# 5 The contribution of changes in industry structure

Chapter 2 pointed to the mining boom as being the main source of additional income growth in the 2000s. The financial sector continued to be important, but the mining and construction sectors together accounted for two-thirds of the additional growth in income, relative to the 1990s. At the same time, the relative importance of the manufacturing sector as a source of output and income declined.

Chapters 3 and 4 noted that the labour income share (LIS) declined in the 2000s because there was more growth in capital income than in labour income. Chapter 4 went on to attribute the divergence between capital and labour income growth primarily to a quantity effect — that is, to an increase in capital intensity. That chapter also explained the fall in the labour share as a failure of growth in the real product wage to keep pace with growth in labour productivity, primarily because of much stronger product price inflation.

This and the next chapter explore the role that structural change has played in the decline in the labour share. Whether industries associated with the mining boom — or other industries or other factors — played a key role is of particular interest. This chapter looks at changes in the structure of industries and the industry structure of labour and capital income. Industry contributions to the ‘quantity versus price’ and ‘productivity and costs’ explanations are considered in the next chapter.

The importance of the mining boom and structural change is not as obvious as it might at first seem. The ACTU (2013) study concluded that structural change only played a small part. It attributed the fall in the labour share primarily to widespread shifts in income away from labour within individual industries.

To some extent, there is a methodological issue tied up in this conclusion. The vehicle typically used to compare structural change and within-industry effects — shift-share analysis — has some limitations in this context of factor income shares. An alternative method is put forward that leads to a different conclusion — one in which the mining boom essentially explains all of the change in LIS.

In this chapter:

* section 5.1 outlines the changes in the industry structure of activity and changes in industry structure of factor incomes that took place in the 2000s
* section 5.2 reports the relative contributions of changes in industry mix and changes within industries in explaining the fall in the labour income share, using shift-share analysis
* section 5.3 identifies the industries that contributed to the disparity in growth in factor incomes at the market sector level.

Section 5.4 provides an assessment of the role of structural change and the mining boom and section 5.5 provides the key point summary.

## 5. Industry sources of factor income growth

Chapter 2 identified the large and rapid redistributions of output and incomes across industries that took place in the 2000s.

As will now be shown, those redistributions also brought large and rapid changes in the distributions of factor incomes.

### Labour income

Labour income within industries grew in a range of 1 per cent a year (Agriculture) to 10.4 per cent a year (Mining), around a market sector average of 5.8 per cent a year (table 5.1).

Even with 10.4 per cent a year growth, Mining remained a relatively small source of labour income in the market sector. It accounted for less than 5 per cent of labour income in 2009-10 (table 5.1).

Construction’s 7.8 per cent a year growth made the industry the largest source of labour income in the market sector (over 15 per cent) by the end of the decade.

Manufacturing lost the most share of market sector labour income. Because its growth was weak relative to other industries, its share fell 4 percentage points over the decade. In the process, Manufacturing lost its position as the prime source of labour income in the market sector.

Growth in labour income was also relatively strong in Financial and insurance services (Finance) and Electricity, gas, water and waste services (Utilities). Finance increased its share to third place, behind Construction and Manufacturing.

Table 5.1 Growth in labour income by industry and industry shares in market sector labour income

per cent per year

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Growth rate | | |  | Industry shares | | |
|  | 1990s | 2000s | Percentage point change |  | 1999-00 | 2009-10 | Percentage point change |
| Agriculture | 4.0 | 1.0 | -3.0 |  | 3.9 | 2.4 | -1.5 |
| Mining | 1.6 | 10.4 | 8.8 |  | 2.8 | 4.5 | 1.6 |
| Manufacturing | 2.8 | 3.5 | 0.8 |  | 19.1 | 15.2 | -4.0 |
| Utilities | -2.2 | 7.1 | 9.4 |  | 2.2 | 2.5 | 0.3 |
| Construction | 4.0 | 7.8 | 3.8 |  | 12.8 | 15.6 | 2.8 |
| Wholesale | 4.9 | 5.4 | 0.4 |  | 9.2 | 8.8 | -0.4 |
| Retail | 5.9 | 5.0 | -0.8 |  | 10.8 | 10.0 | -0.9 |
| Accommodation | 7.8 | 4.6 | -3.2 |  | 5.9 | 5.2 | -0.7 |
| Transport | 3.8 | 6.1 | 2.4 |  | 8.4 | 8.6 | 0.3 |
| Telecoms | 5.0 | 3.4 | -1.6 |  | 4.2 | 3.3 | -0.9 |
| Finance | 6.6 | 7.9 | 1.3 |  | 11.7 | 14.5 | 2.7 |
| Arts & rec | 4.8 | 6.5 | 1.7 |  | 8.9 | 9.5 | 0.6 |
| Market sector 12 | 4.3 | 5.8 | 1.5 |  | 100.0 | 100.0 |  |

*Source*: Author’s estimates based on ABS (Cat. no. 5260.0550.02).

