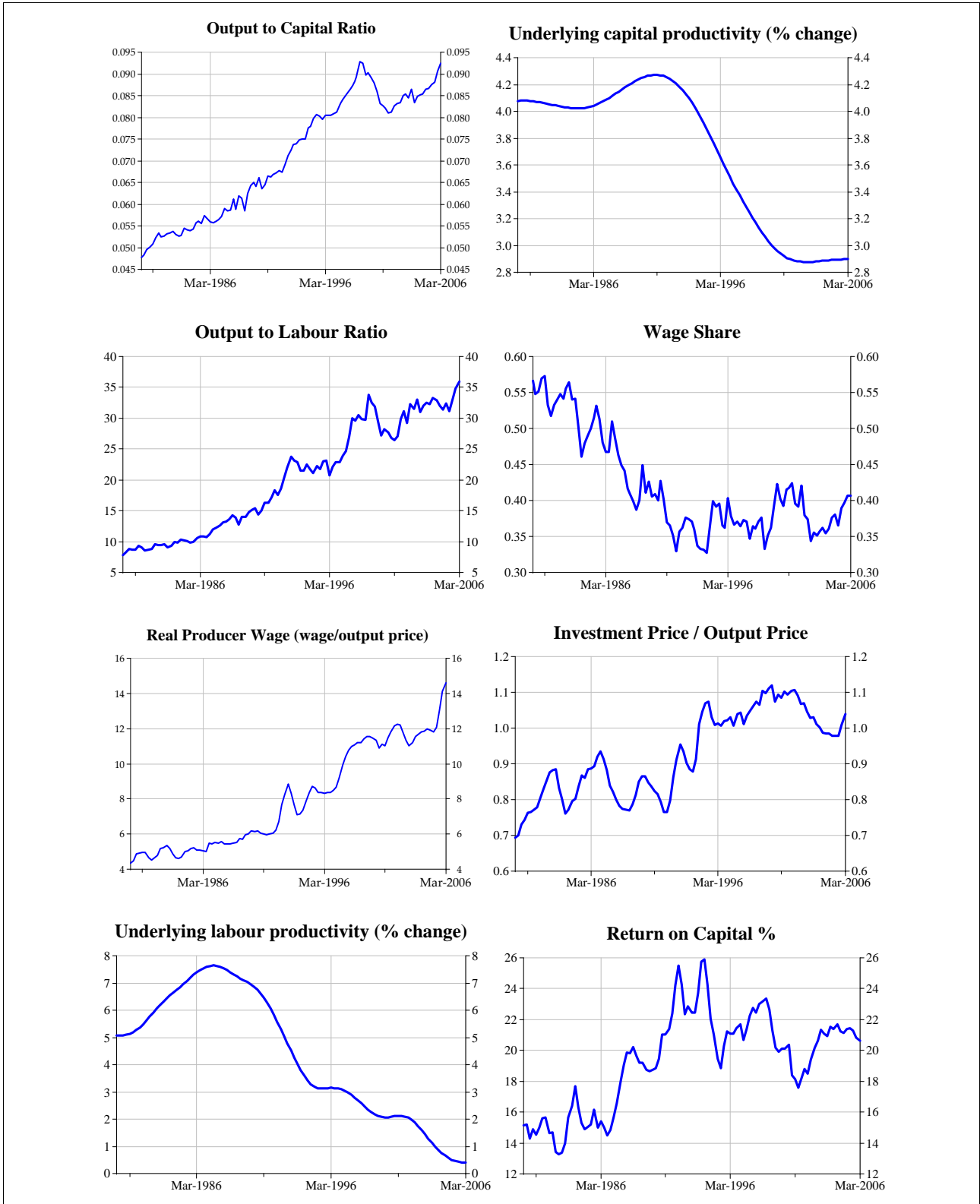
C.8 Consumer Services



C.9 Electricity, gas and water



C.10 Communications



D

Developments in selected industries

Chapter 5 provided a discussion of manufacturing sub sectors that have been subject to large amounts of structural change such as textiles, clothing and footwear, and machinery and equipment. However, the choice of sectors was somewhat arbitrary as all sectors have been subject to some degree of structural change. This appendix provides a brief discussion on structural change in the other manufacturing sub sectors, and also further discussion on developments in communications and construction. Evidence indicates that the degree of specialisation and diversity of manufacturing has increased over time, even as manufacturing's share of value added has decreased.¹³⁰ This is certainly apparent at the sub sector level with each sector responding to different sets of forces, and considerable differences within the sub sectors themselves.

Food, beverages and tobacco

Food, beverages and tobacco is the largest manufacturing sub sector accounting for more than a fifth of manufacturing value added and employment. The Productivity Commission classifies the sector as one producing STMs (simply transformed manufactures). It encompasses such things as abattoirs, dairy processing, fruit and vegetable canning, flour mills and bakeries, confectionary production and breweries and wineries. Traditionally it has employed a large proportion of unskilled workers.¹³¹ However, this situation is changing with the proportion of employees with university qualifications in the sector doubling between 1994 and 2001. This mirrors the trends towards greater employment of professionals in

¹³⁰ Indexes indicate increased specialisation over time within Australian manufacturing since the late sixties, consistent with increased exposure to trade and competition. (PC, 2003, P.70.)

