RECENT TRENDS IN AUSTRALIAN PRODUCTIVITY[1]

Introduction

Productivity growth is a key contributor to economic growth and higher living standards. Improvements in productivity allow more outputs to be produced for any given level of inputs, generating additional income

at the economy-wide level. For businesses, productivity growth improves profitability and competitiveness. For workers, productivity improvements generate higher real wages.[2] For consumers, productivity growth allows businesses to lower prices.

Productivity growth in Australia has slowed since the mid-2000s and still remains well below long-run averages. This persistent productivity slowdown has contributed to slowing output growth and wages growth.

2 Productivity growth explains almost all wage increases since 1901 (PC 2020, p.12).

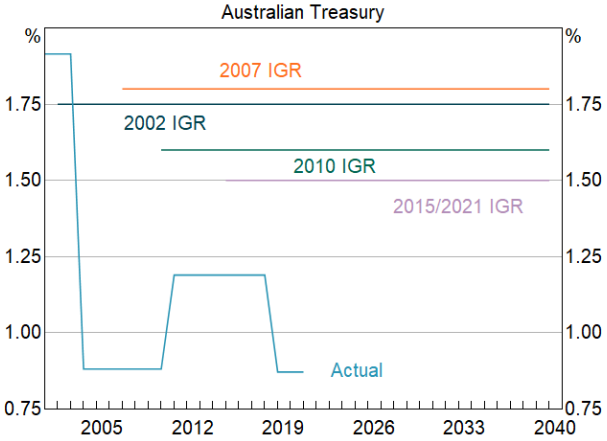
Lagging productivity growth will hurt real incomes

If productivity does not return to its long-run average, there are significant implications for real incomes (Intergenerational Report 2021). If long-term labour productivity growth does not return to its historical 30-year average of 1.5 per cent, and instead converges to the average over the most recent productivity cycle of 1.2 per cent, then by 2060–61 real income per person will be $32,000 lower compared with the baseline (and wages 9.25 per cent lower) (Graph 9).[8]

Graph 8

Actual vs. Projected Productivity

Australian Treasury



* Actual productivity rates are average annual rates based on productivity cycles defined by the ABS.

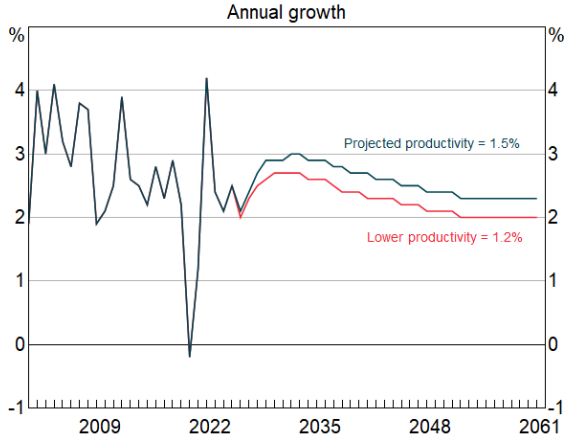
** 2018-21 is an incomplete productivity cycle

Sources: ABS; Australian Treasury; RBA

Graph 9

Impact on Real Incomes

Annual growth



* Sensitivity analysis based on figures in the Intergenerational Report 2021.

** The lower labour productivity of 1.2 per cent is based on average productivity experienced in the 2012-18 productivity cycle.

Source: Australian Treasury

Structural Analysis & Macroeconomic Modelling / Economic Analysis Department

11 May 2022

From: JONES, Bradley
Sent: Wednesday, 1 June 2022 8:10 PM
To:
Cc: EA - PWL Wages; ROSEWALL, Tom
Subject: Re: Labour share of income in MQ22 national accounts [SEC=OFFICIAL]

Thanks , this all makes sense

Sent from my iPhone

On 1 Jun 2022, at 7:47 PM, @rba.gov.au> wrote:

Hi Brad,

You are right that the labour share of income declined with today's national accounts release; (where the labour share of income = COE/Total Factor Income). See updated graphs below, which I also put in the 850 pack.

My view is that the COE outcome in today's release (+1.8% qoq) was actually pretty healthy, reflecting the generally robust state of the labour market, with strong hiring and a steady pick up in remuneration.

Nevertheless, growth in GOS was much larger in the March quarter (+4.8% qoq), so the labour share of income fell. My understanding is the main driver of the strong GOS result in MQ was the large increase in NFC resources company profits due to higher commodity prices. (Abstracting from export-exposed commodities firms, the outcome for the labour share of income in MQ may have looked better.)

