



# **PC productivity insights**

Productivity growth and wages –  
a forensic look

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# Contents

<b>Key points</b>	<b>1</b>
<b>Introduction</b>	<b>1</b>
<b>The link between wages and productivity weakens in the mining and agriculture sectors</b>	<b>2</b>
<b>Understanding decoupling for the 95%</b>	<b>4</b>
<b>Decoupling has limited impact on Australians' income</b>	<b>6</b>
<b>The aggregate and the sectoral – a conclusion</b>	<b>7</b>
<b>References</b>	<b>8</b>

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## Key points

- \* **Over the long term, for most workers, productivity growth and real wages have grown together in Australia. If productivity growth exceeds wage growth over the long term, this is referred to as wage-decoupling.**
- \* **Mining and agriculture – which account for about 5% of total people employed across the economy – have exhibited wage decoupling and skew the national average significantly.**
- \* **In all industries outside of mining and agriculture, which account for over 95% of employment, the difference between productivity growth and wages growth has been relatively low. Outside of mining and agriculture, more than half of the sectors examined experienced zero or negative decoupling. As a consequence, the share of income going to that 95% of labour has declined by less than 1 percentage point over the past 27 years.**
- \* **Productivity growth is the main driver of real wage growth.**
  - For 95% of the labour force, had we been able to maintain productivity growth from 1995 to 2023 at the 2.2% average level seen in the 1990s, then real annual average incomes would today be \$25,000 higher.
  - For the same 95% of the labour force wage decoupling since 1995 means that average real annual incomes are about \$3,000 lower than they otherwise would be.

## Introduction

In the long run, growth in real wages is driven almost entirely driven by labour productivity growth. In the shorter term, factors such as relative bargaining power and economic shocks - such as large movements in the terms of trade - can lead to deviations in the relationship between real wages and productivity. Sometimes wage growth lags productivity growth, other times it can overshoot.

The extent to which productivity growth drives real wage growth is an area of current debate, with some analysis suggesting that the long run effect of productivity on real wage growth and productivity growth has weakened. A persistent long run gap in this relationship is generally referred to as wage decoupling.

Wage decoupling matters to policymakers and individuals. Real wage growth allows households to purchase more or better goods and services and improves welfare and wellbeing. If the link between productivity and wage growth weakens, the attention of policymakers may shift away from productivity and towards other mechanisms to engineer real wage growth.

The reason the link between productivity and wage growth may weaken matters too – it could reflect technological change, or it could be some less benign factors like excessive market power in labour or goods markets (Meloni and Stirati 2023). If it is the latter, and the effects are material and enduring, it could suggest that productivity policies be accompanied by additional measures that force a greater share of income to flow to employees and households, such as by quelling any excess business profits or through changes to the tax and transfer system (OECD 2018, pp. 51–65). Conversely, if real wage growth exceeds labour productivity growth – creating a real wage overhang – then this threatens employment.

In Australia, the debate about the link between real wages and productivity growth has become more intense as productivity growth has slowed and real wages have fallen in a high inflation period.

Given its policy significance, it is important to get the facts right on wage decoupling. Unfortunately, debates about the extent of wage decoupling, its sources and its implications are often dogged by differences in the methods and data. This is because analysts can pick and choose among a wide range of measures of real wage growth and their choices can lead to different, sometimes misleading conclusions. The Commission's preferred measure is to compare labour productivity to real wages from a producer's perspective – see box 1. Throughout this paper, “real wages” refers to real *producer* wages. In addition, analysts often fail to consider the structure of the economy and the nature of industries. This short forensic paper, and its longer appendices, dig into the data to present a more complete picture of the relationship between real wages and productivity.