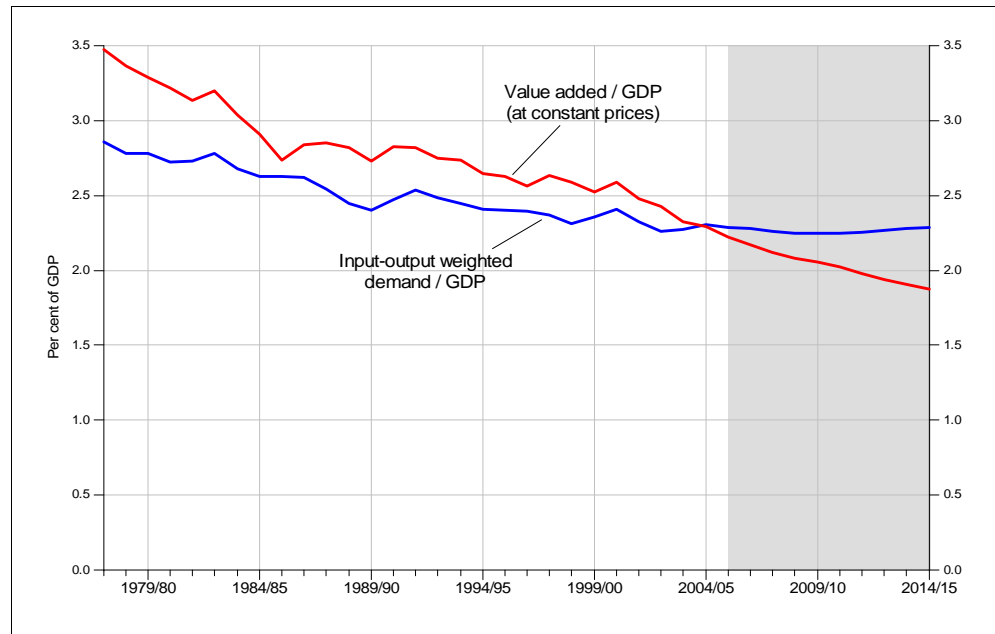
¹³¹ In 1994, 67.3 per cent of employees in the sector lacked post school qualifications, as compared to 50.4 per cent in the workforce as a whole, and 55.5 per cent for manufacturing as a whole.

manufacturing as a whole (see chart 5.2 and the related discussion in Chapter 5.)

Perhaps the most significant factor driving structural change in the sector is changing preferences on the part of households as incomes have risen, particularly for higher quality foods and beverages. This is exemplified by trends in beverage consumption. There has been a large shift in favour of wine relative to beer (with the proportion of wine in total alcohol consumption roughly doubling over the last thirty years.) Within the wine category, the proportion of red wine drunk has roughly doubled over the last twenty years, as have purchases of bottled wine relative to cask wine. (Bottled wine accounted for 52 per cent of sales in 2006 compared to 22 per cent in 1986.) In short, as incomes rise, consumers are demanding better quality, lower yielding varieties of grape for their wine. This in turn means that the focus of grape and wine production has shifted from one of quantity to one of quality. Producers have to devote more effort to quality management, product development and to marketing. In other words there is a greater insourced service component and less of a physical production component to the final product. No doubt a similar story could be told about other food items. (Quantities that can be consumed are limited – quality and variety are what count as incomes rise.)

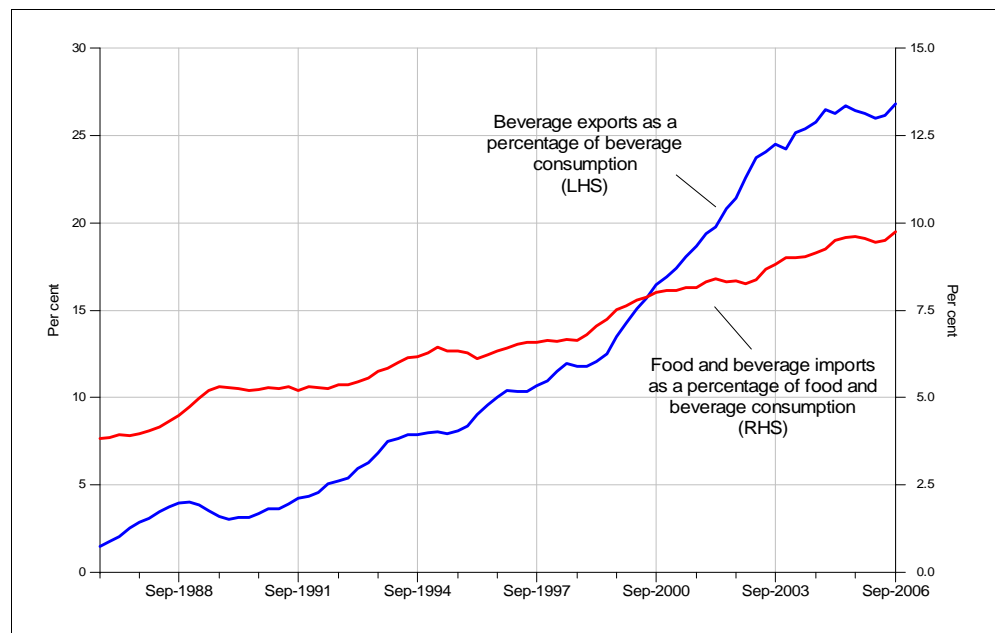
Roughly 70 per cent of output from the sector goes to domestic consumption. Declining consumption of food and alcohol in total consumption (see chart 3.7a and 3.7b in Chapter 3) has meant that overall output in the sector has fallen as a share of GDP (chart D.1). Strong export growth has tended to offset the domestic decline so that the input output weighted demand term has fallen by less than domestic food consumption as a share of GDP. Exports have been driven in particular by booming overseas sales of Australian wine, which have increased by a factor of five over the last ten years relative to domestic sales (chart D.2). However, export prices in \$A terms have fallen by around 20 per cent over the last four years with the higher exchange rate and export growth is projected to slow. At the same time there has been a secular increase in food and beverage imports that appears to be partly due to increased preference for variety as incomes rise (chart D.2). Import penetration has doubled over the last fifteen years although it still remains at a relatively low level at ten per cent. Slowing population growth and a probable slow down in export growth with lower \$A export prices will mean that growth in the sector is likely to be relatively slow over the next five to ten years. However, even though the share is decreasing absolute levels of output are still rising. Employment has been relatively stable over the last twenty years and is likely to remain so over the projection period.