At the whole of economy level, how the labour share of income will evolve over the next few quarters given elevated commodity prices is going to partly reflect what export-exposed firms choose do with their TOT windfall. Some of the windfall might flow to higher wages for workers in the exposed industries. If some of the money is used to make domestic investments, that would support labour income growth across the broader economy (this happened during the last mining investment boom). If firms take more of the windfalls straight to profits, then the money will go to foreign investors, domestic household financial income and government tax revenue; that would weigh on the labour share of income but at least households would benefit from more financial income and government expenditure. We will see how this plays out over the next few quarters while the TOT runs hot.

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Wages and Profits*

Share of total factor income; dashed lines indicate forecasts

* Wages is compensation of employees; profits is financial and non-financial gross operating surplus.

Sources: ABS; RBA

Labour Share of Total Factor Income*

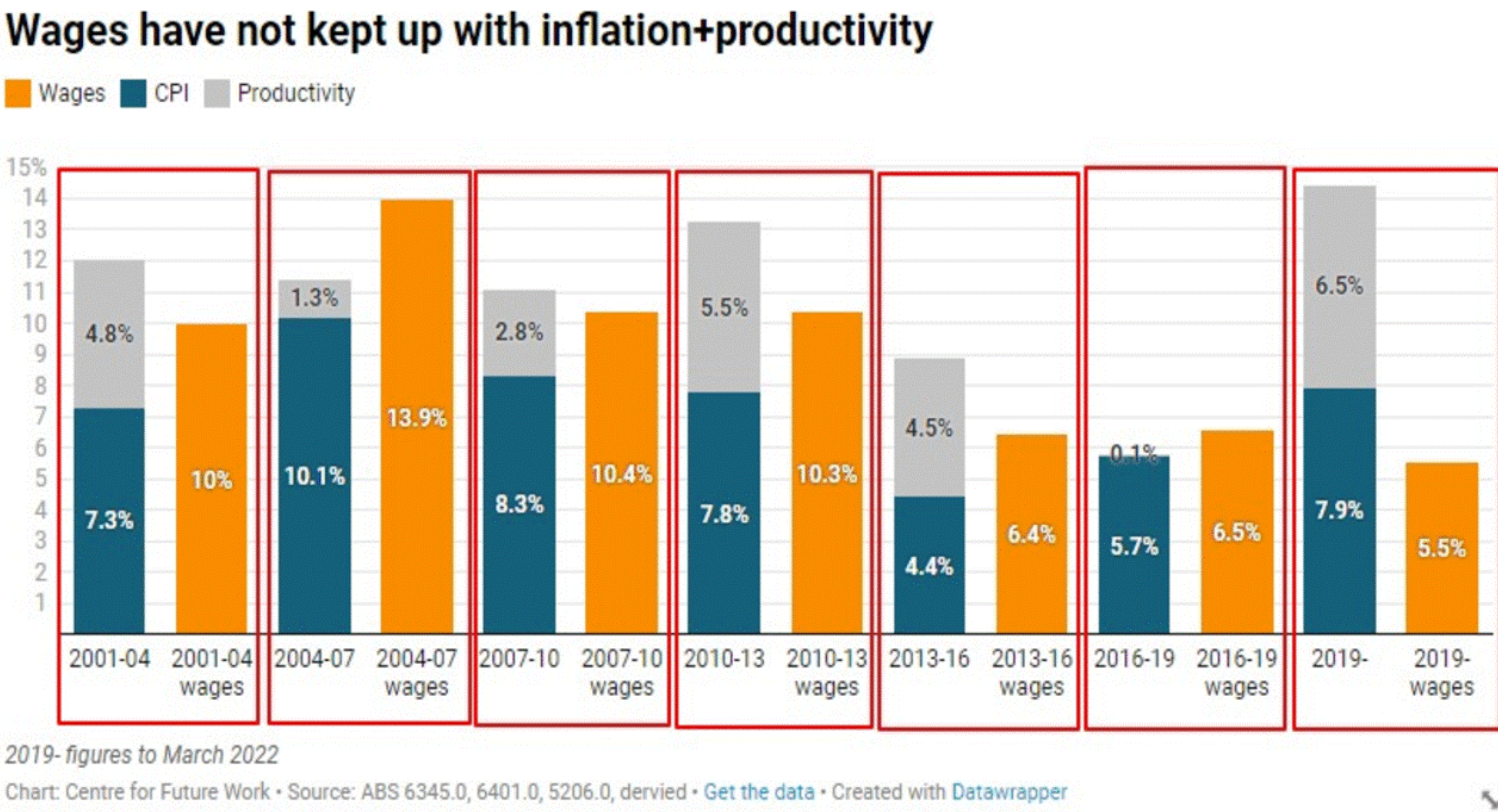
* Labour income defined as compensation of employees.

Sources: ABS; RBA

Wages, productivity and inflation

Tuesday, 7 June 2022

Today's GOTD caught my eye.



