

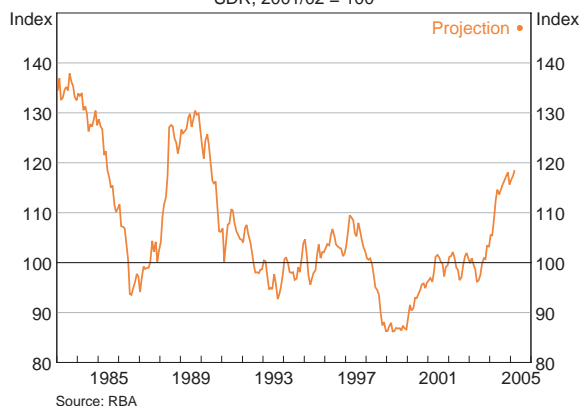
# COMMODITY PRICES AND THE TERMS OF TRADE

## Introduction

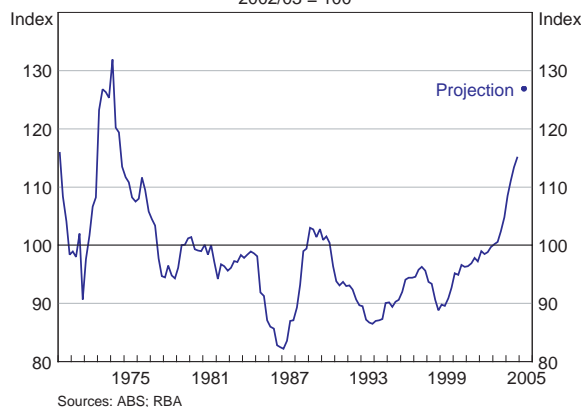
The global economic upswing since 2003 has spurred a sharp increase in world prices for resource commodities. Higher prices from recent contract negotiations for coal and iron ore are projected to boost the RBA index of commodity prices by about 24 per cent (Graph 1) and overall export prices by about 10 per cent.<sup>1</sup> This should bring the terms of trade – that is, the ratio of prices received for our exports to prices paid for imports – to their highest level in over 30 years (Graph 2).

Large movements in the terms of trade have historically had major effects on the Australian economy. An increase in export prices relative to import prices means that a larger volume of imports can be purchased with a given volume of exports. The implied increase in the real purchasing power of domestic production is equivalent to a transfer of income from the rest of the world. The projected increase in the terms of trade in 2005 is equivalent to an increase in Australia's real income of around 2 per cent of GDP, following a similar effect in 2004. Part of this income gain accrues to foreigners, given that there is significant foreign ownership of the resources sector. However, the majority accrues domestically, either as profits or taxes, which

**Graph 1**  
**Commodity Prices**  
SDR, 2001/02 = 100



**Graph 2**  
**Terms of Trade**  
2002/03 = 100

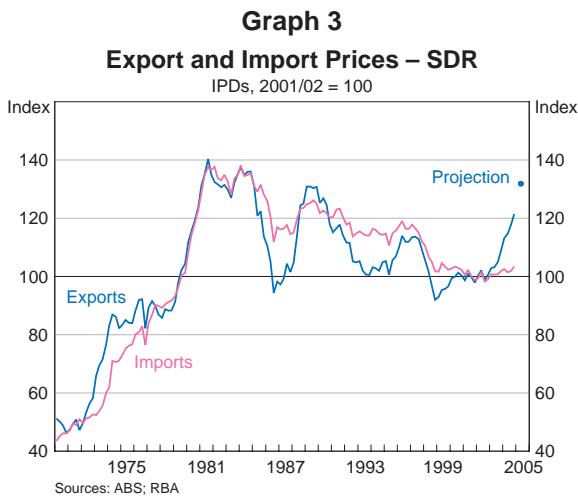


<sup>1</sup> The estimated effect of these rises in contract prices is shown in the projected value in this and subsequent graphs, assuming all other prices remain constant.

stimulates domestic spending and indirectly boosts production. In addition, higher resource prices encourage additional investment in the mining sector over the medium term. This article discusses the expansionary impacts of increases in the terms of trade on the Australian economy.