#### Decadal change in growth

It was noted in chapters 3 and 4 that growth in labour income in the 2000s was more rapid than in the 1990s.

That was mostly also true at the industry level. The biggest uplift in growth was in the Utilities, followed by Mining (table 5.1). Construction’s growth in labour income was also quite a deal stronger in the 2000s. And growth also picked up, albeit to a relatively small degree, in Manufacturing.

Growth was weaker in the second decade in Accommodation and food services (Accommodation), Agriculture, forestry and fishing (Agriculture), and Information media and telecommunications (Telecoms).

### Capital income

Capital income grew in the range of 2.7 per cent a year in Manufacturing to 12.7 per cent a year in Mining, around a market sector average of 7.5 per cent a year (table 5.2).

Table 5.2 Growth in capital income by industry and industry shares in market sector capital income

per cent per year

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Growth rate | | |  | Industry shares | | |
|  | 1990s | 2000s | Change (pp) |  | 1999-00 | 2009-10 | Change (pp) |
| Agriculture | 0.3 | 4.7 | 4.5 |  | 6.5 | 4.9 | -1.6 |
| Mining | 5.1 | 12.7 | 7.6 |  | 12.3 | 20.7 | 8.4 |
| Manufacturing | 3.6 | 2.7 | -0.9 |  | 18.9 | 11.7 | -7.2 |
| Utilities | 2.9 | 5.4 | 2.5 |  | 6.4 | 5.2 | -1.2 |
| Construction | 4.0 | 9.8 | 5.8 |  | 6.5 | 8.1 | 1.7 |
| Wholesale | 3.6 | 6.3 | 2.7 |  | 5.6 | 5.0 | -0.6 |
| Retail | 2.6 | 8.3 | 5.8 |  | 3.9 | 4.3 | 0.4 |
| Accommodation | 5.4 | 9.2 | 3.7 |  | 1.9 | 2.2 | 0.3 |
| Transport | 5.1 | 7.4 | 2.3 |  | 7.3 | 7.2 | -0.1 |
| Telecoms | 7.9 | 6.0 | -1.9 |  | 8.6 | 7.4 | -1.2 |
| Finance | 11.5 | 8.3 | -3.2 |  | 15.4 | 16.8 | 1.4 |
| Arts & rec | 4.8 | 6.9 | 2.1 |  | 6.8 | 6.4 | -0.4 |
| Market sector 12 | 4.9 | 7.5 | 2.6 |  | 100.0 | 100.0 |  |

*Source:* Author’s estimates based on ABS (Cat. no. 5260.0550.02).

With such strong growth, Mining became the largest source of capital income by the end of the 2000s decade, accounting for one in five dollars of capital income in the market sector.

Construction had the next strongest growth at nearly 10 per cent a year, which pushed its share of market sector capital income to 8.1 per cent at the end of the decade. However, Construction remained a more important source of market sector labour income (15.6 per cent).

With the weakest growth, Manufacturing lost the biggest share. It had been the largest source of capital income in the market sector at the turn of the millennium, but its share fell 7.2 percentage points to 11.7 per cent, well behind Mining and Finance. Manufacturing lost more capital income share than labour income share.

There was also relatively strong growth in Accommodation, Finance and Retail trade (Retail). Accommodation and Retail, however, are relatively small sources of capital income. The financial sector remained the second largest source of capital income over the decade.

#### Decadal change in growth

An acceleration in capital income growth from 1990s rates was also widespread. The strongest uplift was, unsurprisingly, in Mining. Construction and Retail also had strong rises in growth rates.

Growth slowed in Finance (from a high rate), Telecoms and Manufacturing.

### Industry labour income shares

Since the incidence of stronger growth in capital income than in labour income was widespread at the industry level, the incidence of falls in the LIS was also widespread (table 5.3):

* Mining and Construction had falls of 4 percentage points.
* The largest falls were in Agriculture (-9 percentage points), Accommodation (‑8 percentage points), Retail (‑6 percentage points) and Telecoms (‑6 percentage points).