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It suggests that wages have not kept up with inflation + productivity for the past couple of decades, aside from a brief period during the mining boom (2004-2007). A common 'rule of thumb' is that sustainable wages growth occurs when wages grow at productivity growth + inflation. So, does this graph imply that wages have been growing below their sustainable level for a long period of time?

First we need to be clear about what we mean by 'sustainable'. Most people would probably define sustainable wage growth as the level of wages growth consistent with the labour share of income remaining stable over time. Based on that definition, it's straightforward to derive the rule of thumb that, for the labour share of income to remain constant, wages should grow at inflation + productivity.

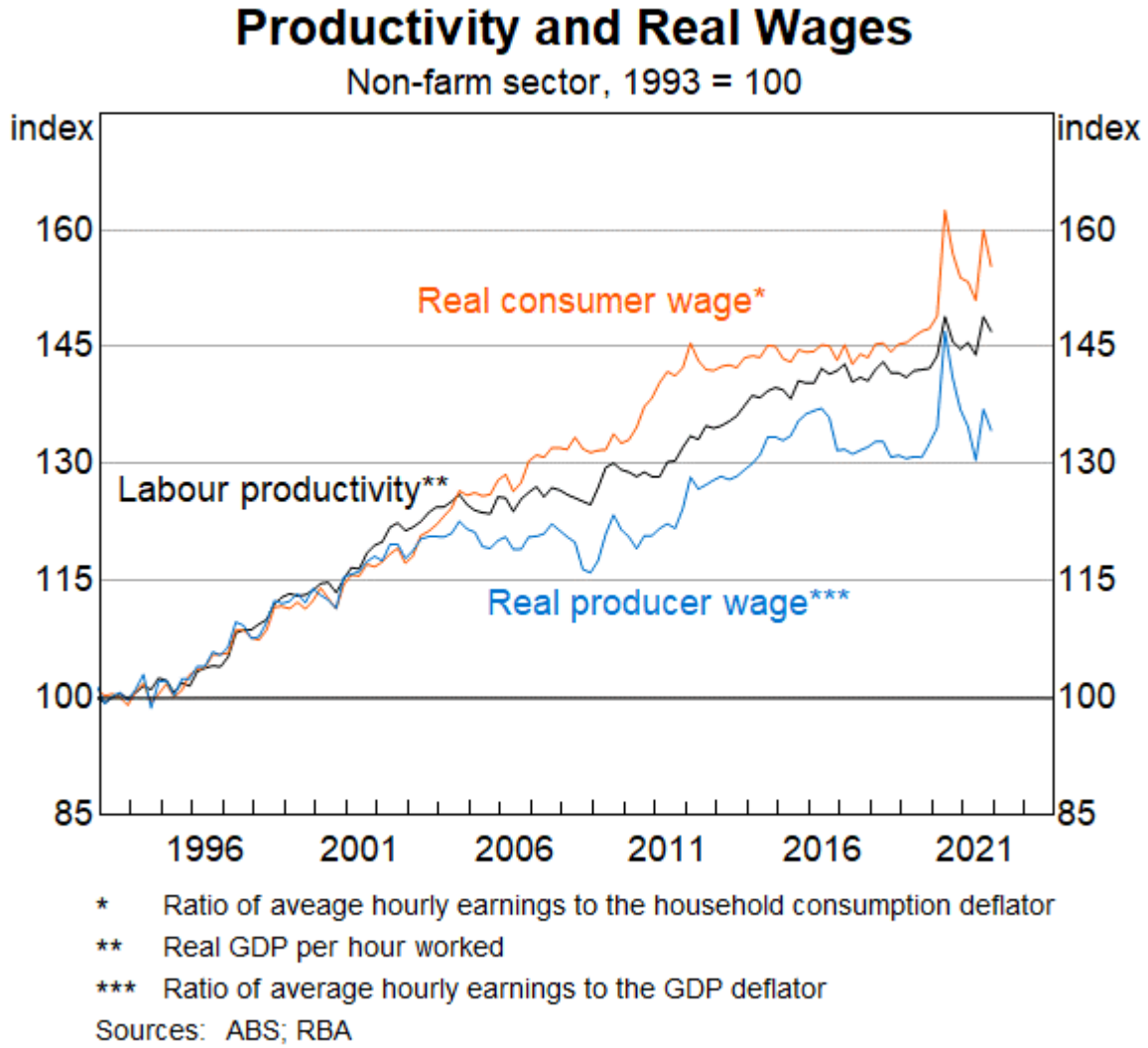
However, taking the above graph at face value would misrepresents that rule of thumb in 2 ways.