## Sources of Movement in the Terms of Trade

Base metals prices have risen significantly over the past two years, and the recent contract renegotiations for some bulk commodities have seen price increases of around 120 per cent for coking coal, 70 per cent for iron ore and 20 per cent for steaming coal. Once the contract price increases for iron ore and coal take effect (and assuming no other changes), the terms of trade will have increased by more than 25 per cent over a two-year period. Furthermore, the terms of trade will have increased by over 40 per cent from the trough in late 1998. Given the substantial movement in the Australian dollar over this period, the most appropriate way of identifying the drivers of movements in the terms of trade is to look at export and import prices in a composite

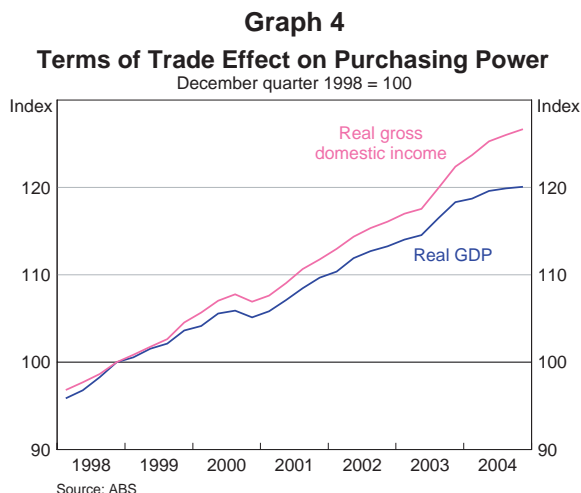


foreign currency such as the SDR. This confirms that the recent episode has been driven mostly by higher export prices, as import prices have not changed materially over this period (Graph 3). Further, the rise in export prices since late 1998 has been driven primarily by higher prices for resource commodities, with prices for other goods increasing more modestly: average export prices for resources have risen by around 51 per cent in SDR terms, versus 27 per cent for rural goods and 4 per cent for manufactures.

By historical standards, the recent increase in the terms of trade is quite large, though it has not occurred as rapidly as some previous shocks. Australia's largest terms of trade shock occurred in the early 1950s when the Korean War induced a surge in the price of wool (and metals) which resulted in the terms of trade rising by 46 per cent in one year. Another sharp rise occurred in the early 1970s amid a broad-based commodity price boom. In the mid 1980s, there was a steep fall in the terms of trade that generated significant concern. In previous episodes, as is the case currently, the swings in Australia's terms of trade were generally driven by movements in export prices rather than import prices. This is not surprising given that Australia has mainly exported commodities which have relatively volatile prices, and imported manufactures which have more stable prices. It is also noteworthy that large changes in the terms of trade have often been substantially reversed in subsequent years.

## The Relationship between the Terms of Trade and the Macroeconomy

Changes in the terms of trade represent changes in relative prices, so they do not directly affect the standard measure of the level of real output (i.e. real GDP) although, as discussed below, they are likely to have substantial indirect effects. An increase in export prices relative to import prices means that a larger volume of imports can be purchased with a given volume of exports, thus increasing the real purchasing power of domestic production. The increase in purchasing power flowing from a rise in the terms of trade can be illustrated by comparing real GDP with real gross domestic income (GDI) (Graph 4).<sup>2</sup> Over the year to the December quarter of 2004, growth in real GDI exceeded that in real GDP by around 2 percentage points.



For any given pattern of real output and expenditures, a rise in the terms of trade will, however, have a direct effect on the trade balance and on the current account position. Assuming no changes in quantities, higher export prices will generate an increase in nominal export earnings and thus an equivalent shift in the trade balance. Given that a proportion of the export sector is owned by foreign residents, some of the income gain from a rise in export prices will accrue to foreigners. The extent of this 'leakage' will vary depending upon the particular area of the export sector in which the price increases occur, but will mean that the direct improvement in the current account position may be smaller than that in the trade balance. In addition, higher real incomes from an increase in the terms of trade will tend to boost imports, and the exchange rate may also adjust, so the overall effect on the trade balance and current account is ambiguous.