Table 5.3 Industry labour income shares

percentage points

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 1989-90 | 1999-00 | 2009-10 | 2000s change |
| Agriculture | 36 | 45 | 36 | -9 |
| Mining | 31 | 24 | 20 | -4 |
| Manufacturing | 60 | 58 | 60 | 2 |
| Utilities | 44 | 32 | 36 | 4 |
| Construction | 73 | 73 | 69 | -4 |
| Wholesale | 66 | 69 | 67 | -2 |
| Retail | 73 | 79 | 73 | -6 |
| Accommodation | 77 | 81 | 73 | -8 |
| Transport | 64 | 61 | 58 | -3 |
| Telecoms | 47 | 40 | 34 | -6 |
| Finance | 63 | 51 | 50 | -1 |
| Arts & rec | 64 | 64 | 63 | -1 |
| Market sector 12 | 59 | 57 | 53 | -4 |

*Source*: ABS (Cat. no. 5260.0550.02).

The LIS *increased* in two industries — the Utilities (4 percentage points) and Manufacturing (2 percentage points). The increase in Manufacturing is particularly noteworthy, as it suggests the relative decline of the industry was focused more on capital than on labour.

## Changes in relative size and changes within industries

There were major reallocations of output and income among industries over the 2000s decade (section 2.3 in chapter 2). In particular, a large share of total income was redistributed from Manufacturing to Mining. Finance and Construction also received a higher proportion of income, while Agriculture received a lower proportion.

Output and income reallocations affect the market sector LIS. A shift toward industries with low LISs and away from industries with high LISs will bring about a fall in the average (aggregate) LIS. The converse is also obviously true.

The 2000s reallocations would have had mixed effects. Mining, being capital intensive, has a low LIS and Manufacturing has an LIS just above average (table 5.3). Those reallocations would have reduced the aggregate LIS. On the other hand, the shift toward the Construction industry, which has a high LIS, would have increased the market sector LIS.

The widespread falls in LIS *within* industries would have worked to reduce the aggregate LIS. On the other hand, the rise in the LIS in the relatively large Manufacturing sector would have raised the aggregate LIS.

### Shift-share analysis

Shift-share analysis provides a means of tracking the ‘within-industry’ changes in LIS and the ‘between-industry’ shifts in industry mix and establishing their relative importance in explaining the fall in aggregate LIS.

The essence of the methodology is to add up:

* the within-industry or change in LIS components
* these are the change in an industry’s LIS, weighted by the relative size of the industry
* the between-industry or structural change components
* these are the change in the relative size (total income) of an industry, weighted by the LIS of the industry.

The sum of these two components across industries equals the change in market sector LIS. The methodology is set out in appendix A.

#### Structural change a major contributor, but ‘within-industry’ effects more important

The widespread falls in industry LISs had the greater effect on reducing the market sector LIS in the 2000s (figure 5.1).

However, the structural change component was also important. Between-industry effects accounted for around 40 per cent of the 2000s fall. The structural change component was pivotal in explaining the change between decades. It changed from a small positive component in the 1990s to a much larger negative component in the 2000s (figure 5.1).

Figure 5.1 Decomposition of change in the market sector labour income share into between-industry and within-industry componentsa

percentage points

|  |
| --- |
| Decomposition of change in the market sector labour income share into between-industry and within-industry components. This figure shows that there was little change in the size of the within-industry effect between the 1990s and the 2000s. The fall in the the labour income share in the 2000s was mostly associated with the between-industry effect going from mildly positive in the 1990s to clearly negative in the 2000s. |

a 1989-90 to 1999-00 and 1999-00 to 2009-10.

*Data source*: Author’s estimates based on ABS (Cat. no. 5260.0550.02).

#### Mining was the largest industry contributor to the 2000s fall

Industry results are presented in table 5.4. Entries in the ‘total contribution’ column are the sum of entries in the ‘within’ column and the ‘between’ column. The industry contributions sum to the market sector totals at the bottom of the table.

The Mining sector was the stand-out contributor, accounting for half of the decline in market sector LIS. Most of that contribution came from structural change — the shift in activity towards this capital-intensive industry. This was, by far, the largest single contribution of all the within-industry and structural change elements.

It was quite a long way back to the ‘second tier’ contributions from Retail (‑0.6 percentage points) and Accommodation (‑0.4 percentage points). A within-industry fall in LIS was the more important element in both cases.