D.11 Food and beverage value added ^a



^a at constant prices as a percentage of GDP
 Data source: ABS 5206.0, CIE AUSM projections and CIE calculations

D.2 Food and beverage exports and imports ^a

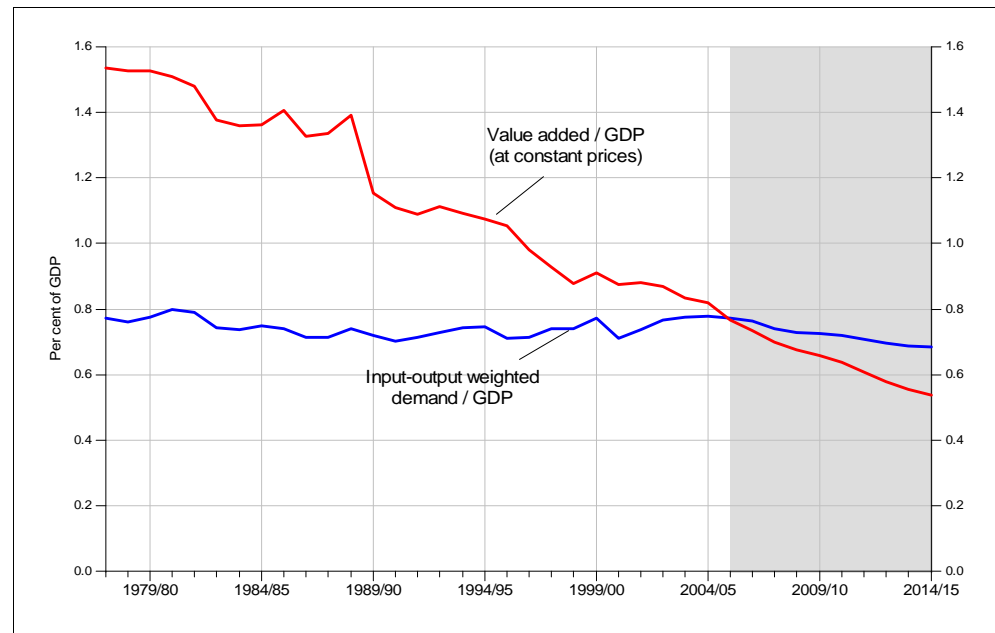


^a Data is at constant 2004-05 prices
 Data source: ABS Cat No 5302.0, 5206.0 and CIE calculations

Wood and Paper Products

This sector ranges from low value added products such as wood chips and newspaper pulp, to products of intermediate complexity such as paper packaging, cardboard and paper board to higher value added wood-based building products. Structural change in the industry is being driven by shifting household preferences, and changing demands from the construction industry, as new building products are developed displacing traditional timber based products. Environmental regulation is also having some impacts at the margin on the composition of output with for example reduced supply of native timber from old growth forests and increased recycling of newspaper. Greenhouse policies may have some impact on the price of, and demand for, timber products over the projection period.¹³²

D.3 Wood and paper products value added



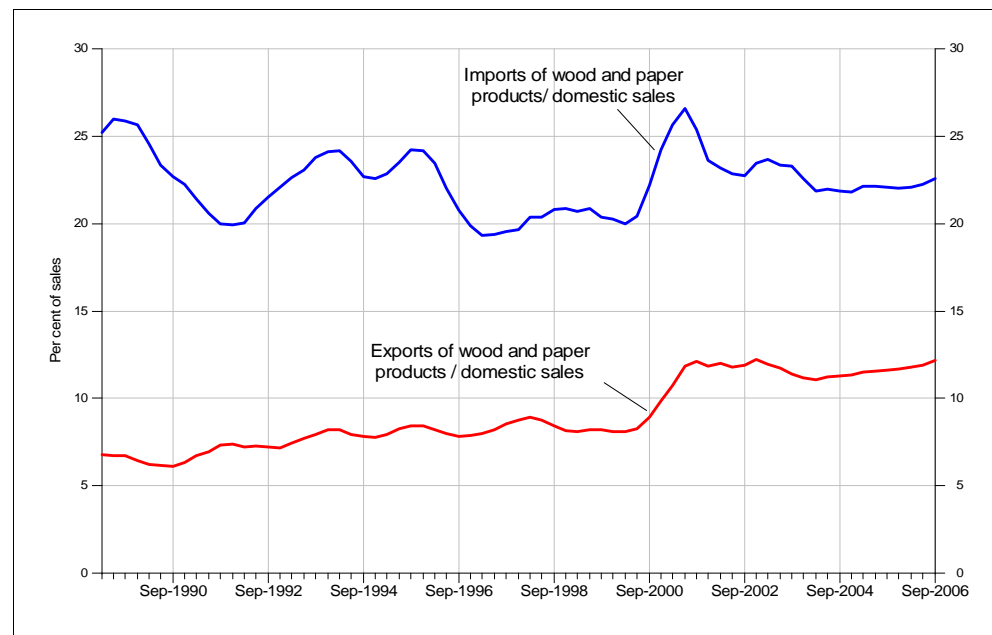
Data source: ABS 5206.0, CIE AUSM projections and CIE calculations

The decline in value added as a proportion of GDP (chart D.3) has been broadly in line with that of manufacturing in GDP. It reflects two developments, the first being the decline in the use of timber in house construction as timber has become more expensive and alternative materials have been developed, and the second being the declining share of newspaper and book consumption relative to other forms of media, and

¹³² The Lignor company, for example, is developing a plant in Albany that uses a process it says will make timber as strong as steel, with claimed significant environmental benefits in the form of carbon sequestration on large building projects.

hence stagnating demand for paper and paper pulp.¹³³ The volume of newspapers, magazines, books and stationary consumed by households has barely changed over the last twenty years, while other goods for recreation and culture have increased by a factor of five. The decline in output share has not been due to increasing import competition. Imports account for around 22 per cent of supply, and have been a relatively stable share of domestic sales over the last twenty years (chart D.4).

