# 1 Setting the scene

## 1.1 What is meant by structural change and structural adjustment?

There is no simple definition of structural change. This term generally describes the fact that, whenever supply and/or demand conditions change in markets for intermediate and final goods and services produced in a country, there will be direct and indirect consequences for industry outputs and structures, as well as for the use of capital, labour and land in that country. Put another way, structural change is the process through which the sectoral composition of the economy is altered in one or more dimensions (box 1.1). Sectoral shares can change when output and/or employment decrease in absolute terms in some sectors, while they expand in others. Shares can also change when rates of growth of output and/or employment differ across sectors.

In conjunction with compositional change across sectors, the geographic distribution of activities, the workforce and the population may also undergo significant changes. Such transformations of the economy are also manifestations of structural change.

In a modern market economy, ‘shocks’ affecting supply and/or demand are ubiquitous and varied. Some shocks (such as those caused by foreign crises) are unanticipated, others (such as seasonal influences) can be factored into decision‑making. Shocks can be short‑ or long‑lived, and their effects may or may not be durable. Some supply and demand changes will occur gradually, such as when demographic or income trends cause household consumptions patterns to vary. Other changes occur more suddenly, as shown by the relatively rapid increase in China’s demand for Australia’s resources and the impact of new technologies such as the Internet on production processes and consumer behaviour. Changes can be policy‑induced, for example, those resulting from the imposition or removal of taxes and subsidies.

Not all supply and demand shocks affecting an economy will result in structural change. That is, some do not significantly alter the pattern of activities. However, there are enough shocks to make structural change a pervasive and continuous feature of the economy.

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| Box 1.1 Defining and measuring structural change |
| Structural change refers to a change in the structure of an economy. That structure is primarily defined in terms of the distribution of output across sectors (broad industry groupings), industries, states or regions. However, because production of goods and services requires primary inputs, the distribution of employment and, in some cases, investment is also of interest. The simplest way to represent the initial distribution is through the respective shares of sectors, industries or regions. Together, the shares add up to 100 per cent of the economy. Structural change implies that, over time, some shares become larger, others smaller. The larger the total proportion of (for example) output that ‘changes’ sectors from one period to another, the greater the magnitude of structural change in the sectoral dimension.  Changing sectoral shares of, for example, employment may translate into changing shares of other variables, such as female employment or casual employees. However, the changing gender balance or casualisation of the workforce, per se, are not usually regarded as structural change.  When distinguishing between many sectors, comparing individual shares over time becomes impractical. For this reason, changes over time in a multitude of shares are often summarised through a ‘structural change index’ (chapters 3 and 4).  Structural change is normally measured over the medium‑to‑long run, even though it can be the result of short‑term shocks such as an economic downturn. There is a risk that measuring structural change over the short run could provide a distorted picture of durable economic transformations. Short‑run fluctuations can be driven by changes in capacity utilisation, lumpy investment, market ‘bubbles’, cyclical crises, natural events such as droughts and cyclones and other irregularities.  Structural change is usually measured as changing shares in ‘real’ indicators, such as quantities, workers employed or hours worked. On occasions, structural change is also measured in terms of shares of output and investment at current prices. This ‘value’ approach has the advantage of accounting for the total amount of structural change, once price and quantity adjustments have taken place. However, output shares measured at current prices conflate the proximate causes of change (price movements) with their consequences (output changes).  Changes in the share of a particular industry should not be always construed as being caused by factors specific to that industry. Industries are mutually interdependent for their supply of inputs or their deliveries. For example, a driver of structural change that directly impacts on industry A may have significant indirect repercussions in industry B, through upstream or downstream linkages.  Structural change can happen with varying speed or intensity. Some change unfolds gradually, reflecting the nature of the forces driving it, such as: population ageing; rising educational attainment; or resource depletion. Other structural change may occur relatively quickly, such as when change is caused by: inventions or innovations; policy decisions; or international developments such as a financial crisis. |
| *Sources*: IAC (1977); PC (1998). |
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As the supply of factors of production (capital, labour and land) is not unlimited in the economy, expansion of one industry or sector can only occur if some others contract in relative or absolute terms.[[1]](#footnote-1)

The process through which expansion and contraction occur is known as the structural adjustment process (box 1.2). It is driven by changes in the *relative* prices of goods, services and factors. Price changes initially ‘equilibrate’ excess demands or supplies and are the market signalling mechanism for bringing about shifts in outputs and factor use across industries. For example, higher output prices resulting from increased demand for a product signal the opportunity for higher returns from producing that product over others. As firms respond to this signal and investment and output expand, in the absence of further shocks, prices will tend to fall over time to reflect long‑run production costs. Similar price signalling occurs in markets for factors of production, which leads to capital, labour and land being reallocated to uses in which they are most valued.