Construction only made a small negative total contribution. Its positive structural change contribution (shift toward an industry with above-average LIS) was more than offset by a relatively-large negative within-industry contribution.

Table 5.4 Industry contributions to the change in the market sector LIS through within, between and total effects

percentage points

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1989-90 to 1999-00 | | |  | 1999-00 to 2009-10 | | |
|  | within | between | total |  | within | between | total |
| Agriculture | 0.60 | 0.19 | 0.79 |  | -0.45 | 0.24 | -0.21 |
| Mining | -0.50 | 0.09 | -0.41 |  | -0.27 | -1.70 | -1.97 |
| Manufacturing | -0.44 | -0.03 | -0.47 |  | 0.38 | -0.38 | 0.00 |
| Utilities | -0.68 | 0.43 | -0.25 |  | 0.16 | 0.04 | 0.20 |
| Construction | 0.00 | -0.08 | -0.08 |  | -0.40 | 0.33 | -0.08 |
| Wholesale | 0.23 | 0.00 | 0.23 |  | -0.15 | -0.09 | -0.25 |
| Retail | 0.45 | 0.09 | 0.54 |  | -0.48 | -0.11 | -0.59 |
| Accommodation | 0.13 | 0.24 | 0.37 |  | -0.33 | -0.07 | -0.41 |
| Transport | -0.24 | -0.01 | -0.25 |  | -0.24 | 0.00 | -0.23 |
| Telecoms | -0.34 | -0.20 | -0.54 |  | -0.36 | 0.16 | -0.20 |
| Finance | -1.05 | -0.27 | -1.32 |  | -0.13 | -0.07 | -0.20 |
| Arts & rec | 0.00 | 0.01 | 0.01 |  | -0.08 | 0.01 | -0.07 |
| Market sector | -1.9 | 0.5 | -1.4 |  | -2.4 | -1.6 | -4.0 |

*Source*: Author’s estimates based on ABS (Cat No 5260.0550.02).

Manufacturing made no overall contribution. Its relatively-large and positive ‘within’ contribution (0.4 percentage points) was offset by a relatively-large and negative ‘between’ contribution (-0.4 percentage points), which came about because there was a shift away from this industry with its above-average LIS.

The major industry contributors to the within-industry component of the LIS fall were: Retail (‑0.5 percentage points), Agriculture (‑0.5 percentage points), Construction (‑0.4 percentage points), Telecoms (‑0.4 percentage points) and Accommodation (‑0.4 percentage points).

### The ACTU study

The ACTU (2013) drew attention to the fall in Australia’s LIS as ‘a worrying development’. It correctly associated the fall with a growth in real wages that has not kept pace with labour productivity growth (chapter 4). The ACTU study states that a period in which real wages rise faster than labour productivity growth is needed merely to restore the labour income share of the 1990s.

The ACTU study included a shift-share analysis. It attributed a higher proportion (72 per cent, rather than the 59 per cent found here[[1]](#footnote-1)) to the within-industry component.[[2]](#footnote-2) By way of further comparison, an OECD (2012) study attributed around two-thirds of the fall in Australia’s LIS from 1990 to 2007 to within-industry effects.

The difference in shift-share results between this and the ACTU study does not matter a lot. It is likely due to several factors:

* different industry coverage
* the ACTU study covered all industries, rather than the 12-industry market sector used here
* this may be the most important explanation for the difference in results
* different method of calculating labour income shares
* the ACTU used an alternative method of allocating the income of sole proprietors to labour and capital components, whereas the ABS method is relied upon here
* measurement of income shares is an imprecise science and there are arguments in support of different approaches
* different time periods
* the ACTU calculations cover 1999-00 to 2011-12, whereas the end-point used here is 2009-10 and the shift-share analysis is sensitive to the choice of end-points
* however, there was little change in the aggregate LIS over 2009-10 to 2011‑12.

The common conclusion from the two studies is that within-industry and structural change were both important, with at least some weighting in importance toward the within-industry component.

To the extent that the difference is due to industry coverage, it is likely that the importance of structural change via Mining and Manufacturing, found here, is ‘diluted’ by the inclusion of more labour-intensive industries in the ACTU study.

The ACTU report does not present contributions from individual industries, although it does refer to the falls in LIS in Retail, Accommodation and Transport (which, along with the highest fall in Agriculture, have also been highlighted here).