D.4 Wood and paper products – imports and exports over domestic sales ^a



^a Imports and sales measured at current prices.

Data source: ABS Cat No 5432.0, 5439.0, 5676.0 and CIE calculations

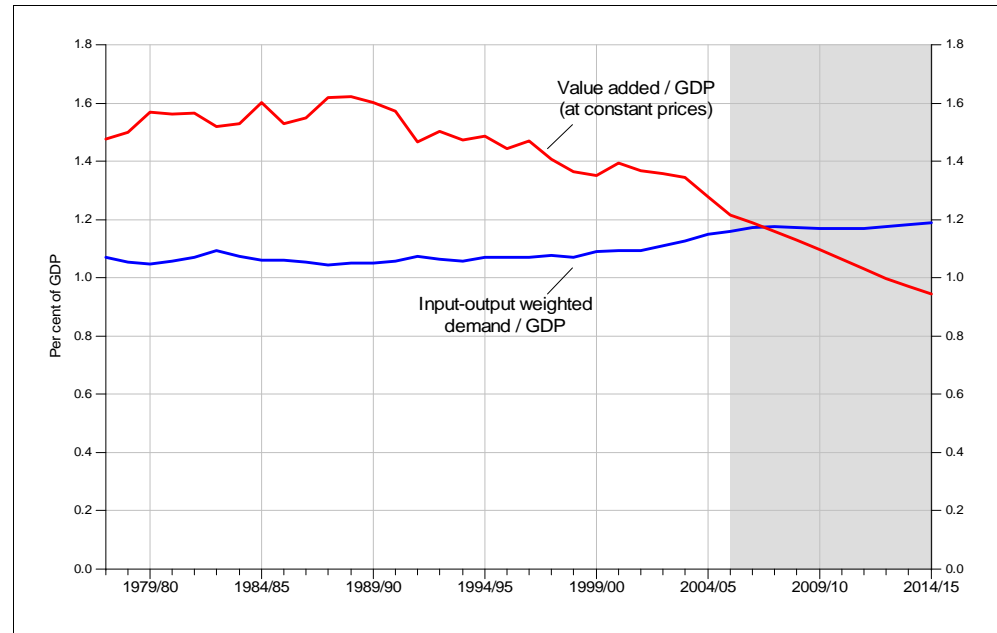
Printing, Publishing and Recorded Media

This sector is fairly evenly divided between the physical production of newspapers, magazines and books, and recorded media, such as videos, audio tapes, CDs and DVDs. Structural change within the sector has largely been driven by the development of new technology. A successive series of innovations: videos; cd players; dvd players, has boosted expenditure on the second category, while, as mentioned earlier, demand for the newspapers, magazines and books has stagnated. For newspaper and magazine publishers the main source of new profit growth has been in on-

¹³³ Newspapers, books and stationary are one component of the recreation and entertainment consumption category in the quarterly national accounts. Hence the contrast between the decline in value added relative to the relative stability of the input output weighted demand for this category is partly a reflection of a shift within the final demand category.

line publishing. On-line advertising (recruitment and on-line trading) has eaten into traditional advertising revenue. Circulation of most major daily newspapers is either stagnating or falling, while at the same time subscriptions to online services are rising. Consequently the physical production side of the industry is declining.

D.5 Printing and publishing value added



Traditionally the sector has been characterized by low trade shares. However increasing on line purchases of digital music, movies and other media may lead to an increase in service imports over the projection period.¹³⁴

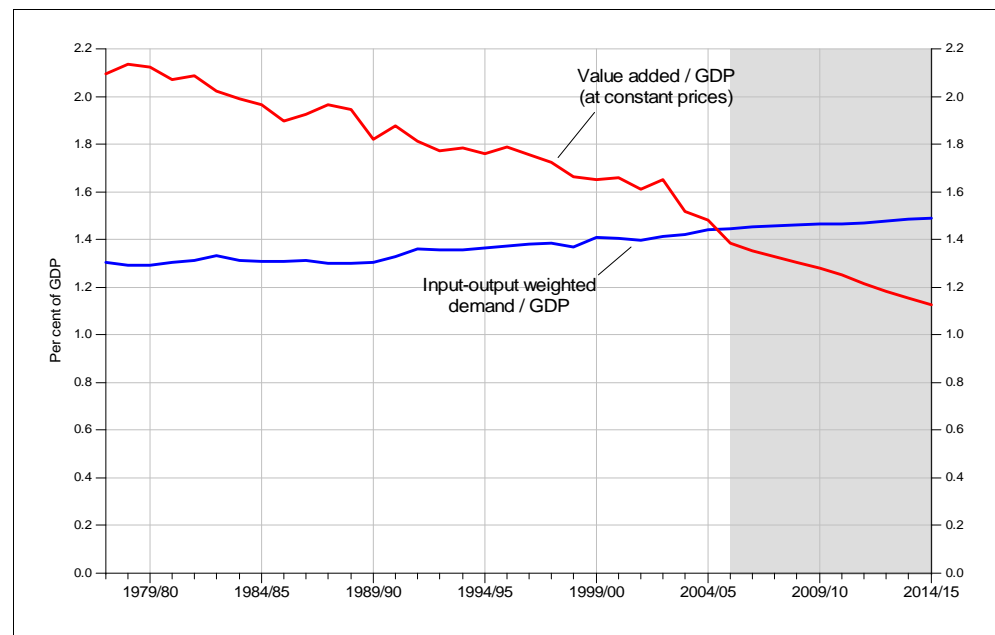
Developments in this sector are possibly a good example of the service component of the final good increasing with changing technology, while the physical production component declines (or in some cases disappears entirely). It is also a good example of technical change leading to occupational change. Employment in the sector is likely to decline in absolute terms over the projection period, with job losses concentrated at the low skill end of the spectrum. The sector already has a high proportion of skilled employees. In 2001 16.4 per cent had university degrees compared to 11.2 for the manufacturing sector as a whole. The proportion of employees with degrees doubled between 1994 and 2001.