While relative price changes occur virtually instantaneously (unless prices are regulated),[[2]](#footnote-2) the process of changing industry outputs and shifting factors of production generally takes more time. This is because there are real costs involved in adjusting quantities. For example, labour and capital are not homogeneous across industries and jobs.[[3]](#footnote-3) Displaced workers may require retraining in order to secure another job. Investment in new plant and equipment can have a long lead time, and only some types of capital are easily deployed to other uses.

There will be natural as well as ‘man‑made’ impediments to structural adjustment. Some people simply may not be suited to other types of work. Man‑made impediments include regulatory impediments (such as barriers to new investments), or policies (such as subsidies) designed to cushion certain industries from market pressures. With scarce resources, protecting selected industries or firms from those pressures will generally mean that even greater adjustment pressures are placed on others.

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| Box 1.2 Defining and measuring structural adjustment |
| Structural adjustment is the process whereby factors of production — land, labour and capital — are reallocated from one activity to another. Factors move more or less rapidly between activities in search of higher returns. Mechanisms underlying these movements differ, depending on the factor of production involved.  Labour reallocation  Labour is reallocated when workers change one or more aspects of their employment. This can occur through labour mobility, that is, the physical movement of workers between jobs, industries or locations. Labour reallocation can also take place without any worker changing his or her job. If, over time, new jobs are created at differing rates in different industries, the structure of overall employment will progressively alter. (Note that overseas immigration is not regarded as a form of labour mobility, in a domestic context. Nonetheless, it is one of the reasons why net job creation in one industry may take place without domestic workers changing jobs.) Finally, labour reallocation can occur through a change in a person’s work arrangement so that, for example, he or she carries out a new set of tasks, according to a different schedule (Shomos et al. 2013).  Capital reallocation  As in the case of labour, reallocation of capital can take the form of existing equipment, plants and buildings being switched between activities. This type of reallocation includes trade in second‑hand capital goods between firms, as well as the transfer of productive capacity within a firm (for example, between establishments or product lines). As with labour, structural adjustment in capital can take place ‘at the margin’, via differential rates of net capital creation across industries, sectors or regions. Capital creation within an industry may be the result of investment by established producers, or of net entry of new firms (or of firms switching between industries). Conversely, capital destruction occurs when redundant assets cannot be traded and are scrapped.  Net investment, therefore, is a structural adjustment mechanism that explains how some industries are able to increase their installed productive capacity over time. An alternative way of looking at investment flows is as a ‘leading indicator’ of structural change. That is, today’s changes in the industry distribution of net investment may foreshadow tomorrow’s distribution of output (with the caveat that future productive capacity may not be fully utilised at all times). For this reason, some authors include investment trends in their analysis of *structural change* (Connolly and Lewis 2010; Connolly and Orsmond 2011). This approach is adopted in this supplement.  Land reallocation  Land (including natural resources) can sometimes be reallocated from one type of activity to another through changes in land use and, where required, rezoning. For example, agricultural land on the periphery of capital cities may be rezoned to allow light industrial or service activities. Regulatory impediments to, for example, the establishment of large retail operations in some areas because of planning guidelines, may result in land not being allocated to its highest‑value uses (PC 2011c). |
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Moreover, policies that unnecessarily ‘throw sand in the wheels’ will essentially mean that national income is lower than it could be. Generally speaking, the quicker shifts occur such that resources can be deployed in higher‑valued uses revealed by price signals, the better. That said, if shifts are induced by *distorted* price signals — for example, because of unpriced, policy-relevant externalities or inefficient policy interventions — then they may not deliver net community benefits.

To understand the structural adjustment process is to be able to answer the following questions. Where did the additional resources flowing into an industry come from? How rapidly did resources move from one part of the economy or country to another? What motivated these movements? Were there any impediments to this movement? Did one sector’s expansion lead to the net creation of jobs or businesses in the economy, or was this expansion entirely offset by job destruction and/or business exits in other sectors?

## 1.2 Sources of structural change

Modern economies are constantly buffeted by global and domestic forces, giving rise to structural change. The sources of change may or may not be expected, recurring or reversible. Before they can be discussed in more detail in the next chapter, it is necessary to explain how these sources lead to a change in the economy’s structure.