Seemingly based on the structural change contribution coming in at 28 per cent of the LIS fall, the report concludes:

Only a small portion of the fall in the labour share can be ascribed to a shift in economic activity towards low-labour share industries such as mining.

It’s clear that the mining boom has contributed to the fall in the labour share in the 2000s, but that it accounts for a small part of it. (ACTU 2013, p. 16)

This seems to underplay the role of the mining boom, for two reasons. First, in the shift-share analysis here, Mining accounted for half of the decline in the LIS. Second, as will now be demonstrated, the shift-share approach captures structural change in a way that is limited in this income share context.

## Industry contributions to growth in factor incomes

This section looks at industry contributions to the fall in the LIS in terms of disparities in individual industry’s contributions to labour income growth and to capital income growth.

### Industry contributions to the 2000s growth in factor incomes

The fall in the LIS came about as a divergence between growth in market sector capital income and growth in market sector labour income (section 4.2 in the previous chapter).

As an extension, industry contributions to the fall in the aggregate LIS can be viewed as the difference between:

* industry contributions to growth in market sector capital income
* growth in industries’ capital income weighted by the industries’ share in market sector capital income
* industry contributions to growth in market sector labour income
* growth in industries’ labour income, weighted by the industries’ share in market sector labour income.

Industry contributions to growth in labour and capital income and the difference between them are shown in figure 5.2 and table 5.5.

Figure 5.2 Industry contributions to growth in labour income, growth in capital income and to the difference between them

percentage points

|  |
| --- |
| Industry contributions to growth in labour income, growth in capital income and to the difference between them. This figure shows that the Mi8ning stands out as a contributor to the difference between market-sector growth in labour and capital income in the 2000s, because its contribution to growth in capital income was so large. |

*Source*: Author’s estimates based on ABS (Cat. no. 5260.0550.02).

Table 5.5 Industry contributions to the growth gap between labour income and capital income in the 2000s decade

percentage points

|  |  |  |  |
| --- | --- | --- | --- |
|  | Labour income | Capital income | difference |
| Agriculture | 0.04 | 0.31 | -0.27 |
| Mining | 0.35 | 2.11 | -1.76 |
| Manufacturing | 0.63 | 0.48 | 0.16 |
| Utilities | 0.17 | 0.31 | -0.14 |
| Construction | 1.07 | 0.65 | 0.42 |
| Wholesale | 0.48 | 0.37 | 0.11 |
| Retail | 0.51 | 0.37 | 0.14 |
| Accommodation | 0.25 | 0.17 | 0.08 |
| Transport | 0.54 | 0.52 | 0.03 |
| Telecoms | 0.13 | 0.47 | -0.35 |
| Finance | 1.06 | 1.25 | -0.19 |
| Arts & rec | 0.60 | 0.46 | 0.14 |
| Market sector | 5.8 | 7.5 | -1.6 |

*Source*: Author’s estimates based on ABS (Cat. no. 5260.0550.02).

#### The Mining sector stands out

From this point of view, Mining more than accounted for all of the decline in the market sector LIS in the 2000s. There were other industry contributions that basically offset each other. But Mining accounted for a little more (-1.8 percentage points) than the *entire* excess of growth in capital income over growth in labour income at the market sector level.

The ‘second tier’ contributors to the income growth gap were Telecoms (‑0.4 percentage points), Agriculture (-0.3 percentage points), Finance (-0.2 percentage points) and Utilities (-0.1 percentage points). Finance made strong contributions to both labour and capital income, but the difference between the two was relatively small and in favour of capital income.

It is of particular interest that Construction and Manufacturing worked in the direction of *increasing* the market sector LIS. The Construction contribution is fairly large, contributing 0.4 percentage points more to labour income than to capital income. The Manufacturing contribution was on the low side of 0.2 percentage points.

The industry contributions to the decline in LIS according to this approach differ in some important ways from the findings of the shift-share analysis. But before discussing and examining these differences, the issue of structural change is explored further.

### ‘Dynamic’ structural change

Shift-share analysis captures structural change in terms of:

* changes in the industry structure of total income
* a ‘comparative static’ analysis of changes in structure and income shares at the start and end of the 2000s decade.

There is a different way to look at the role of structural change, and that is to capture it in terms of:

* separate changes in the industry structure of labour income and of capital income
* a ‘dynamic’ view of structural change based on changes in growth rates.

For the current purposes, the ‘dynamic’ approach takes the growth in factor incomes in the 1990s as a benchmark. The various industry contributions delivered an aggregate LIS that was stable over that decade.