¹³⁴ These transactions may be difficult for the ABS to fully identify.

Petroleum, coal and chemicals

This is a diverse sector ranging from petroleum refining, basic chemicals and fertilisers, paints, pesticides and medicines and pharmaceuticals. The former are regarded as STMs. Petroleum refining and the production of industrial chemicals and fertilisers are basic industrial processes that do not appear to have been subject to large amounts of structural change. Most refinery activity is directed towards the domestic market. However a significant proportion of basic chemicals and fertilizer production is for the export market. The location of these processes within Australia largely depends on transport considerations and the availability of local primary inputs and infrastructure. Projections for the sector are shown in Chart D.6 below.

D.6 Petroleum, coal and chemicals value added

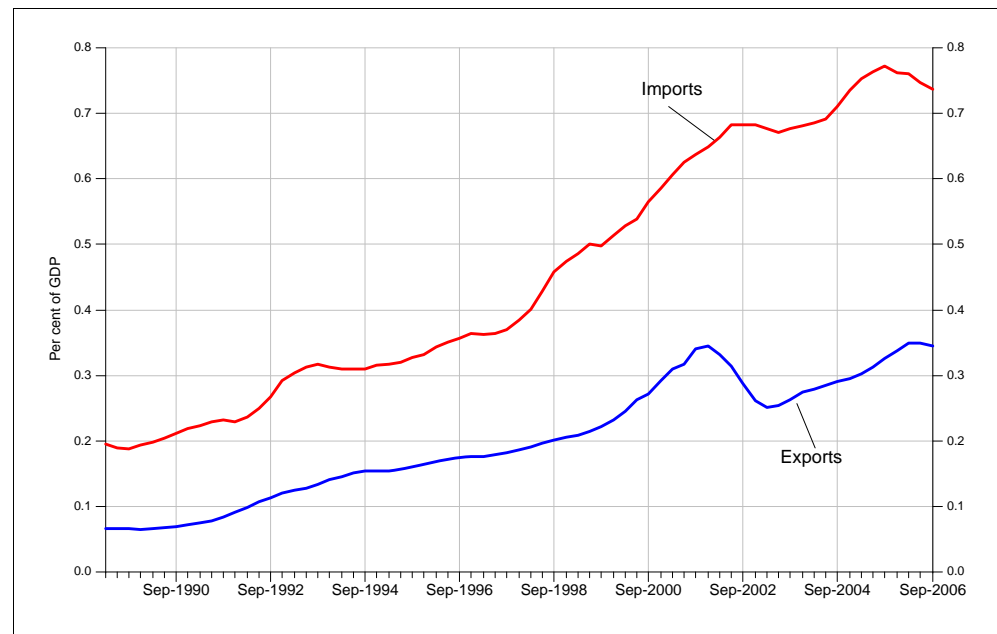


Data source: ABS 5206.0, CIE AUSM projections and CIE calculations

The largest changes within the sector are occurring in medicines and pharmaceuticals. This, along with medical instruments, is the most skill intensive part of manufacturing. Increasing demand is being driven by population aging, increased demand for health services as incomes rise, and Australia's emerging comparative advantage in the area. Exports have doubled as proportion of GDP over the last ten years despite the appreciation of the exchange rate over the last five years (chart D.7) However, imports have increased by a similar amount. A similar picture occurs for basic chemicals. Exports have increased but imports have increased by more. (In particular Australia imports large quantities of organic chemicals, such as phosphates, for use in fertiliser production.)

The overall increase in trade seems to be the main reason for the decline in value added relative to the input output weighted demand measure shown in D.6. (Exports are one component of the demand measure.) For example consumption of pharmaceuticals is increasing but most of the demand is being met by rising imports. There may also have been increased outsourcing of services within the sector over time. The sector has the highest skilled labour requirements of any manufacturing sub sector, with 21 per cent of employees having university qualifications in 2001.