First, it's not comparing apples with apples. **Wages should be measured using average earnings from the national accounts (AENA), rather than the WPI**. This is important. The WPI is partly quality adjusted, whereas labour productivity and AENA are not. If we think that the upskilling of the workforce and reallocation of labour to higher productivity firms is an important source of productivity and wage growth over time, we want to make sure that both the productivity and wages are capturing it in the same way. Quality adjustment of the WPI is one reason why the trend growth rate of AENA per hour is higher than the WPI (by around ¼-½ppts per year since late 90s). The other reason is that non-wage benefits have increased in importance over time, most notably via higher super contributions.

Second, the graph is not using the most appropriate measure of inflation – at least if the intention is to draw implications about the labour share of income. **For the labour share to remain constant, inflation should be measured using the GDP deflator** rather than the CPI. More generally, when measuring real wages, the choice of deflator will depend on whether we're interested in real wages from the perspective of households or firms. Households care about their purchasing power – i.e. how their wages are tracking relative to the goods & services they buy (the CPI or HFCE deflator). Firms view wages as a cost – i.e. relative to the prices of the products that they sell (the broader GDP deflator). It is the latter concept – the so-called 'real producer wage' – than needs to keep pace with productivity growth in order for the labour share to remain constant, rather than the real consumer wage. Indeed, one way to think about the labour share is simply the ratio of real producer wages to productivity.

This distinction between the real producer and real consumer wages has been the subject of much discussion over the years at the Bank. In the decade leading up to 2012, the surge in commodity prices meant firms could pay higher wages but still remain highly profitable (particularly miners and firms that serviced miners). So nominal wages went up. At the same time, the Australian dollar appreciated considerably, which kept a lid on the CPI despite strong domestically-driven inflation pressure. As a result, real consumer wages grew much faster than productivity, which has often been referred to as the 'terms of trade dividend'. After 2012, real consumer wages stagnated – they remained at a high level, but grew more slowly than productivity. In comparison, real

producer wages have tracked productivity much more closely. Productivity growth was a little bit stronger than real wage growth (from the firms' perspective) over time, and for that for that reason the labour share has declined.



In sum, it's worth being careful when thinking about (and communicating) the rule of thumb. In some settings it may make sense to assume that the terms of trade remain flat (e.g. when discussing the outlook), such that the any wedge between the CPI and GDP deflator becomes less relevant. If that assumption is implicit, then a rule of thumb regarding 'sustainable' wage growth would simply need to make very clear that wages growth should be defined broadly using AENA per hour rather than the WPI.

NB: I'm not arguing that we shouldn't look at measures of real wage growth that deflate the WPI by the CPI. At the moment, real WPI growth is clearly the preferred measure of real wages for short-run policy analysis, at least until the pandemic-related noise in the AENA data fades away. The key point is that if we want to use productivity growth as a yardstick for real wage growth, we should be wary of using real WPI (aside from quick and dirty point in time calculations with lots of caveats). Like most things, the most appropriate measure to look at depends on what you want to do with it.

1 comment

I agree with what you have written here about the appropriate variables for this analysis.

One question that I haven't been able to work out though is why a 'sustainable' wage is one that is consistent with the labour share of income remaining stable over time. Is the stability of the labour share relevant or desirable from a policy perspective? Is it there a rule of thumb for what is an optimal share in a healthy developed economy?

A glance at the long-run data suggests that the labour share of income in Australia has pretty consistently trended downwards over time, from a peak of around 62% in 1975, to around 50% today; or more in line with Greg Jericho's time frame, has declined from 55% in 2001 to 50% today. This would imply that wages have mostly been growing below inflation + productivity over this period. This means that the point he was trying to make may stand, even if he is guilty of using the wrong measures to show it.
Tuesday, 21 June 2022