### Structural change as a new equilibrium on the production frontier

For structural change to take place, there must be a change in one or more of the three key variables that can be used to describe any economic system (Prescott 2006):

* Endowments — this refers to the stock of factors of production (land, labour and capital) available to an economy at a point in time for use in the production process. Endowments of land are defined to include stocks of minerals, energy, timber and water. Endowments of labour depend in part on demography, so that population ageing and immigration can bring about changes in the available supply of labour. Endowments of physical capital are measured through the stock of productive assets available to businesses and governments. This stock increases through investment and depreciates because of wear and tear.
* Technology — this term encompasses the way in which inputs are combined to produce goods and services. Technology includes not only the knowledge embodied in hardware, but also such intangible factors as management practices and ‘know‑how’.
* Preferences — this refers to the varying levels of utility consumers derive from the consumption of different goods and services, in different quantities and combinations. Preferences can change for a number of reasons, but changing income levels and demographic change are the main long‑term reasons.

To these three economic ‘fundamentals’, a fourth one is often added, termed ‘institutions’. This refers to the set of laws, rules and regulations, governance frameworks and policies that constrain or encourage the acts of producing and consuming. In a structural change context, institutions are important for two main reasons. First, a change in some institutions can trigger structural change directly. An example is when reductions in tariff protection cause some industries to grow more rapidly, due to the lower costs of imported inputs. At the same time, those industries receiving less protection decline in relative terms, unless they can improve their competitiveness. Second, institutions can condition the structural change impact of other factors. A case in point is the workplace relations framework that — among setting other rules and principles — affects the flexibility of employment and workplace arrangements. For example, the impact of changing female work preferences on the economy’s endowment of labour depends in part on employers’ ability to offer part‑time and casual positions.

If an economy did not engage in foreign trade, then it would form its own closed system. In that case, its combination of domestic factor endowments, technology, preferences and institutions would determine the structure of that economy at a given time — that is, the goods and services produced and consumed and the mix of factors used to make them. Prices of those goods, services and factors of production would also be entirely determined domestically.

But virtually all economies are open to foreign trade and international factor flows to some degree, and the relevant economic system consists of all trading partners considered as a group. It is then the *distribution* of the fundamentals across all trading partners that determines the structures of these economies. Differences in fundamentals will dictate each country’s comparative advantage and, therefore, the extent and nature of its exchanges with others.[[4]](#footnote-4)

Given this interdependence, if one or more of the fundamentals changes in the domestic economy or in one of its trading partners’, affecting relative prices for some goods or services, then all of these economies’ structures will generally change also, reflecting new comparative advantages, world prices and trade patterns.

The influence of fundamentals is illustrated graphically in figure 1.1, in the context of a simplified two‑sector economy that produces two tradeable goods: manufactures and natural resources (minerals and energy).

The first two panels of that figure illustrate how changes in factor endowments (panel A) and technology (panel B) affect equilibrium in a small, open economy such as Australia. In that economy, relative prices for the two goods are set in world markets, independently of domestic supply and demand conditions, including endowments and technology. In both scenarios, a change in one fundamental leads unequivocally to a change in the economy’s structure, as the economy moves from point A to point B.

The next two panels (C and D) illustrate the consequences of a change in consumer preferences. In panel C, it is domestic preferences that are changing, in favour of manufactures. This time, the economy is assumed to be non‑trading, which means that relative prices do respond to the changed demand conditions. Once equilibrium is restored at point B, more manufactures and less resources are being produced and consumed than was the case at point A.

Finally, in panel D, an increase in foreigners’ preferences for Australian resources is illustrated. This time, it is assumed that such a change is sufficient to alter relative world prices in favour of resources — a broad illustration of Australia’s experience during the natural resources boom. This leads to an expansion of Australian resources output as well as an increase in resources exports. Conversely, domestic manufacturing output falls and imports rise. This scenario illustrates the importance of *international relativities* in fundamentals for the economic structure of Australia. In this instance, foreign preferences for resources have increased, while Australia’s have not.

It is worth noting that expanding foreign trade, in panel D of figure 1.1, allows Australian consumers to derive greater utility from their consumption of the two commodities, relative to the initial equilibrium. This is due to the fact that, in an open economy, the gains from specialisation and exchange can be exploited, so that consumption possibilities are not limited by what Australia alone can produce.