D.7 Exports and imports of medicines and pharmaceuticals ^a



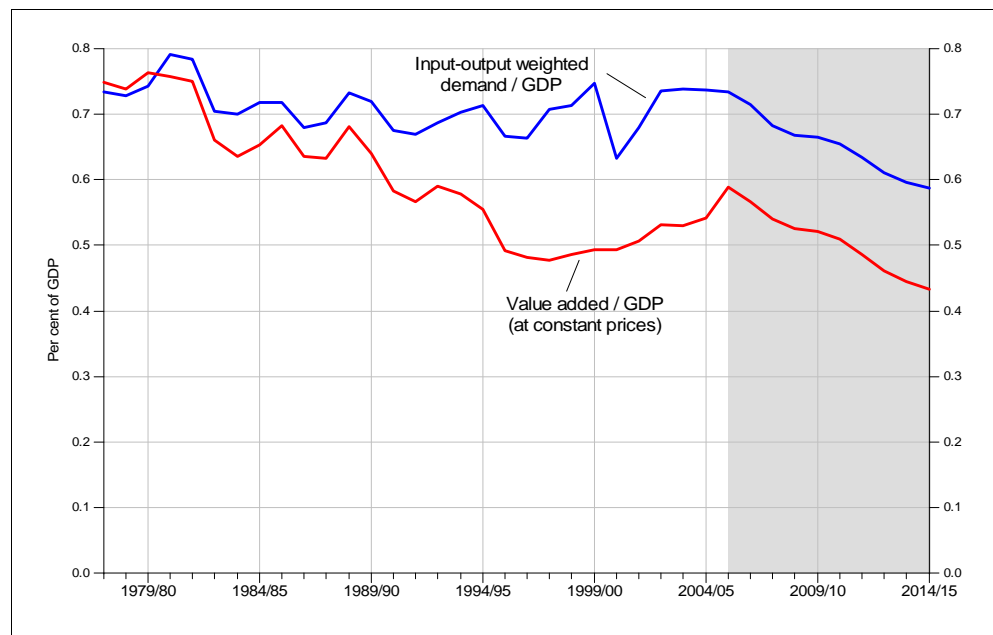
^a Measured at current prices

Data source: ABS Cat No 5432.0, 5439.0, 5206.0 and CIE calculations

Non-metallic mineral products

The sector mainly produces inputs for the building industry, for example bricks, ceramic tiles, ready-mix concrete and glass. As a consequence the outlook for the sector is heavily influenced by that for construction and hence demographics. Activity has lifted in recent years with high levels of engineering construction for the mining sector, and a resurgence of office and commercial building after more than a decade of relative inactivity.

D.8 Non-metallic mineral products value added



Data source: ABS 5206.0, CIE AUSM projections and CIE calculations

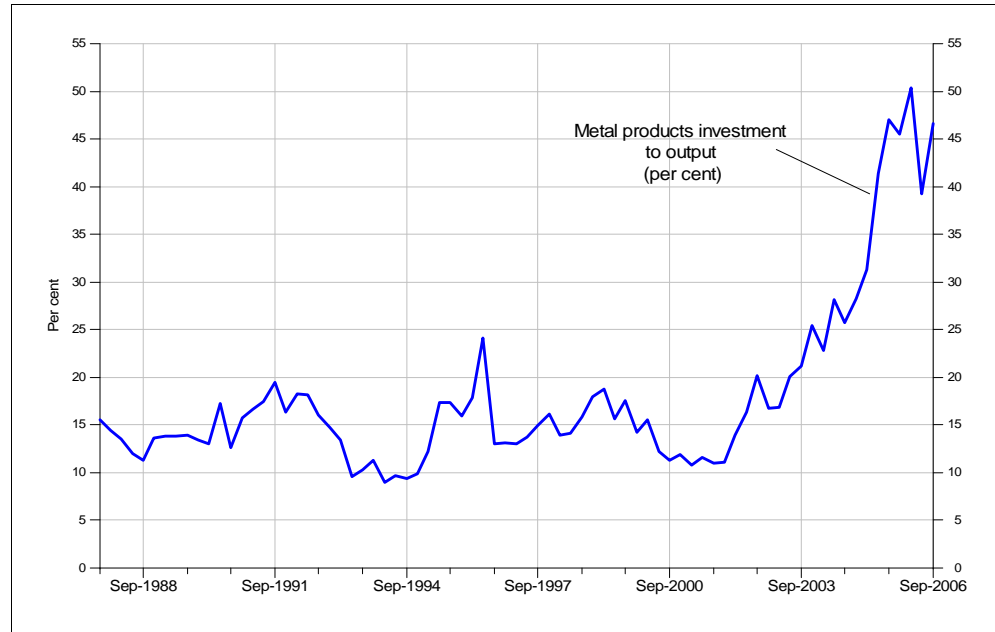
The outlook for the sector is consequently tied closely to the outlook for the construction sector.¹³⁵ Output is projected to decline in absolute terms from 2009 as is employment. Given that the sector has a high proportion of unskilled workers, this will tend to add to the overall occupational trend towards higher skilled workers.

Metal products

This sector can be classified in two parts, basic metal products such as refined aluminium, copper and zinc destined for the export market, and fabricated metal products such as steel girders, reinforcing mesh, pipes, sheet metal and roofing material mainly servicing the domestic market and related to the construction cycle. Developments in the sector have been dominated by the commodity boom. With metal prices at record level, mining investment has increased rapidly as has closely associated investment in refined and smelted products (for example alumina refining and aluminium smelting, and copper and zinc smelting). The surge of investment can be seen in chart D.9. This part of the sector is usually classified as producing STMs and like mining is very capital intensive.