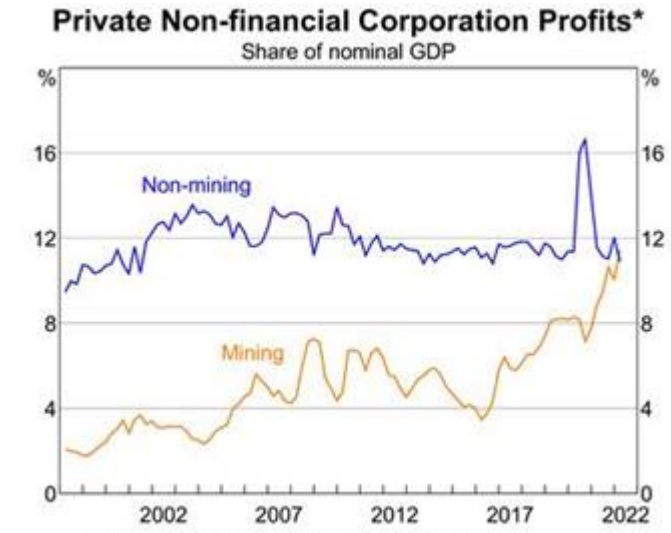
Add a comment

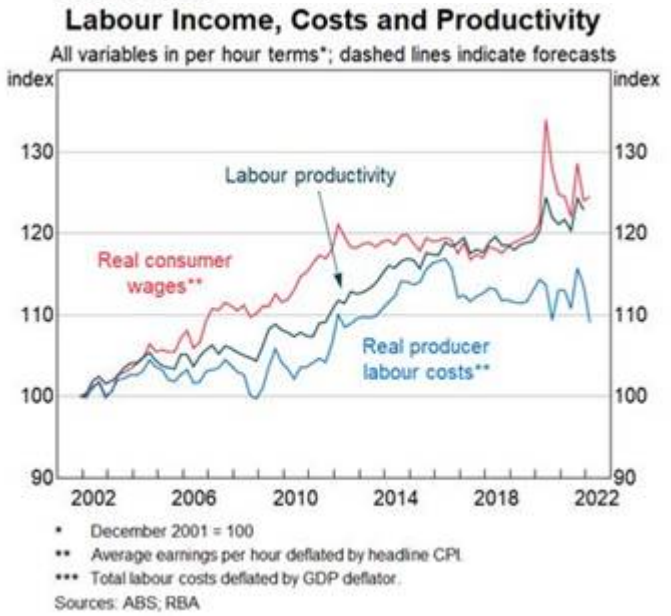
Post

From: COCKERELL, Lynne
Sent: Tuesday, 28 June 2022 9:48 AM
To: EA - PWL Labour; JONES, Bradley; ROSEWALL, Tom; HOLLOWAY, James
Subject: FW: The labour share of income; and producer vs. consumer wages [SEC=OFFICIAL]

Hi ,

Thanks. They are a useful set of graphs. Given the differing fortunes between mining and non-mining firms, it would interesting to consider what the RH graph would look like for non-mining firms. In lieu of actually doing the calculations, my guess is that the real producer labour cost line would be rising rather than being flat over the past decade, which could help close some of the gap to non-mining version of labour productivity. Lynne





From: BULLOCK, Michele
Sent: Monday, 27 June 2022 5:39 PM
To:

Cc: 8.50 attendees EA - PWL Labour
Subject: RE: The labour share of income; and producer vs. consumer wages [SEC=OFFICIAL]

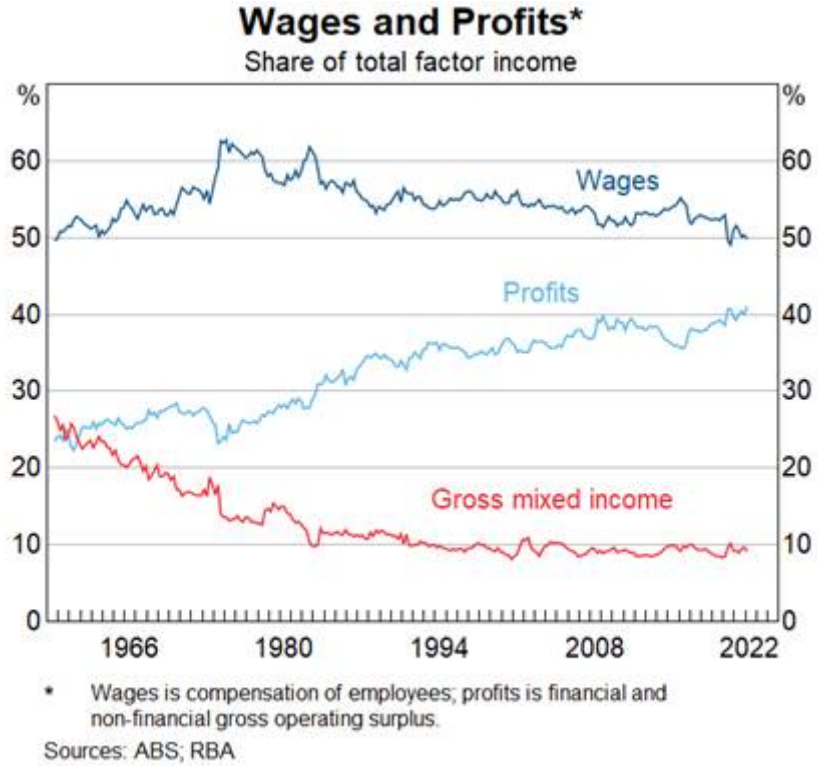
Thanks . Very comprehensive.