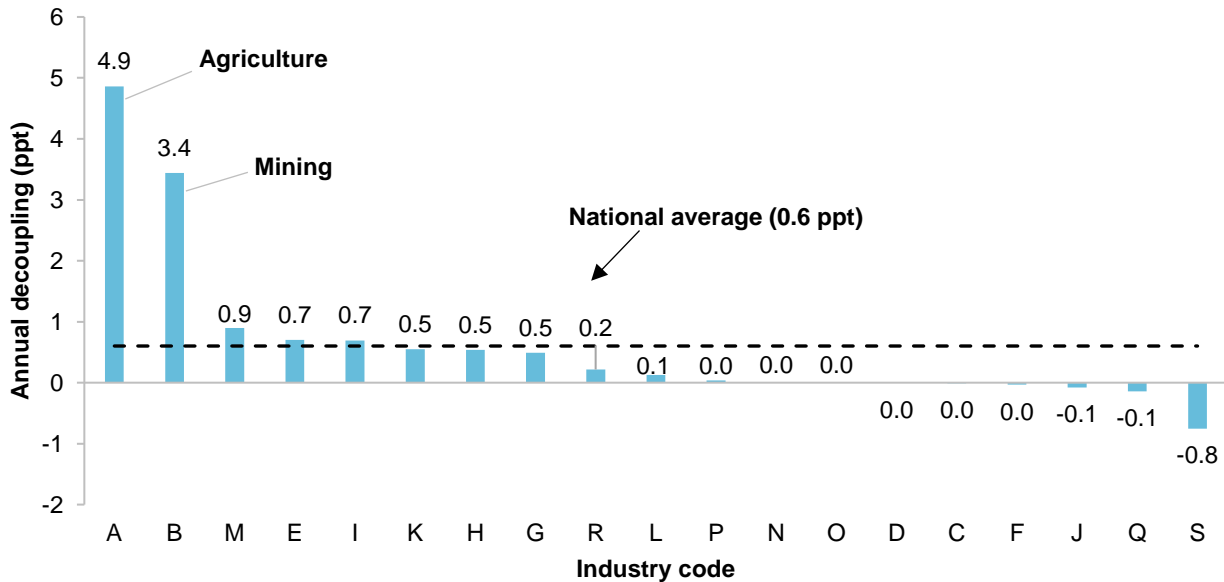
### **Box 1 – A quick note on the Commission's preferred measure of wage decoupling**

The Commission's preferred measure of wage decoupling is to compare labour productivity to producer wages. This is because businesses have control over the prices they set and wages they offer; but limited control over the prices people pay for other goods and services. Their capacity to pay wages depends on the prices they receive for their goods and services (rather than the other prices consumers pay). While changes in the prices set by producers and the prices paid by consumers often track closely, there are reasons for them to diverge. Consumer price changes can reflect factors outside the control of domestic businesses, such as the price of imports, taxes (like excise, stamp duties and the goods and service tax), and subsidies (like childcare, Medicare and Pharmaceutical Benefit Scheme benefits). Wage decoupling therefore is more logically analysed with a view to the producers' perspective on wages ('producer wages'), which are linked to the costs employers face and the productivity enhancements they enjoy, rather than consumer prices – see appendix A.2.

Despite this, it is also true that from the perspective of employees, the buying power of wages depends on the prices of the goods and services they enable consumers to buy. For illustrative purposes, we have included in this paper comparisons of the growth in labour productivity to both the growth in the real wage from consumers' perspective (the wage received by workers, relative to the price they pay for goods and services), and growth in the real wage from a producer perspective (the wage paid by businesses, relative to the price they receive for goods and services).

## **The link between wages and productivity weakens in the mining and agriculture sectors**

Given significant differences in labour use, capital use, methods of production and output across different industries, an aggregate view of Australia's economy masks significant differences in wage and productivity growth within different industries. When we look at wage decoupling by industry, the Commission finds that there are two sectors which exhibit strong wage decoupling: mining and agriculture (figure 1). Outside of mining and agriculture, more than half of the sectors examined experienced zero or negative decoupling. This is consistent with the OECD finding that wage decoupling is more prominent in primary industries which are exposed to international commodity prices (Schwellnus, Kappeler and Pionnier 2017). Note that in figure 1, 1995 is chosen as a starting point, but the result is consistent for any starting point from 1986 onwards – see appendix D.

**Figure 1 – Wage decoupling is noticeably high in 2 of 19 industries, (1995–2022)<sup>a,b,c</sup>**

**a.** Wage decoupling is expressed in percentage points as the average annual labour productivity growth minus average annual producer wage growth, over a defined period (27 years in this paper). **b.** Nominal wages are compensation of employees per hour. Compensation of employees for each industry is in the national accounts, but hours worked by employees needs to be derived by multiplying the share of hours worked by employees (as opposed to those worked by owner-managers of unincorporated enterprises) in the *Labour Force Survey* by the total hours worked for the industry in the *Labour Account*. **c.** Industry codes are: Agriculture, forestry and fishing (A); Mining (B); Manufacturing (C); Electricity, gas, water and waste services (D); Construction (E); Wholesale trade (F); Retail trade (G); Accommodation and food services (H); Transport, postal and warehousing (I); Information media and telecommunications (J); Financial and insurance services (K); Rental, hiring and real estate services (L); Professional, scientific and technical services (M); Administrative and support services (N); Public administration and safety (O); Education and training (P); Health care and social assistance (Q); Arts and recreation services (R); Other services (S).