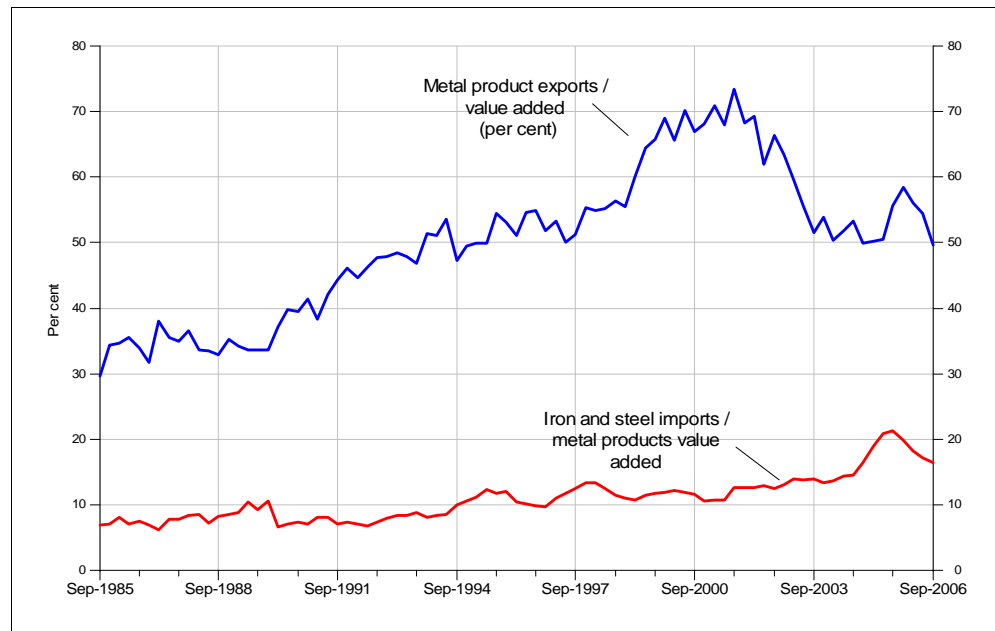
¹³⁵ The

D.9 Metal products investment – part of the resources boom ^a



^a Capital expenditure over value added at constant prices
Data source: ABS 5625.0 and 5206.0 and CIE calculations

D.10 Metal product exports and imports

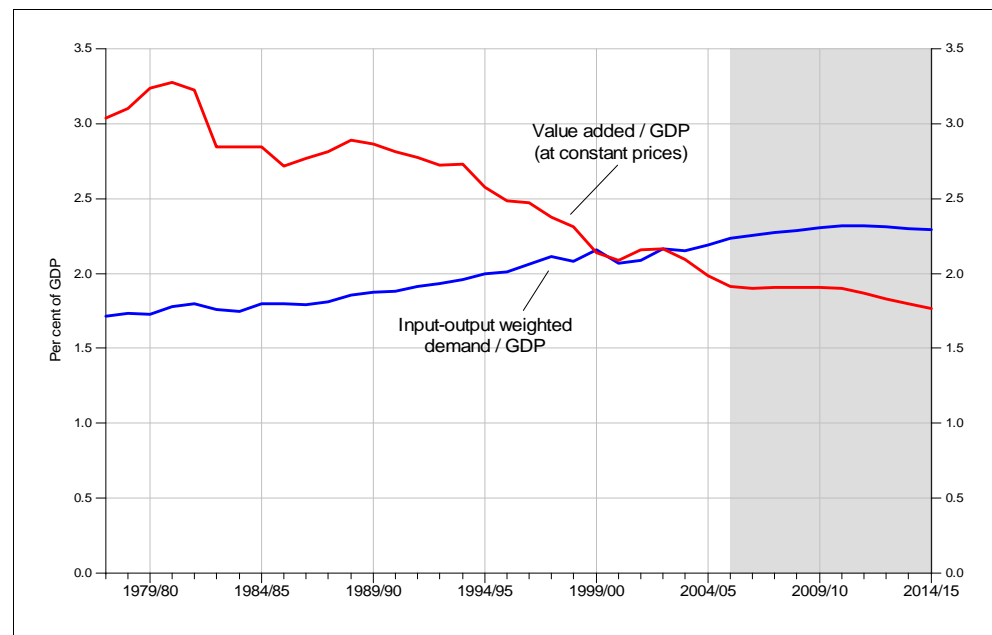


^a Data is at current prices.
Data source: ABS Cat No 5432.0, 5439.0, 5676.0 and CIE calculations

With both mining exports and construction increasing over time the input output weighted demand term has increased as a proportion of GDP (chart D.11). The main reason that the value added share has declined is that refined metal production simply hasn't kept pace with the rapid expansion of other minerals industries such as iron ore. As projects in the metal

products area have long lead times the high levels of investment that are currently occurring are yet to lead to higher output or exports (charts D.10 and D.11). However, output is projected to increase at a faster pace over the next few years as new facilities come on line. At the same time demand for fabricated metal products is projected to decline with the general decline in domestic construction activity.