From:
Sent: Monday, 27 June 2022 4:17 PM
To: BULLOCK, Michele
Cc: 8.50 attendees ; EA - PWL Labour
Subject: The labour share of income; and producer vs. consumer wages [SEC=OFFICIAL]

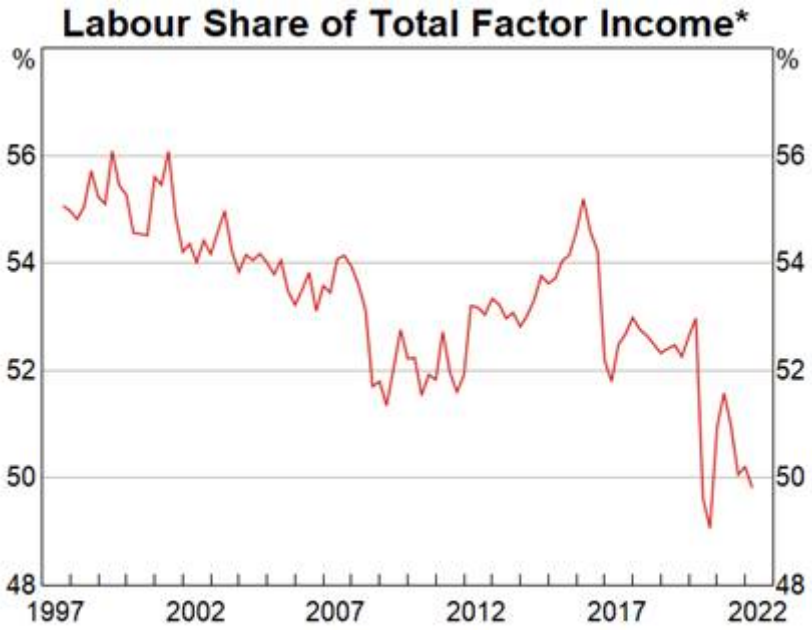
Hi Michele,

Following on from the discussion at the 850 this morning, here are a few graphs on the subject of factor shares of income and producer vs consumer wages:

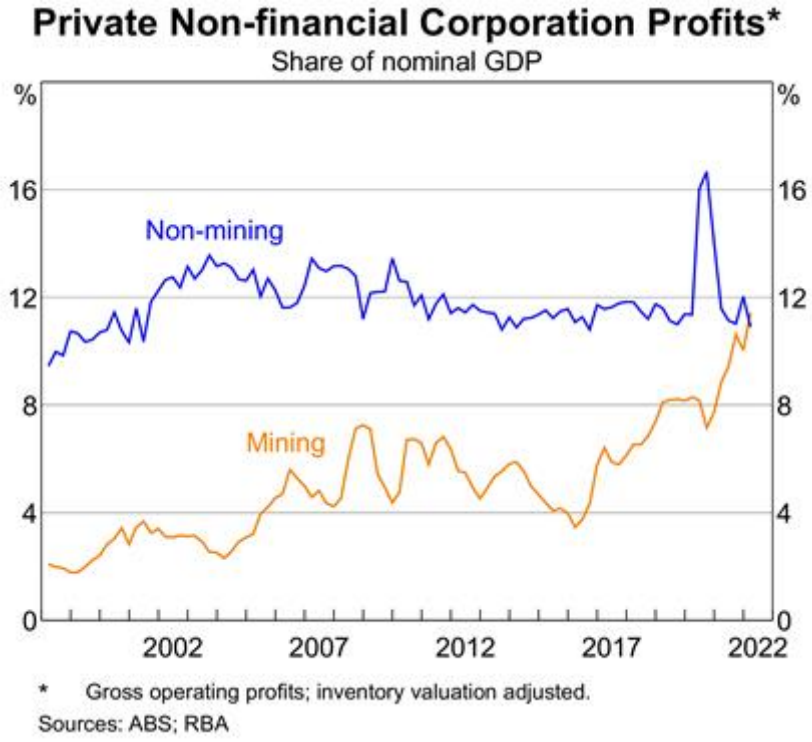
This graph shows long-run trends in factor shares. The profit share has been tracking up pretty steadily since around 2016, with the labour share declining by a similar amount. GMI (which is mostly profits from self-employment) has been relatively stable.