Source: Productivity Commission estimates using: ABS (*Australian System of National accounts, 2021-22*, Cat. no. 5204, table 6; *Labour Account Australia, March 2023*, Cat. no. 6150.0.55.003, industry summary tables; *Labour Force, Australia, Detailed, April 2023*, Cat. no. 6291.5.001, table EQ05).

While mining and agriculture are relatively small employers in Australia – combined they account for just over 4% of total employed workers, or 5% of total hours worked in the economy – they are particularly large in terms of economic output, accounting for approximately 18% of the economy in terms of their value add. This means that they have a disproportionate effect on the economywide estimate of wage decoupling. Indeed, the large gap between real wages growth and productivity growth in these two sectors accounts for much of the wage decoupling observed at the national level.

The mining and agriculture industries are unique as they are predominantly export-focussed industries. The terms of trade boom (fuelled by increasing commodity prices) experienced in Australia throughout the 2000s, and again since 2016, has increased producer prices (the prices Australian businesses receive for their output) relative to consumer prices (the prices Australians pay for their goods and services). Rising commodity prices depress real producer wages, driving a wedge between them and real consumer wages. Historically, consumer and producer wages have tracked closely together (appendix E.2), but have separated recently (likely because of rapidly increasing commodity prices). As a rising terms of trade depresses real producer wages, but has little direct effect on productivity (which measures output per unit of input), the rising terms of trade also drives a wedge between productivity and producer wages. This is a key feature of the wage decoupling observed in Australia.

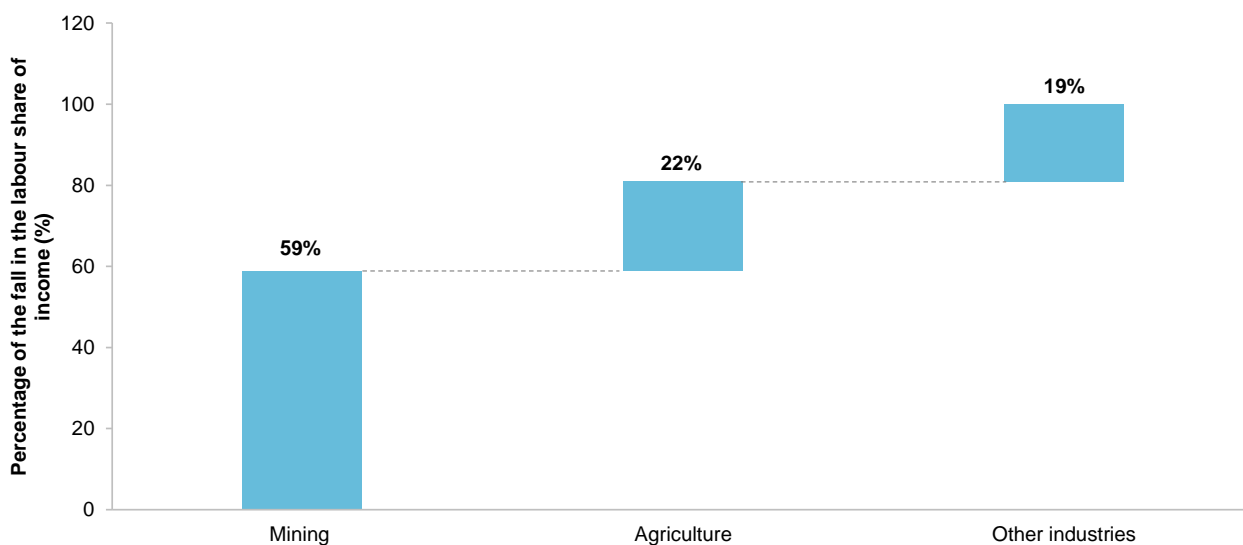
A more detailed consideration of why mining and agriculture have such an outsized effect on aggregate figures is provided in appendix C.

To help understand the extent to which these industries skew the national average, consider the labour share of income. Long term wage decoupling would lead to a decline in the proportion of income which labour receives. If productivity is growing, output is growing and national income is growing (all else equal) but if wages are not growing as fast as productivity (and therefore, as fast as income), then the income must be flowing to other sources. And the labour share of income could be observed to decline.