Figure 1.1 Structural change: analytical framework and examples

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| A: change in endowments (open economy)  QM2  QM1  T1’  T2’  QR2  QR1  B  A  Output of manufactures, QM  T1  T2  Price ratio, slope = -PR/PM  Output of resources, QR | In the panel on the left, the initial equilibrium of the economy is at point A. This point is determined by the economy’s production possibility frontier (T1T1’) and the negative of the ratio of the price of resources to the price of manufactures (‑PR/PM). The economy’s initial structure is represented by outputs QM1 and QR­1.  Following the discovery of new mineral deposits, the economy’s endowment of ‘land’ increases. This shifts the production possibility frontier to T2T2’. Given that the world price ratio does not change, the new equilibrium is at point B. The economy’s structure has now changed towards more resources output and less manufacturing output (QR2 and QM­2, respectively).  Note that an increase in other endowments, such as labour through increased labour force participation or immigration would produce a similar effect (although not favouring resources, as that sector is normally considered to be relatively less labour‑intensive than manufacturing). |
| B: technological advances (open economy)  QM2  QR2  QR1  T1’  QM1  T1  T2  A  B  Output of manufactures, QM  Price ratio, slope = -PR/PM  Output of resources, QR | In this panel, technological advances mean that the manufacturing sector can produce a greater level of output with the same level of inputs. This has the effect of shifting the production possibility frontier towards manufactures. At the same world price ratio as prevailed initially, the economy’s equilibrium moves from point A to point B.  At the new equilibrium, the improvement in manufacturing technology has caused structural change reflected in an increased share of manufacturing in production, and a commensurately lower share of resources production. |
| C: changing consumer preferences (closed economy)  I2  A  B  I1  I3  Output of manufactures, QM  QR1  QR2  QM2  QM1  Output of resources, QR | The panel on the left illustrates structural change that is fostered by changing domestic consumer preferences. At the initial equilibrium A, consumer preferences shift in favour of manufactures. This means that the initial community indifference curve I1 going through A is no longer applicable. (An indifference curve traces out the combinations of the two goods between which consumers as a whole are indifferent.) Consumer tastes are now reflected by community indifference curve I2, so that A is no longer an equilibrium. At that point, excess demand for manufactures causes their relative price to increase. Equilibrium is restored at B, where more manufactures and less resources are produced and consumed than before (for a higher level of community welfare on I3). |

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Figure 1.1 (continued)

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| D: increased overseas demand for resources (open economy)  B  Output of manufactures, QM  D  QR4  QR1  QR3  QR2  QM4  QM1  QM2  QM3  A  I1  I2  P2 = -PR2/PM2  P1 = -PR1/PM1  Output of resources, QR  C | In this panel, the initial equilibrium and economic structure are defined by production equilibrium point A and consumption equilibrium point B. This means that quantity (QM2‑QM1) of manufactures is imported and quantity (QR1‑QR2) of resources is exported. The curve I1 represents the community’s initial consumption indifference curve.  If overseas demand for resources increases, the price of resources also rises, relative to that of manufactures. As a result, the equilibria move to C (production) and D (consumption). This translates into an increase in resource exports and an increase in manufacture imports. The structure of domestic production has changed towards resources, away from manufactures. Moreover, the welfare of the community has increased, as it is consuming on a higher indifference curve I2. This scenario broadly illustrates the effects of the resources boom on Australia’s production and consumption patterns. |

An important corollary of the brief analysis presented above concerns the implications for factors of production. Whenever the position of the economy on its production possibility frontier changes, the patterns of use of, and rewards to, labour and capital change also. This is due to the fact that, as one or more of the economic fundamentals is altered (as illustrated in panels A to D of figure 1.1), excess supply and excess demand initially develop in labour and capital markets, creating pressures for adjustment. For equilibrium to be restored simultaneously in both markets, factor price movements need to occur such that, in each sector of production, the ratio of wages to capital rentals is equal to the ratio of the marginal products of labour and capital. Unless this condition is met, unused labour or capital or both will exist and the economy will operate within its production possibility frontier. The total quantity of each factor used across the economy, combined with the economy‑wide price for each factor, ultimately determines how much of the nation’s income accrues to workers, and how much to the owners of capital and other factors of production.

### Structural change in Australia

Regardless of their stage of development, all countries experience some form of structural change. Indeed, the broad similarity of long‑term patterns of change in economic structure worldwide underpins a school of thought highlighting the so‑called ‘stylised facts’ of structural change.[[5]](#footnote-5) These stylised facts describe the three successive phases of development followed by most economies:

* the long‑term decline of agriculture from its pre‑development dominance
* the medium‑term rise, then fall, of manufacturing as nations industrialise, and
* the long‑term rise and ultimate dominance of the services sector, as nations become modern economies.

Notwithstanding these similarities, even those authors who focus on these stylised facts acknowledge the country‑specific nature of much structural change (Acemoglu 2012; Herrendorf et al. 2011).

#### The importance of international trade and ‘globalisation’

Although Australia’s development trajectory accords broadly with the stylised facts of structural change (chapters 3 and 4), it stands out in some important respects. Even prior to the current resources boom, Australia has always had a much more resource‑oriented economy than any other comparable developed economy. With its comparative advantage traditionally lying in broadacre rural commodities, minerals and energy — as far back as the gold rushes of the nineteenth century — Australia has tended to experience disproportionately the volatility of international commodity prices.