The benchmark comparison is then an exercise to calculate:

* industry contributions to the acceleration in labour income growth in the 2000s (in comparison to the 1990s)
* these are simply the changes in industry contributions to labour income growth between the two decades
* industry contributions to the acceleration in capital income growth in the 2000s
* these are the changes in industry contributions to capital income growth between the decades
* industry contributions to the wider gap in growth in factor incomes
* these are the difference between the first two calculations and are the industry contributions to the difference in accelerations in labour and capital income.

The results are displayed in table 5.6 and figure 5.3.

As was reported in the previous chapter, labour income accelerated by 1.5 percentage points between the decades (from 4.3 to 5.8 per cent a year). Capital income accelerated by 2.6 percentage points (from 4.9 to 7.5 per cent a year). The gap between labour income growth and capital income growth therefore opened up by 1.1 percentage points. These values are shown in the ‘Market sector’ row at the bottom of table 5.6.

Table 5.6 Changes in industry contributions to labour income growth, capital income growth and to the wider gap between labour and capital income growth

Percentage points

|  |  |  |  |
| --- | --- | --- | --- |
|  | Labour income | Capital income | difference |
| Agriculture | -0.11 | 0.38 | -0.49 |
| Mining | 0.29 | 1.48 | -1.19 |
| Manufacturing | 0.05 | -0.25 | 0.30 |
| Utilities | 0.25 | 0.08 | 0.17 |
| Construction | 0.58 | 0.43 | 0.15 |
| Wholesale | 0.04 | 0.14 | -0.09 |
| Retail | -0.07 | 0.25 | -0.32 |
| Accommodation | -0.15 | 0.08 | -0.23 |
| Transport | 0.21 | 0.16 | 0.04 |
| Telecoms | -0.08 | -0.18 | 0.10 |
| Finance | 0.41 | -0.16 | 0.56 |
| Arts & rec | 0.13 | 0.18 | -0.05 |
| Market sector 12 | 1.5 | 2.6 | -1.1 |

*Source*: Author’s estimates based on ABS (Cat. no. 5260.0550.02).

Figure 5.3 Industry contributions to accelerations in labour income and capital income and to the difference between the two

percentage points

|  |
| --- |
| Industry contributions to accelerations in labour income and capital income and the difference between the two. This figure shows that the negative Mining contribution to the difference between the acceleration in labour income and acceleration in capital income stands out, because of the industry’s strong contribution to the acceleration in capital income. |

*Data source*: Author’s estimates based on ABS (Cat. no. 5260.0550.02).

From this view point, Mining made by far the strongest structural contribution to the fall in the aggregate LIS. It accounted for 1.2 percentage points of the 1.1 wider gap between labour and capital income growth. Unsurprisingly, this was because it contributed so much (1.5 percentage points) to the acceleration in capital income growth.

Again, the contributions from other industries were smaller and essentially offset each other. The ‘second tier’ contributors to the wider factor income growth gap were Agriculture (-0.5 percentage points), Retail (-0.3 percentage points) and Accommodation (-0.2 percentage points). Finance made a relatively large counter contribution (0.6 percentage points). It had a much stronger labour income contribution, whereas its capital contribution fell.

Construction and Manufacturing also moved in the counter direction, working to narrow the gap between labour and capital income growth. Construction had a much larger labour contribution, whereas Manufacturing mostly had a smaller capital contribution.

With this approach, ‘within-industry’ and reallocation effects between industries are not distinguished. Rather this approach identifies what the different industries contributed to the observed aggregate difference between labour and capital income growth. This takes account of the importance of an industry to market sector labour or capital income, which the shift-share approach does not. The shift share approach takes account of the importance of an industry in terms of its share of *total* *income* in the market sector.

#### A digression on scale and reallocation effects

There is a way to calculate reallocation effects, within the factor income decomposition approach. But, rather than distinguish between ‘within’ and ‘between’ effects, the approach suggested here distinguishes between ‘scale’ and ‘reallocation’ effects.

This further decomposition is presented here, more for methodological illustration and confirmation of trends, than for provision of fresh insights.

The first step is to scale up the industry contributions to factor income growth in the 1990s, according to the additional growth in factor incomes in the 2000s. Each 1990s contribution is multiplied by the ratio of 2000s growth to 1990s growth at the market sector level. The results are the entries under the ‘Scale’ column in table 5.7.