In Australia, the income share of labour has declined from about 55% to 50% between 1994--95 and 2021--22 (ABS 2023). Commission analysis finds that the mining and agriculture sectors account for 81% of the decline in labour's share of income over this period (figure 2). In other words: for all industries outside of mining and agriculture, the labour share of income has declined by less than 1 percentage point over the 27 year period.

This point contrasts sharply with other recent analyses of wages and labour income share in Australia which have taken an aggregate view of wages and productivity (ACTU 2022; Stanford 2018; Stanford, Macdonald and Raynes 2022) and ignore the large influence the mining and agriculture sectors have on the aggregate figure.

**Figure 2 – Mining and agriculture explain most of the fall in the labour income share**



Source: Productivity Commission estimates based on the methodology detailed in appendix B.3.

In other words, for over 95% of the working population, the average experience of wage decoupling and income share changes since 1995 is relatively low. The mining and agriculture sectors drive the aggregate results, and for those who do not work in these industries, the headline figures are highly misleading.

## Understanding decoupling for the 95%

As mining and agriculture explain a large portion of the observed wage decoupling but only a fraction of employment, Commission analysis strips out these sectors to consider wage decoupling across the rest of the economy.

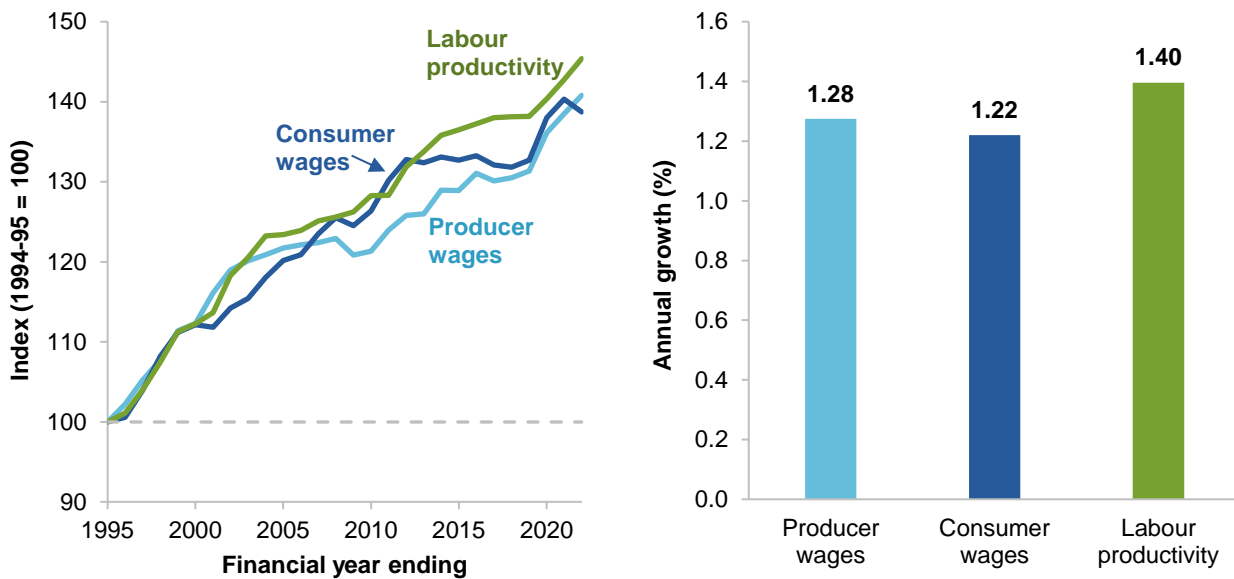
When doing so, the Commission finds evidence of a much smaller gap between growth in labour productivity and growth in real wages between 1994-95 and 2021-22. Specifically, the Commission estimates that average annual



real wage growth has been about 1.28% over the period – approximately 0.12 percentage points lower than the 1.40% growth in labour productivity (figure 3). This amounts to a 9% difference in growth rates.

**Figure 3 – A smaller gap between labour productivity and real wages for 95% of employees<sup>a,b,c</sup>**

**Producer wages, consumer wages and labour productivity in all industries (except mining and agriculture) between 1994-95 and 2021-22**



**a.** The industries excluded are Mining and quarrying, and Agriculture, forestry and fishing. All other Division (1 digit) industries of the Australian and New Zealand Standard Industrial Classification are included. **b.** Methodology outlined in appendixes A and B.1. **c.** Producer wages are wages deflated by producer prices (GVA deflator) and consumer wages are wages deflated by consumer prices (consume price index). Labour productivity is defined as GVA per hour (for all industries other than mining and agriculture) rather than GDP per hour.