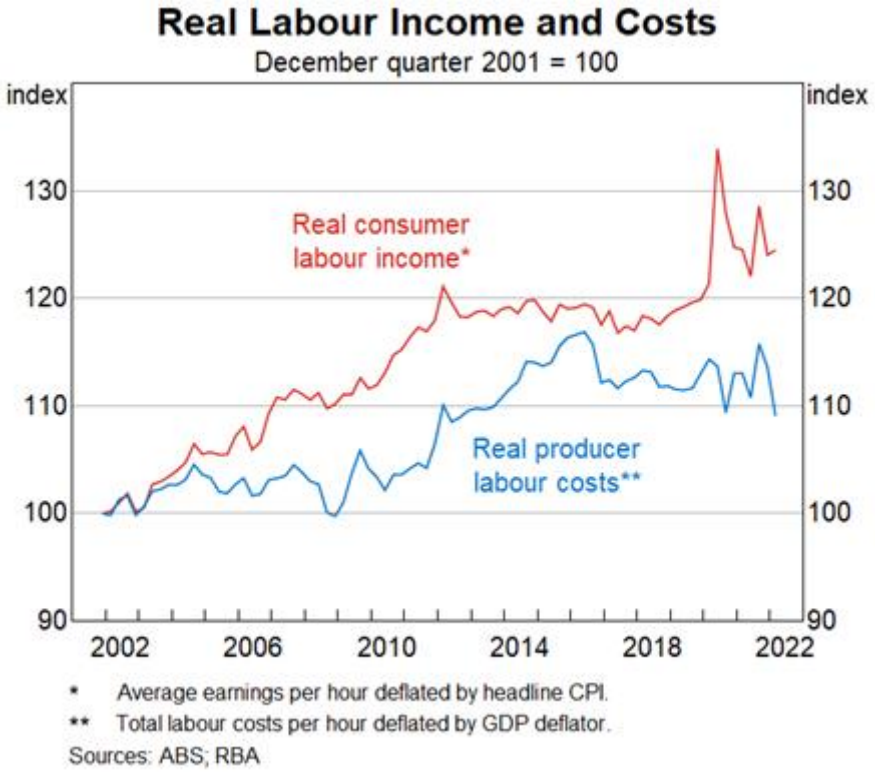
Here is a close-up of the labour share more recently. It fell by about 4ppt during the pandemic; after briefly staging a partial recovery, it has fallen again.



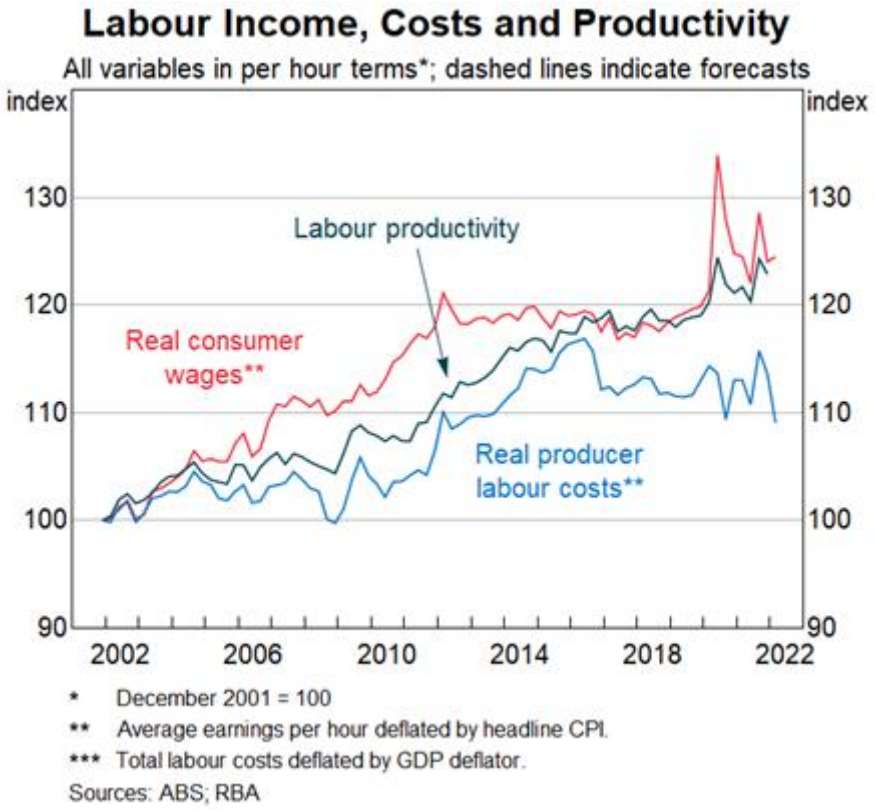
This is likely to reflect recent trends in corporate profits: elevated non-mining profits during the pandemic and elevated mining profits now:



This graph compares growth in real broad labour income for workers to growth in real labour costs for firms. Real firm labour costs have been growing more slowly than real labour income over the last few years; recently this would in part reflect the strength in the terms of trade, which means that the prices firms receive for goods are growing much faster than the price firms pay for labour.



This graph throws labour productivity into the mix for comparison. On average, consumer wages have grown more slowly than productivity since 2012, in line with the labour share of income declining and the profit share rising.