For example, during the early 1950s, the Korean War led to a spike in the demand for Australian wool that saw Australia’s terms of trade reach an unprecedented high (figure 1.2). Conversely, at the time of the United Kingdom’s entry into the European Economic Community in 1973, Australia lost much of that country’s market for its agricultural exports (IAC 1977). This loss exacerbated other pressures felt by some major rural industries around that period, leading to a decline in their share of the economy.

Australia’s sensitivity to overseas economic conditions was demonstrated repeatedly over the course of the twentieth century. On each occasion, one or more of the country’s fundamentals was altered (as illustrated in figure 1.1), resulting in structural change. For example, during the early 1970s, the discovery of major bauxite and oil reserves and increased Japanese demand for iron ore and coal led to a resources boom. In the late 1970s, there was another resources boom, this time triggered by increases in the price of energy, in the wake of oil price shocks (Battelino 2010). The consequences of these resource discoveries and booms for industry structure and competitiveness were the catalyst for the elaboration of the ‘Gregory thesis’, analogous to the ‘Dutch Disease’ and ‘resource curse’ constructs (discussed below).

Figure 1.2 The terms of trade peaked in late 2011**a**

Index values, 1870–2013 (1901–2000 average=100)

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a Based on annual data to 1959, and seasonally adjusted quarterly data averaged over the year to June thereafter. Dates refer to the June quarter. Data for 2012‑13 include only the September, December and March quarters.

*Sources*: Connolly, E. (RBA, Sydney, pers. comm., 28 August 2012, unpublished data) and ABS (*Australian National Accounts: National Income, Expenditure and Product, March 2013*, Cat. no. 5206.0).

The current natural resources boom is but the latest in a series of external trade shocks affecting the Australian economy. The sharp rise in the price of Australia’s minerals exports, beginning in 2002‑03 saw the terms of trade match the heights previously reached during the boom in agricultural export prices in the 1950s (figure 1.2).

Unlike earlier resources booms, the most recent one has proved to be long‑lived. Its effects have been accentuated by the strong appreciation of the Australian dollar and a significant fall in the prices of goods imported from Asia. In the midst of these favourable developments, the occurrence of the Global Financial Crisis (GFC) led to a temporary downturn in activity which, despite being relatively mild in Australia, has nonetheless resulted in some durable effects.

Both the resources boom and the GFC have thrown into stark relief the extent to which the world economy is increasingly integrated and interdependent — in other words, ‘globalised’. For example, the ratio of world merchandise exports and imports to world GDP grew from 29 per cent in 1986 to 53 per cent in 2008, prior to the downturn caused by the GFC (Productivity Commission estimates based on World Bank data). Globalisation means that countries linked by trade, financial transfers, technology, information flows, immigration and social exchanges are now enmeshed in each others’ opportunities and risks. On the downside, this can mean a more rapid transmission of economic turmoil and financial crises. On the upside, it means that Australia is benefitting greatly from China’s strong demand for steel, underpinned by rapid industrialisation and urbanisation and a growing standard of living.

Based on the KOF index of globalisation for 2012, Australia was the 21st most globalised country, in overall terms, and the 32nd highest globalised country in economic terms (out of 208 countries).[[6]](#footnote-6) For Australian producers, globalisation presents both opportunities and risks. On the one hand, markets for traded goods and services are now larger and, in particular, Australia’s minerals and energy are in great demand. Technology has also enhanced the ability of many Australian firms to achieve lower production costs through access to cheaper imported inputs, or through the outsourcing of some activities (including services) to overseas suppliers.

Technological advances are often put forward as an enabler of globalisation (Langhorne 2001, cited in Dreher, Gaston and Martens 2008). Improvements in transport and communication technology have fostered countless innovations in the ways of ‘doing business’ internationally and improvements in the range, speed and ease of international transactions.

Globalisation has also had a downside for some domestic producers. For example, the Australian motor vehicle, printing and publishing industries have lost domestic market share to overseas competitors. But not all firms in these and other trade‑exposed industries are similarly affected. Some have been able to harness the increasing geographic dispersion of production processes to their advantage (box 1.3).