Source: Commission estimates using: ABS (Australian System of National Accounts, 2021 22, Cat. no. 5204.0., table 46; Labour Account Australia, March 2023, Cat. no. 6150.0.55.003., industry summary tables; Labour Force, Australia, Detailed, April 2023, Cat. no. 6291.0.55.001., table EQ05; Consumer Price Index, Australia, Cat. no. 6401.0., table 1).

Thus, there is evidence of a very small amount of wage decoupling – much less than we find at the economy-wide level (inclusive of mining and agriculture). And from a policy perspective, the size of that gap matters – is wage decoupling of 0.12 percentage points sufficiently material to be a key issue for policy makers, particularly when more than half of those sectors experienced zero or negative decoupling?

It is worth noting that the absolute size of the gap between annual real wages growth and productivity growth has been remarkably stable since the mid-1980s (see appendix D.2). But, as productivity growth has fallen, the proportional impact of that difference grows, and we see that in the data. When productivity growth is 4% and the wage-decoupling gap is 0.12 percentage points, the gap matters lot less for income than when productivity growth is 1.4%. That interplay between the level of productivity growth and the gap to real wages growth translates into income differences, which we explore in the following section.

## Decoupling has limited impact on Australians' income

A stylised example can assist in understanding the implications of wage decoupling for those Australians not working in mining or agriculture. Given a starting point of average annualised wages in 1995 (inflated to 2023 dollars for comparability), figure 4 shows the real wage in 2023, under various productivity growth and wage decoupling scenarios.<sup>1</sup>

The dark orange highlighted cell is what was actually observed: average real wages grew from a little over \$75,500 in 1995 to just over \$106,500 in 2023, all in 2023 dollars.

In contrast, if wages growth had kept up with productivity growth over that period (that is, no wage decoupling) then wages would have risen to just over \$110,000 in 2023 – about 3% higher (the cell highlighted in green).

By comparison, if decoupling had remained fixed at 0.12 percentage points but productivity growth had been 0.4 percentage points higher, at its 60-year average (1.8%), average wages would have been greater than \$118,000 in 2023, or 11% higher (the cell highlighted in purple).

**Figure 4 – Average wages in 2023 under various productivity growth and wage decoupling scenarios<sup>a</sup>**

		Productivity growth (%)				
		0	1	1.4	1.8	2.2
Wage decoupling (percentage point)	-0.20	\$79,903	\$104,474	\$116,090	\$129,223	\$143,626
	-0.10	\$77,778	\$101,722	\$113,044	\$125,845	\$139,887
	0	\$75,707	\$99,040	\$110,075	\$122,553	\$136,241
	0.10	\$73,689	\$96,426	\$107,181	\$119,344	\$132,687
	0.12	\$73,277	\$95,893	\$106,590	\$118,689	\$131,962
	0.18	\$72,112	\$94,383	\$104,919	\$116,835	\$129,909
	0.20	\$71,723	\$93,879	\$104,360	\$116,216	\$129,223

a. The table shows real wages in 2023 under various productivity growth and wage decoupling scenarios, assuming a starting annual salary of \$75,706 in 1995.

Source: Productivity Commission estimates

Thus, over the long-term, wage decoupling meant average real annual wages were about \$3,000 lower in 2023 than they would have been without decoupling. But higher productivity growth dominates this effect and is far more material, even if the presence of the decoupling we actually observed. Indeed, if productivity

<sup>1</sup> For consistency with the rest of the paper, average annualised wages are estimated using the Commissions preferred measure of wages for this exercise - compensation of employees, divided by hours worked (see appendix A.2). This hourly salary is multiplied by 38 hours per week and 52 weeks in the year to convert to an annualised salary, and inflated to 2023 using the GVA deflator (see appendix A.2).

growth had returned to levels previously seen in the 1990s (of 2.2%) real annual incomes would today be just over \$25,000 higher.