D.11 Metal products value added



Data source: ABS 5206.0, CIE AUSM projections and CIE calculations

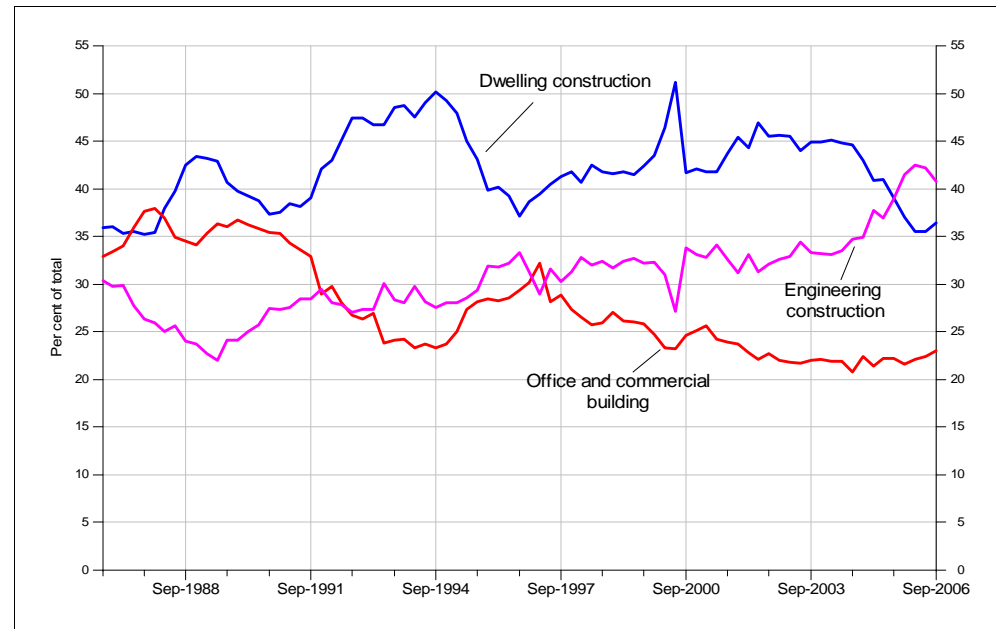
Construction

Construction has been subject to significant economic reforms over the last fifteen years with the introduction of enterprise bargaining and more recently the impacts of the Workplace Reform Act 1996 and the Work Choices legislation in 2006. Industrial relations reform has had significant impacts on workplace practices on large building sites. Both labour and capital productivity surged following the reforms in the late 1980s. However more recently productivity growth has slowed, perhaps associated with increased shortages of skilled labour due to the mining investment boom.

The outlook for the sector is discussed extensively in Chapter 2 and Chapter 3. Overall demographic change seems likely to lead to reduced demand for construction services. As the bulk of workers in the sector are tradesmen, the slow down in the sector will reduce the overall numbers of tradesmen employed in the economy.

The slowdown in dwelling construction might also have implications for the structure of firms in the sector. In recent times the proportion of construction work done accounted for by engineering construction has surged (the surge being due to increased mining construction). Dwelling construction seems likely to continue to decline as a proportion of total activity. This seems likely to increase the predominance of large business relative to small business, as dwelling construction (particularly extensions and renovations) is the part of the sector that is dominated by relatively small business. Given that the construction is the sector with the most small business, this might have implications for the number of small businesses in the economy as a whole.

D.12 Composition of construction work done.



Data source: ABS Cat No.8782.0 and CIE calculations.

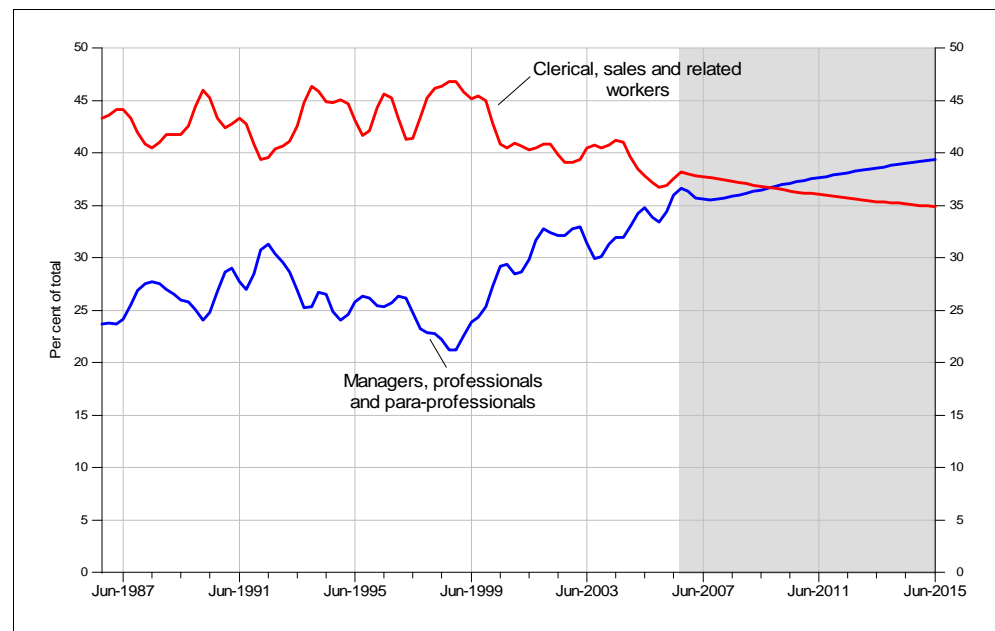
Communications

Communications has been subject to extensive micro economic reform over the last two decades with the corporatization then partial privatisation of postal and communication services, the deregulation of the market, and the application of competition policy. The early period of deregulation saw significant labour shedding by the public sector. However, with prices falling and demand expanding, those displaced from the public sector were rapidly picked up by new private sector entrants to the market such as Optus. Overall employment has expanded in absolute terms over the last two decades.

Communications is an area where there has been rapid productivity growth due to technological advances. But arguably deregulation, corporatization and the introduction of competition were important factors in speeding the take up and adaptation of new technologies. The initial stages of deregulation were characterised by very high levels of growth in both capital and labour productivity as greater use was made of existing capital and as work practices improved in the sector and 'feather bedding' was eliminated (see chart c.10). The introduction of enterprise bargaining and the elimination of paid rate awards were also important changes that occurred during the period

More recently productivity growth in the sector has slowed albeit from very high levels. Concerns are arising about the impact of competition policy and the national access regime on the level of infrastructure investment in the sector (the so called 'dynamic costs' of competition regulation). With output prices falling, real producer wages have risen and there has been substitution away from labour towards capital. There has also been a shift in occupational demand towards professionals within the industry (chart D.13).

D.12 Occupational shares in communication services



Data source: ABS Cat No 6203.0, CIE AUSM projections and CIE calculation

With a continuous series of product innovations and falling prices leading to high growth in consumption, output and employment is set to continue to grow at a faster rate than the rest of the economy over the projection period (see charts 3.7f and 3.11i in Chapter 3).

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