The second step is to take the difference between the actual 2000s industry contributions (table 5.5) and the scaled up contributions. These are the reallocation effects.

The net contributions in panel C of table 5.7 are the differences between the labour contributions (panel A) and the capital contributions (panel B).

Table 5.7 Scale and reallocation contributions in the 2000s to labour income growth, capital income growth and the difference between them

percentage points

|  |  |  |  |
| --- | --- | --- | --- |
|  | Scale | Reallocation | Total |
| ***A. Labour income*** | | | |
| Agriculture | 0.21 | -0.16 | 0.04 |
| Mining | 0.08 | 0.27 | 0.35 |
| Manufacturing | 0.79 | -0.16 | 0.63 |
| Utilities | -0.10 | 0.27 | 0.17 |
| Construction | 0.66 | 0.41 | 1.07 |
| Wholesale | 0.59 | -0.11 | 0.48 |
| Retail | 0.80 | -0.28 | 0.51 |
| Accommodation | 0.55 | -0.29 | 0.25 |
| Transport | 0.46 | 0.09 | 0.54 |
| Telecoms | 0.28 | -0.16 | 0.13 |
| Finance | 0.89 | 0.17 | 1.06 |
| Arts & rec | 0.64 | -0.04 | 0.60 |
| Market sector 12 | 5.8 | 0.0 | 5.8 |
| ***B. Capital income*** | | | |
| Agriculture | -0.10 | 0.42 | 0.31 |
| Mining | 0.97 | 1.14 | 2.11 |
| Manufacturing | 1.11 | -0.64 | 0.48 |
| Utilities | 0.36 | -0.05 | 0.31 |
| Construction | 0.32 | 0.32 | 0.65 |
| Wholesale | 0.36 | 0.01 | 0.37 |
| Retail | 0.19 | 0.18 | 0.37 |
| Accommodation | 0.14 | 0.03 | 0.17 |
| Transport | 0.54 | -0.02 | 0.52 |
| Telecoms | 1.00 | -0.52 | 0.47 |
| Finance | 2.16 | -0.91 | 1.25 |
| Arts & rec | 0.43 | 0.03 | 0.46 |
| Market sector 12 | 7.5 | 0.0 | 7.5 |
| ***C. Labour income less capital income*** | | | |
| Agriculture | 0.31 | -0.58 | -0.27 |
| Mining | -0.89 | -0.87 | -1.76 |
| Manufacturing | -0.32 | 0.48 | 0.16 |
| Utilities | -0.46 | 0.32 | -0.14 |
| Construction | 0.34 | 0.08 | 0.42 |
| Wholesale | 0.23 | -0.12 | 0.11 |
| Retail | 0.61 | -0.47 | 0.14 |
| Accommodation | 0.41 | -0.33 | 0.08 |
| Transport | -0.09 | 0.11 | 0.03 |
| Telecoms | -0.71 | 0.37 | -0.35 |
| Finance | -1.27 | 1.08 | -0.19 |
| Arts & rec | 0.21 | -0.07 | 0.14 |
| Market sector 12 | -1.6 | 0.0 | -1.6 |

*Source*: Author’s estimates based on ABS (Cat. no. 5260.0550.02).

In brief, the results suggest that the most important reallocations among market sector industries in the 2000s were:

* Mining (-0.9 percentage points) because of the very large reallocation of capital income toward the industry (1.1 percentage points)
* Agriculture (-0.6 percentage points), mostly because of an increased allocation of capital income
* Retail (-0.5 percentage points), fairly evenly divided between negative labour and positive capital reallocations
* in the other direction, Finance (1.1 percentage points), Manufacturing (0.5 percentage points) and Telecoms (0.4 percentage points), mainly because of lower allocations of capital income.

## Assessment of the role of change in industry structure

There are some important differences between the shift-share results and the results of the analysis based on industry decompositions of factor income growth.

* The shift-share analysis attributes an important but less-than-complete role to structural change and the mining boom, whereas the analysis based on the industry decomposition of growth in factor incomes attributes the fall in market sector LIS overwhelmingly to Mining.
* A ‘dynamic’ view of structural change, using the decomposition of factor incomes approach, similarly attributes the changes in growth rates overwhelmingly to Mining.
* Construction has a slight negative effect on the aggregate LIS in the shift-share analysis but has a positive role in the factor income decomposition analysis.
* Manufacturing had a positive ‘within’ effect, but no overall effect, in the shift-share analysis, whereas it is found to have had a positive effect on the aggregate LIS in the factor income decomposition analysis.