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| Box 1.3 International value chains and ‘made in the world’ |
| A value (or supply) chain is defined as ‘the unbundling of stages of production across different countries, based on their cost advantages’ (Lamy 2012). An example of a value chain is that underlying the manufacture of an Apple iPhone. Although iPhones are assembled in China for export to the rest of the world, it has been calculated that the value added embodied in each unit is created in a range of countries, with China among the smallest value adders. As a result, an iPhone is literally ‘made in the world’.  The concept of a value chain emphasises that, increasingly, trade between countries is made up not of trade in finished products, but of trade in intermediates, tasks and value added. Thus, a country’s exported goods can incorporate parts and labour supplied, via imports, by a multitude of other countries. For example, it has been estimated that, in 2005, a third of the value of Norway’s exports was accounted for by the imported inputs they contained. This proportion was higher in manufacturing than in services.  The increasing dispersion of production activities across countries provides additional opportunities for countries to become part of a chain, at a level commensurate with their capabilities and endowments. As the tasks required to assemble a particular good are increasingly split‑up and distributed, countries become better able to exploit their comparative advantage in building one or more components, rather than the whole product.  The rising importance of value chains has been underpinned by the rapid growth of foreign direct investment (FDI) within world trade. Many FDI flows represent a multinational company’s funding of upstream and downstream activities carried out by its overseas subsidiaries or foreign affiliates. For example, over the last ten years, the US company Boeing has invested in excess of $500 million in plant, equipment, training and research laboratories (such as CSIRO) in Australia. |
| *Sources*: Lamy (2012); Isakson (2011); Austrade (2012). |
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## 1.3 Why is structural change of policy interest?

As mentioned earlier, structural change cannot take place without accompanying adjustments. Accordingly, the potential benefits of structural change cannot be realised until structural adjustment takes place. However, structural adjustments are not costless. It is this feature that causes community concern and motivates much of the government interest in this area.

### Promoting the benefits of resource reallocation

In a market economy, scarce productive resources will tend to flow to their highest‑value uses. If, for example, changing preferences of foreign consumers mean that overseas demand for Australia’s minerals and energy increases, relative prices received by Australian producers will come to reflect this shift in market conditions. In time, resources will be reallocated to the production of the more highly-valued product.

This is the process illustrated in figure 1.1(D) by a movement of the economy along its production possibility frontier, which results in more natural resources being produced (and exported) and fewer manufactures being produced (while more are imported). The movement of the economy along the frontier need not be smooth or orderly, particularly in response to large shocks, where structural adjustment cannot be easily accommodated within the context of economic growth. In the domestic sector less favoured by overseas demand, some or all firms will need to reduce their output and, possibly, higher‑cost ones to close their doors. In the favoured sector, there will be increased production and likely entry of new firms, attracted by the higher relative prices (and, hence, returns).

In practice, the sector experiencing declining relative overseas demand often finds itself doubly hampered, because the shift of the economy towards resources exports tends to result in its decreased competitiveness both at home and abroad (via exchange rate appreciation and rising domestic input costs). This is, in essence, the ‘Dutch Disease’ scenario already mentioned (box 1.4). Notwithstanding their negative connotation, the adjustments that follow the initial shift in overseas demand are both predictable and desirable. In other words, they are likely to produce net community benefits.

Nevertheless, a range of factors can prevent those benefits from being realised in full. First, adjustment relies on timely, accurate and transparent price signals. If those characteristics are present, firms and consumers adjust their behaviour in ways that are inherently efficient. If, conversely, price signals are obscured, delayed or distorted, perhaps by government regulation or policy (or its absence, in the case of policy‑relevant externalities), efficient adjustments may not take place to the same extent, if at all. For example, government assistance to an internationally uncompetitive industry might prolong its claim on resources that could be employed more productively elsewhere. In terms of figure 1.1(D), movement of production from point A to point C would not take place.

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| Box 1.4 Is Australia suffering from the Dutch Disease? |
| The term ‘Dutch Disease’ was coined in the 1970s to characterise structural change in the Netherlands economy, following the discovery and exploitation of North Sea gas reserves. Other terms used to describe the same set of changes include ‘booming sector effect’, ‘deindustrialisation’, ‘resource curse’ and, in Australia, ‘Gregory thesis’ and ‘two‑speed economy’.  The key structural changes underlying the Dutch Disease are, in addition to the expansion of the booming resources sector, the relative contraction of the non‑booming industries (traditional exporters, but also providers of inbound tourism services) and import‑competing industries. At the same time, the sector producing non‑tradeable commodities (mainly services) expands in relative terms. These sectoral shifts are brought about by two separate effects:   * Resource movement effect — as the booming sector expands, it draws resources away from other parts of the economy. This is the scenario illustrated in figure 1.1(A). * Spending effect — a boom in exports of resources generates additional income in the economy. For example, the additional income generated in Australia by the higher terms of trade has been estimated at 15 per cent or more of Gross Domestic Product (Stevens 2011). Part of this extra income is inevitably directed at non‑tradeable goods, the price of which increases (the price of tradeables cannot rise as it is set by world markets). As production of non‑tradeables becomes more profitable, that sector draws resources away from both the booming and non‑booming sectors.   At the end of this process, the non‑booming tradeables sector has unambiguously shrunk, in relative terms. Moreover, the real exchange rate — the ratio of non‑tradeables prices to tradeables prices expressed in domestic currency — has appreciated. During Australia’s resources boom, the transformation summarised above was accelerated by the historic rise in the terms of trade and the high value of the Australian dollar.  The term ‘disease’ suggests harmful effects, not least the contraction of the non‑booming tradeables sector. However, this was not the long‑term experience of the Netherlands and nor should it be in Australia. A better description is ‘multi‑speed’ economy, which more accurately conveys that leading and lagging sectors have always been a reality in Australia. Recent structural transformations are, in many cases, consistent with longer‑term trends.  The real appreciation of the exchange rate is the economy’s response to the heightened price of natural resources and it is the key trigger for the necessary reallocation of factors of production from one part of the economy (the non‑booming sector) to others (the natural resources and non‑tradeables sectors). Put another way, in an economy close to full employment, growth in non‑traded activities can only be accommodated through the relative contraction of other parts of the economy. |
| *Sources*: Corden and Neary (1982); van Wijnbergen (1984). |
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Moreover, if factor use and rewards are unable to respond to pressures for change, some resources could become unemployed. This is not to say that no adjustments would occur; in a context of factor or product markets rigidity, the adjustments taking place are those enforced on some economic agents that would otherwise have benefited from changing circumstances. An example of such adjustment occurs when some consumers or firms pay more for some goods or services than they would have, had the economy adjusted fully. Another is when a sector is unable to expand fully, due to the fact that resources are ‘locked in’ by economic distortions. In both these scenarios, ‘negative’ adjustments mean that community welfare lies below its potential.