The indirect effects of increases in the terms of trade on real output and the broader economy arise from the influence of higher real incomes on spending, which tends to boost real GDP and inflation. The nature and extent of this stimulus depends importantly on the behaviour of the exchange rate, since this will determine how the income gains are shared. To better understand the possible effects of changes in the terms of trade on the economy, it is useful to consider two polar cases: one where the exchange rate does not change, and the other where the exchange rate moves one-for-one with the terms of trade, appreciating at times of rises in the terms of trade and depreciating when the terms of trade fall. It is also helpful to assume that in each case

<sup>2</sup> Real GDI adjusts real GDP by the change in the relative price of exports and imports. It is also possible to adjust real GDI for net income flows overseas, which will include the proportion of higher export revenues accruing to foreigners, resulting in a measure known as real gross national income. Some further background on these adjustments is provided in 'The terms of trade and the national accounts', feature article in ABS Cat No 5206.0, December quarter 2004.

the increase in the terms of trade is driven by an increase in the world price of commodities, while prices of non-commodity exports remain unchanged; this implies that the world prices of total exports (and hence the terms of trade) rise on average by less than the increase in world commodity prices.

If the exchange rate did not respond to the increase in world commodity prices and the terms of trade, the domestic currency price of these commodities would rise by the full amount of the world price increase. In this case, the (pre-tax) income gains from the terms of trade would accrue entirely to exporters of commodities. This would increase consumption spending by those who own and work in this sector, and would encourage investment to increase the supply of commodities for export. There would also be broader multiplier effects on the economy, boosting demand, real GDP and possibly inflation, but with some leakage of demand into imports. To the extent that the commodities sector is partly foreign-owned, some of the income gains would accrue offshore.

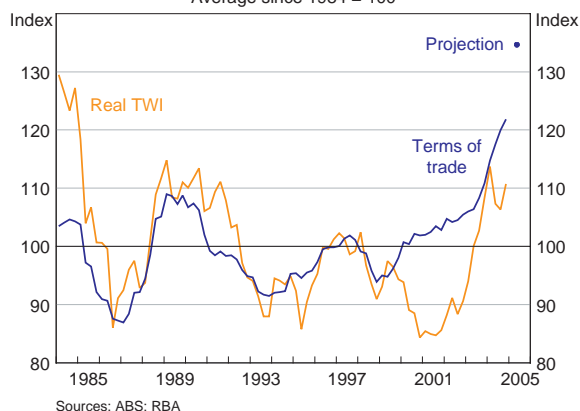
On the other hand, if the exchange rate appreciated by the same amount as the terms of trade increase, the domestic currency price of total exports would be unchanged, with a rise in the domestic price of commodity exports offset by a fall in that of other exports. Hence income gains accruing to the commodity-exporting sector would be offset by income losses for the other exporters. However, real income gains would still accrue to the broader economy through lower import prices, encouraging higher real levels of consumption and investment.

The first case, where the exchange rate does not change, broadly characterises the situation that existed prior to the float of the Australian dollar. For example, during the wool price boom of the 1950s, the fixed exchange rates of that era meant that the rise in export prices contributed to a surge in domestic incomes and demand, and also to a sharp rise in inflation. A similar situation occurred during the terms of trade shock of the early 1970s.<sup>3</sup> On each of these occasions, the effects on domestic demand and inflation were reversed when the terms of trade subsequently fell back. These two episodes provide powerful evidence of the large income effects

that have previously stemmed from increases in the terms of trade.

The current situation would correspond to a case somewhere between the two stylised polar cases described above. Since the float of the Australian dollar, changes in the terms of trade have often been accompanied by movements in the exchange rate, with the exchange rate tending to strengthen when the terms of trade have increased, and weaken when they have fallen (Graph 5). However, the relationship

**Graph 5**  
**Terms of Trade and Real Exchange Rate**  
Average since 1984 = 100



<sup>3</sup> At that time the fixed exchange rate was revalued several times as the terms of trade rose, and was devalued as they fell. However, these realignments were insufficient to insulate the economy fully from external shocks.

is far from exact and in recent years has not provided a good basis for explaining movements in the exchange rate. On average, if the real exchange rate responds less than one-for-one to an increase in the terms of trade, it will mean that the domestic currency price of commodities still rises, but by less than the world price. In addition, the movement in the exchange rate in that case reduces revenues for other exporters. Hence the movement in the exchange rate dampens, but does not eliminate, the boost to the nominal income of the export sector. At the same time, the appreciation in the exchange rate reduces the prices of imported goods, encouraging part of the increase in domestic demand to spill over to imports. This is likely to reduce the expansionary and inflationary effects of terms of trade increases relative to earlier episodes when the exchange rate was not free to adjust.