The differences arise because shift-share analysis captures relative size and ‘between’ effects in terms of total income. The industry decomposition of factor incomes approach, on the other hand, captures the relative size and significance of industries in terms of labour income and capital income separately.

Consequently, the within-industry changes in LIS in the shift-share analysis overlook the significance that some changes have on the market sector as a whole. Mining and Construction are two prime examples.

In Mining, there was strong growth in labour income, but from a small base as far as the market sector is concerned. The within-industry fall in Mining LIS is not all that large (below average at -2 percentage points), because there is not a lot of difference between growth in industry labour and capital income. However, while the growth in mining labour income had comparatively little significance for the market sector growth in labour income, the growth in capital income in Mining, which is a large source of market sector capital income, had a large effect on aggregate capital income growth. And so, the effect of the growth in factor incomes in Mining has a much greater effect on the market sector LIS than the change in within-industry LIS indicates.

The LIS in Construction fell because capital income grew faster than labour income in the 2000s. The fall of 4 percentage points was of the same magnitude as the fall in the market sector average. This within-industry effect outweighed the structural-change effect in the shift-share analysis. However, because the industry is *the* major source of labour income, the growth in Construction labour income had a larger effect on market sector labour income than the growth in Construction capital income had on market sector capital income. The contribution to aggregate LIS, from the perspective of industry contributions to growth in factor incomes, was positive.

In similar vein, shift-share analysis implicitly assumes in this context that increases in the size (total output and income) of industries can be separated from the way in which industries expand (in capital- or labour-intensive ways). The prime case that challenges this view is Mining, where the expansion of the industry has necessitated higher unit capital requirements. That is, because of depletion and decline in the ‘quality’ of resource deposits, proportionately more capital investment is needed to maintain and increase output (Topp et al. 2008).

## Key point summary

* There were large reallocations of labour and capital income across industries in the 2000s.
* The biggest shifts were in capital income — toward Mining and away from Manufacturing.
* The biggest labour income shifts were toward Construction and Finance and away from Manufacturing.
* Manufacturing’s capital income shift was greater than its labour income shift.
* Most industries experienced falls in LIS in the 2000s.
* Mining and Construction each had falls of -4 percentage points.
* The largest falls were in Agriculture (-9 percentage points), Accommodation (-8 percentage points), Retail (-6 percentage points) and Telecoms (-6 percentage points).
* The LIS *increased* in two industries — the Utilities (4 percentage points) and, importantly, Manufacturing (2 percentage points).
* The rise in Manufacturing’s share was because there was greater downward adjustment in capital income growth than in labour income growth.
* Shift-share analysis attributes important roles to both within-industry falls in LIS and to between-industry shifts toward low-LIS industries and away from high-LIS industries.
* It attributes more to the ‘within’ than the ‘between’ effects.
* The largest industry effect was through Mining, which accounts for half of the fall in the aggregate LIS, mostly through a between-industry effect (shift to an industry with a low LIS).
* However, the shift-share approach underestimates the effects of the Mining industry on the aggregate LIS.
* Analysis based on industry decompositions of labour income and capital income growth generates some different results.
* It attributes the difference in market sector labour and capital income growth (and therefore the fall in LIS) overwhelmingly to the Mining industry.
* The ‘second-tier’ contributors were Telecoms, Agriculture, Finance and the Utilities.
* Construction and Manufacturing are both found to have had *positive* effects on the LIS.
* A ‘dynamic’ view of structural change, based on the change in growth rates in factor incomes from the 1990s to the 2000s also attributes the changes in factor income growth rates overwhelmingly to Mining.
* The mining boom essentially explained all of the fall in the LIS, even though the other ‘major movers’, Construction and Manufacturing, worked in the direction of increasing the LIS.
* There were some other factors, operating in the ‘second-tier’ industries, but they were swamped by the Mining sector effects.

1. The ACTU study attributes -4.2 out of -5.8 percentage points to within-industry effects, whereas this study attributes -2.4 out of -4.0 percentage points (table 5.4). [↑](#footnote-ref-1)
2. The methodology in this study weights share shifts by the deviation of industry LISs from the market sector average. This highlights the role of share shifts by industries with above- and below-average LISs. The ACTU method does not include the market sector average in the calculation of structural change effects. However, this methodological difference affects the distribution of, and not the sum of, structural change effects across industries. [↑](#footnote-ref-2)