To avoid such an outcome, it would be important for governments to address distortions and rigidities — in both product and factor markets — that may have accumulated over the years. This rationale for government intervention was re‑emphasised recently by the Secretary of the Department of the Treasury:

We also need to ensure that our scarce resources can move quickly so that we can take full advantage of the opportunities before us. Workers, investors and entrepreneurs must be able to direct their resources according to their best judgements and in response to appropriate price signals. To ensure that price signals are good guides, we need to maintain and foster healthy competition by regulating against price distortion and supporting dynamic and efficient markets. (Parkinson 2012)

On the other hand, beneficial adjustments may not take place because of market failures. For example, information gaps and credit constraints can mean that those affected by structural change are unable to respond as efficiently as they might. As an illustration, possible responses for newly laid‑off workers might include upskilling, retraining, relocating or starting a small business. Yet, workers might lack the information about the costs and benefits of each option, or the financial means to act. Thus, they may become unemployed or leave the labour force altogether, even though they could and would prefer to be employed in another part of the economy. This represents a costly outcome for the economy, in terms of output forgone, skills decay, increased government transfers, and psychological damage to individuals.

In some cases, a change may be so sudden, unforeseen or large, that the adjustments required of some groups would be extremely costly or considered inequitable by the community. Changes introduced by governments and other public institutions are often perceived to fall into this category. According to the Industries Assistance Commission:

Because some Government decisions have an obvious and immediate effect on the economy many people see changes in government policy as the major source of structural change in the economy. (1977, p. 45)

Instances of institutions‑induced structural change are many, such as when governments began to reduce tariff protection of Australian industry in the 1970s, thus putting pressure on manufacturing’s share of employment and output. In subsequent decades, further waves of microeconomic reform — including under the National Competition Policy — caused significant structural change in a number of industries, such as Electricity, gas and water and Transport and communication (De Laine, Lee and Woodbridge 1997; PC 2005c).

Government policies can have a multitude of structural effects, not all of which are readily identifiable. Policies may apply across‑the‑board, but create differing pressures for change on different industries (for example, environmental regulations). Or policies may just target a single industry — for example, with the aim of reforming its operation — but in doing so affect others indirectly, through inter‑industry and income effects. In either scenario, identifying the ‘winners’ and ‘losers’ from the policy can be a complex task. For example, it is necessary to assess whether any group is likely to be materially more disadvantaged by the intended policy than could be expected under a baseline ‘market churn’ scenario:

Individuals and firms win or lose from market‑based changes every day. This is usually considered to be part of the normal operation of markets. For the losers, assistance beyond the social safety net and generally available measures is rarely provided. (PC 2001, p. 42)

Complicating factors abound in this type of exercise, such as when a change disadvantages wage earners but favours owners of capital in the same industry (or vice versa). If some individuals belong to both groups, estimating net gains or losses becomes even more challenging.

Those technical difficulties aside, governments will sometimes opt to provide assistance, over and beyond what is available through the safety net, to those groups put at risk of inequitable outcomes by structural change (policy‑induced or not).

Further discussion of the potential benefits and costs of structural adjustment, and of appropriate policy settings, may be found in PC (2012a, 2001).