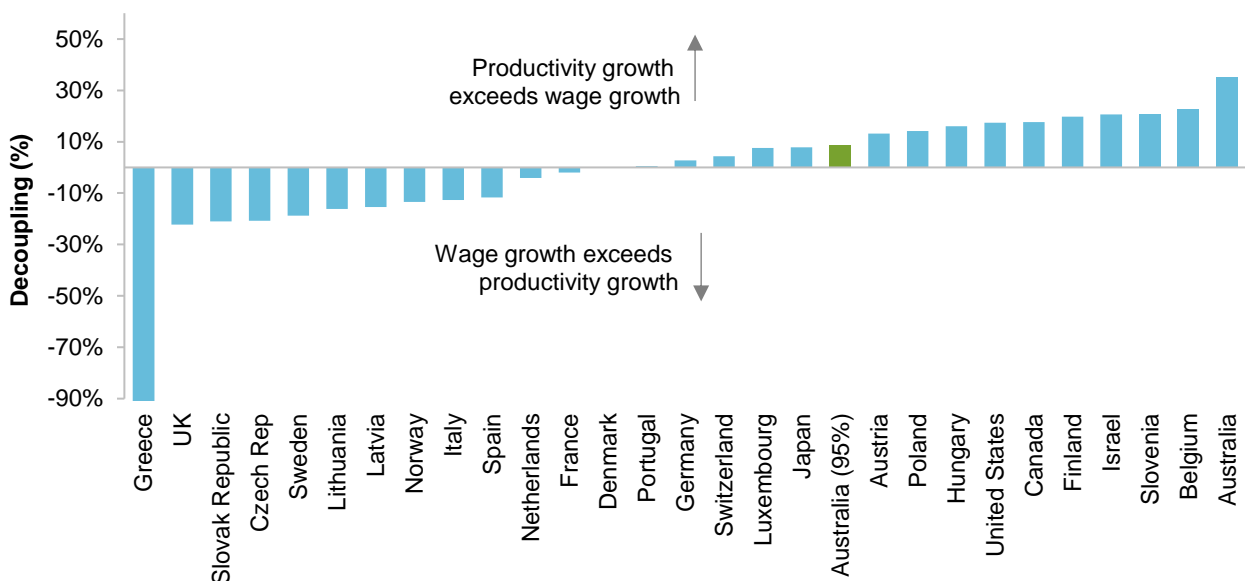
In other words, the impact of boosting productivity far outweighs the impact of bridging the observed productivity wage gap. And importantly, productivity remains the key to continued wage growth and long-term prosperity.

## The aggregate and the sectoral – a conclusion

The OECD's *Compendium of Productivity Indicators* (2023) provide cross country data on labour productivity and real wage growth, which suggests that the 0.12 percentage point (or 9%) gap experienced by most Australians would sit between the Japanese and Austrian whole of economy experience (figure 5).

We, and others, do observe wage decoupling in the aggregate data. Indeed, ignoring sectoral differences, Australia's aggregate wage decoupling would put us at the top of the list internationally. But the structure of our economy and our experience are very different from many of these economies. The reality is that wage decoupling is more prominent in primary industries which are exposed to international commodity prices (Schwellnus, Kappeler and Pionnier 2017). Once this reality is taken into account and a careful analysis of Australian decoupling is undertaken, it is clear that the gap is sectoral in nature.

**Figure 5 – The international experience of decoupling is varied<sup>a</sup>**  
1995 to 2020



a. Decoupling is measured as the percentage difference between annual growth rates in labour productivity and real producer wages over the period from 1995 to 2020 with the exception of Canada (1997–2018) and the United States (1997–2020).

Source: Productivity Commission estimates, OECD (2023).

Different conclusions on wage decoupling can be reached depending on the data used and the approach to managing divergences in decoupling within different sectors. Indeed, the conclusions presented in this note – that wages and productivity remain strongly linked – contrast sharply with other less rigorous analyses which ignore sectoral issues and only consider the aggregate picture. The OECD data in figure 5 highlights this, but also highlights the importance of understanding the nuances of wage decoupling.

We trust that by setting out all the variables and all the different ways the data can be presented in the appendices, this helps the reader understand the various ways this analysis can be completed. While there is general agreement – or rather, common practice – on how to measure labour productivity, the same cannot be said for how to measure wages. There are several variables that influence the outcome.

Measuring real wages requires a combination of a measure of total labour income, a measure of hours worked and a measure of price inflation. Wages are distinct from income, as income tends to be a combination of wages, returns on capital and any transfers received. Wages represent the return to labour hours worked – which is what we are more interested in for this analysis.

Our reasoning for the choices, as well as a presentation of how the results change under different data choices, are detailed in appendix A. Regardless of how the data is cut, in the Australian case, for the majority of wage earners, there has been a relatively small amount of wage decoupling, with workers in several sectors experiencing zero or negative wage decoupling. On the other hand, if productivity growth could be lifted by a few fractions of a percentage point, the short- and long-term impact of decoupling of the magnitude observed over the past two decades would become negligible. That is where the Commission, in its *Advancing Prosperity* report, has put the emphasis for moving forward.

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