### **The Likely Effects of the Current Increase in Commodity Prices and the Terms of Trade**

The macroeconomic effects of the recent increases in prices for non-rural commodities are likely to mirror some of the channels described above, with income effects stimulating domestic demand and GDP, and some spillage into stronger imports. In addition, the strength in commodity prices over recent years is likely to have contributed to the appreciation of the exchange rate since 2002, and thereby to the weakness seen in some other trade-exposed sectors. To get a richer understanding of the impact of the rise in commodity prices on the economy, it may be instructive to look in more detail at the sectors that benefit from higher resource prices.

In the short term, higher world prices result in greater sales revenue for mineral producers, almost entirely from higher prices rather than higher volumes, since production will be largely predetermined by technical factors. With wages largely set by existing contracts and other costs also mostly independent of commodity prices, most of the increase in revenues will flow through to profits. The effects of this increase in profits on spending and activity will depend importantly on how much of the increase accrues to domestic entities (including governments) and how much to foreigners.

A substantial part of the increase in profits accrues to state and federal governments. Royalties, which are a pre-tax item, are payable to state governments on mineral and onshore petroleum production.<sup>4</sup> These are mostly at ad-valorem rates, and although there is substantial variation in rates and definitions, they probably imply that around 5 per cent of additional revenues from higher commodity prices typically accrue to state governments. More significantly, based on the statutory corporate tax rate, up to 30 per cent of the increase in profits would be payable in corporate income tax to the Australian government. The higher level of profits would also result in some additional tax revenue from personal income taxes paid by shareholders on dividends or – in the longer run – on capital gains. Although the payment of these royalties and taxes may initially reduce the stimulus from higher commodity prices, there will still be an expansionary impact to the extent that higher government revenues allow higher government spending or a reduction in tax rates. Over a period of time, assuming government net fiscal positions are held roughly constant, the increase in revenues flowing from higher export revenues to domestic governments would thus represent a corresponding stimulus to the economy.

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<sup>4</sup> In addition, the Australian government levies a resource rent tax on offshore projects involving petroleum and other hydrocarbons.

The remainder of the initial boost to revenues (roughly two-thirds of the total) accrues to shareholders of the companies. This occurs either in the form of higher dividends, or if earnings are retained, in the form of capital gains. Domestic shareholders include both households and institutional investors such as superannuation funds. However, to the extent that there is foreign ownership of the Australian resources sector, part of the addition to incomes will accrue to foreigners.<sup>5</sup> Although there are no precise figures on aggregate foreign ownership, some ABS data for 2000/01 suggest that foreign ownership in the resources sector is around 50 per cent.<sup>6</sup> This is probably somewhat higher than at the time of earlier resource booms.

The expansionary effect of these income flows on the Australian economy can be expected to operate through a number of channels. Higher dividends and capital gains accruing to domestic shareholders will feed into household income and wealth and, over time, into household spending. More importantly, higher commodity prices are likely to have substantial effects on the behaviour of resource producers, assuming that the price increases are not viewed as completely temporary. In particular, higher commodity prices are likely to lead to increased exploration expenditure and increased investment in new projects, based on newly discovered resources or projects that only become feasible at higher world prices. In fact, there has already been considerable investment in the resources sector, with the value of completed resource projects having more than quadrupled in 2004.

These projects typically have a significant impact on the economy during the construction phase, with large initial investments, including considerable domestic expenditure on engineering construction, and involving relatively large workforces: the peak workforce at this stage of the project will sometimes be more than ten times the permanent level of employment once the project is operational. Such projects provide significant impetus to growth through multiplier effects, though the construction phase usually involves substantial imports of capital equipment, so part of the boost to spending will spill into imports. It is to be expected that these expansionary effects will be spread over a number of years rather than just being confined to the year in which the increase in commodity prices occurs.