## 1.4 Aims and structure of this supplement

In a reflection of the importance of structural change and structural adjustment for economic growth and community welfare, the Productivity Commission and its predecessor organisations have devoted a number of publications to exploring these themes (box 1.5).[[7]](#footnote-7) A recent instalment in this suite of publications was contained in the theme chapter of the 2011‑12 Annual Report, entitled ‘Structural adjustment in a “multi-speed” economy’ (PC 2012a). This supplement provides additional data and supportive analyses for this theme chapter, although its scope differs slightly in parts. The supplement includes a case study of the natural resources sector, which was a large part of the structural change and adjustment unfolding during the decade to 2012.

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| Box 1.5 Selected Industry Commission and Productivity Commission publications on structural change and structural adjustment |
| * Industry Commission 1993, *Impediments to Regional Industry Adjustment*, Inquiry Report, Canberra. * De Laine, C., Lee, K. and Woodridge, G. 1997, *Microeconomic Reform and Structural Change in Employment*, Industry Commission, Staff Research Paper, no. 6, Canberra. * Productivity Commission 1998, *Aspects of Structural Change in Australia*, Research Report, Canberra. * Productivity Commission 2001, *Structural Adjustment — Key Policy Issues*, Commission Research Paper, Canberra. * Thompson, G., Murray, T. and Jomini, P. 2012,\* *Trade, Employment and Structural Change: the Australian Experience*, OECD Trade Policy Working Papers, no. 137, Paris. * Productivity Commission 2012, *Trade & Assistance Review 2010‑11*, Annual Report Series, Productivity Commission, Canberra, May (see chapter 4). * Productivity Commission 2012, *Annual Report 2011‑12*, Annual Report Series, Productivity Commission, Canberra, October (see chapter 1). |
| \* Paper contributed by Productivity Commission researchers to the International Collaborative Initiative on Trade and Employment, coordinated by the OECD. |
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The remainder of this supplement is structured as follows.

Chapter 2 examines the global and domestic forces behind structural change in Australia, using a range of indicators. The potential implications of these forces for particular industries are also considered, as is selected empirical evidence.

Chapters 3 and 4 describe, measure and analyse the various manifestations of structural change over the last ten years and longer, using a wide range of output, investment and employment data. This allows a consideration of whether the pace of change accelerated in recent times, compared with earlier periods. Similarities and differences in the nature of change in successive decades are also highlighted.

Chapter 5 explores in greater detail the underlying mechanisms at work for labour market adjustment. This requires going beyond the trends observed at the sectoral and industry level to examine changes at the level of the individual worker, such as changes in labour force status and job location.

Chapter 6 provides a detailed case study of the natural resources sector[[8]](#footnote-8) that serves to illustrate many of the trends and responses identified in preceding chapters. The rapid expansion of resource sector employment and investment in the last decade or so are forms of structural change made possible, in part, by the economy‑wide reallocation of factors of production. Given the geographic concentration of mining areas, such movement has led to structural change at a geographic, as well as an industry, level.

1. Limits to factor endowments (supplies of factors of production) are not immutable. Endowments can increase through foreign capital inflows, domestic investment, immigration or demographic change. [↑](#footnote-ref-1)
2. If relative prices cannot change, excess demands will lead to shortages and non-price rationing, while excess supplies initially will lead to unanticipated inventories or waste, followed by underutilised capital and unemployment. In other words, shocks would still have consequences, but generally more costly ones than if resources could move to higher-valued uses. [↑](#footnote-ref-2)
3. The term ‘capital’ is used throughout this supplement to refer to a firm’s durable assets, including machinery, equipment and buildings. It is not meant to refer to ‘financial’ capital, such as loans and equity funds, or ‘working’ capital, which includes liquid funds and stocks of material, outputs and work in progress. [↑](#footnote-ref-3)
4. For example, classical international trade theory postulates that gains from trade arise, on the production side, as a consequence of differences in relative factor endowments between nations (Woodland 1982). Differences on the demand side — for example, in consumer preferences or income per capita — also create scope for gains from trade (Markusen and Melvin 1988). [↑](#footnote-ref-4)
5. This school of economic thought is associated with the work of 1971 Nobel Prize in Economics Laureate, Simon Kuznets. [↑](#footnote-ref-5)
6. See http://globalization.kof.ethz.ch as well as Dreher, Gaston and Martens (2008) for details of the index. KOF is the acronym for the German word ‘Konjunkturforschungsstelle’, meaning ‘economic research agency’. The index is produced under the auspices of the Swiss Economic Institute. [↑](#footnote-ref-6)
7. Available from www.pc.gov.au. [↑](#footnote-ref-7)
8. The terms ‘natural resources sector’, ‘resources sector’, ‘mining sector’ and ‘Mining industry’ are used interchangeably in this supplement. Appendix A provides a definition of the natural resources sector. [↑](#footnote-ref-8)