## How Long Will the Higher Commodities Prices Last?

The fact that earlier sharp increases in commodity prices and the terms of trade have frequently been followed by falls in the terms of trade suggests the possibility that recent increases in these variables might at some stage be partly reversed.<sup>7</sup> There might be particular concern about this in the case of coal and iron ore where the latest price increases have taken prices to levels in real terms that are substantially above the ranges seen over the past decade or two.

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*5 In the case of BHP Billiton Ltd and Rio Tinto Ltd, the existing dual-listed company (DLC) structures entail sharing arrangements which mean that the benefits of higher earnings in the Australian twin effectively also accrue to shareholders of the UK-listed twin companies. Of course, the sharing arrangements work in the other direction too, so shareholders in the Australian companies benefit from higher commodity prices received elsewhere in the operations of their group.*

*6 ABS data show that 48 per cent of all mining industry assets in 2000/01 were owned by businesses that could be identified as majority foreign-owned. However, this figure does not correspond to the proportion of total foreign ownership of mining sector assets. Given the complexity of ownership structures, and the scope for diffusion of foreign ownership, it seems likely that 48 per cent represented a lower bound to total foreign ownership at that time.*

*7 The historical experience that large increases in real commodity prices and the terms of trade are often substantially unwound is confirmed by statistical tests of their time-series properties (see 'Long-term patterns in Australia's terms of trade', RBA Research Discussion Paper No 2005-01 by Christian Gillitzer and Jonathan Kearns).*

There is indeed some evidence that market participants expect some unwinding of recent price increases. Futures prices for base metals are trading at a significant discount, with two-year futures for aluminium, copper and nickel on average around 19 per cent below spot prices at present. Price projections of commodities analysts at some leading investment banks currently suggest longer-term price declines for coal and iron ore averaging around 40 per cent from the new contract prices. However, it is possible that analysts might err on the side of conservatism (i.e. to use relatively low long-term price assumptions) following the recent large run-ups in prices, so it would not be surprising if their price expectations were gradually moved upwards, just as long-dated oil futures prices have drifted up as spot prices have remained high.

The fact that commodity prices are not expected to continue at prevailing levels presumably reflects the likelihood that the current high prices will bring forth substantial additional supply of commodities over the medium term. For example, in addition to increased capacity in Australia, significant expansions of supply of coal are expected in Canada, Indonesia and South Africa, and of iron ore in Brazil and South Africa. Indeed, previous commodity price cycles suggest that expansion in supply is often more than is needed, resulting in 'cobweb cycles' (or 'hog cycles') in prices. However, given the consolidation of the global resources sector over recent years, over-investment is likely to be less of a factor than in earlier episodes. Importantly, the advent of China as a major consumer of resources makes the current increase in demand partly structural. Furthermore, part of the recent rises may reflect the fact that real commodity prices in the late 1990s and early in this decade appeared to be below their long-run average values. Hence, even if the prices of some commodities did fall back over coming years, it is likely that a substantial part of the recent strength in commodity prices will be maintained over the medium term.

## Summary

The recent strength in non-rural commodity prices reflects the strong growth in demand in the world economy, especially in China, and the tight supply situation. Rising commodity prices have already generated a substantial increase in Australia's terms of trade over recent years, and it is estimated that the current round of increases in bulk commodity contract prices will increase the terms of trade by a further 10 per cent when they take effect this year. Overall this will represent the largest cumulative run-up in Australia's terms of trade since the early 1970s.

An increase in the terms of trade of this magnitude is a significant source of stimulus to the Australian economy, though it is likely that the expansionary effects will be somewhat smaller or more drawn out than in some earlier episodes when the exchange rate was less free to adjust. In addition, changes in the ownership structure of resource companies over the past couple of decades may have reduced the immediate impact of higher resource-industry profits on domestic incomes and spending. Nonetheless, since around two-thirds of the gain in incomes from higher commodity prices accrues to domestic entities, either through profits or taxes, increases in commodity prices are clearly an expansionary influence on the economy overall. In addition to their immediate impact on domestic incomes and spending, higher commodity prices will provide an ongoing impetus to the economy through higher investment in the resources sector over the medium term, with a substantial boost to domestic activity during the construction phase of new projects. Indeed, a great deal of resource-related investment has been committed in recent years. The amount of further new investment will depend crucially on the extent to which the recent sharp increases in prices are expected to be sustained. ✎