Cheers,

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IMPLICATIONS OF THE FWC DECISION: INSIGHTS FROM MICRODATA[1]

This note uses various microdata sources to provide additional insights into the direct effect the Fair Work Commission's (FWC) recent decision will have on wages, margins and prices nationally, and across firms, as well as on consumption. They key findings are:

- *Microdata indicates the expenditure-weighted increase in wages for award workers will be 4.65 per cent, consistent with Bergmann and Delaney (2022).*
    - *There is little variation in the award adjustment across industries.*
- *Workers on awards are concentrated in a subset of, generally smaller, firms, rather than being evenly spread across firms. As such, only a subset of firms will be directly affected by the decision.*
    - *Margins at firms with a large share of awards are similar to those in other firms, which taken alone suggests they are no more likely to pass on the price change.*
- *Simulation exercises suggest that aggregate prices will not need to adjust substantially to accommodate the direct effect of the FWC decision on wages, though a subset of generally smaller firms will require sizeable price changes of over 1 per cent to maintain their margins.*

The FWC decision

The FWC recently announced a 5.2 per cent increase to the national minimum wage (Bergmann and Delaney 2022). It also announced that award wages will rise by 4.6 to 5.2 per cent for employees earning up to $22.88 per hour, and 4.6 per cent for those higher up the pay scale. Overall, this is the largest annual wage adjustment since at least the late 1990s. In this note, we draw on a range of micro datasets on jobs, workers and firms to shed light on the direct channels through which this decision could affect the inflation outlook.

We focus on direct channels. In particular, we do not account for the fact that many employees on EBAs or individual arrangements have their wages set above the award, but are directly linked in some way to FWC decisions.[2] We also do not account for the possibility that FWC decisions have 'ripple' effects on other wages – for example, due to a desire to preserve wage relativities within firms or because the FWC outcome provides a reference point for wage negotiations.[3] The only indirect channel that we briefly consider is the effects of the decision on consumption, which matters for inflation via standard aggregate demand channels.

1 I would like to thank for their useful discussions and feedback.

2 For example, an 'award plus 5 per cent' arrangement; see Bishop and Cassidy (2019).

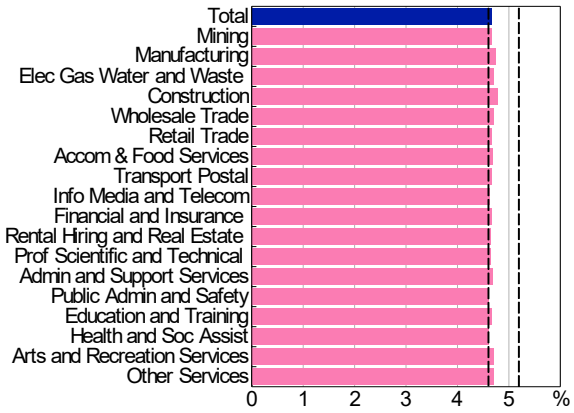
3 See the seminal paper on these ripple effects by Gramlich (1976), and more recent empirical evidence (for the US) by Autor et al (2015).

Award changes and their impact on the wage bill

Our starting point is to estimate the effect of the FWC decision on the wage bill, both in aggregate and across industries. To do this, we use job-level data from the ABS's Survey of Employee Earnings and Hours (EEH), which is the most accurate source of data on the distribution of hourly wages in Australia.[4]

We estimate that the average wage increase across all jobs on awards or the national minimum wage (NMW) is 4.7 per cent. This is identical to Bergmann and Delaney's (2022) estimate, based on other sources of information.[5] If we also account for the fact that higher-paid jobs contribute a larger share of the wage bill than lower-paid jobs, we find that the average wage increase is 4.65 per cent.[6] There is little variation in the award adjustment across industries, with all industries tightly clustered in the 4.6–4.8 per cent range (Graph 1).

Graph 1
Average Wage Increase*
Jobs on awards or NMW



* Expenditure weighted; extrapolated from job-level data in May 2018 EEH; dashed lines at 4.6 and 5.2 per cent indicate minimum and maximum possible increase

Sources: ABS; RBA

Award changes and their impact on margins and prices

To understand the direct effect of award changes on prices, it is important to think about their effect on margins not only in aggregate, but also across firms. To the extent that award workers are evenly distributed, the impact on costs and profit margins at any given firm may be relatively small, limiting the need for firms to pass on costs, particularly if there are fixed costs of price adjustments.[7] However, if they are concentrated this could mean large cost and profit changes, and therefore potentially price changes, for a small subset of firms. The nature of these firms, and whether they tend to have higher or lower margins, could also be important in determining whether they absorb or pass on higher wage costs.

Award workers are concentrated in a subset of generally smaller firms

To examine the distribution of award wage workers across firms, we use the aforementioned EEH data and examine the share of workers in each firm whose wages are set by awards. Table 1 shows that award workers are heavily concentrated in a subset of firms, rather than being evenly distributed across firms. Even in sectors such as retail and accommodation where award use is more common, there is a large share of firms with few or no workers whose wages are set by awards. While other workers' wages may be linked to awards through their EBA or individual agreements, this result suggests that the narrow, direct effect of award changes will be more intensely felt by only a moderate subset of firms.

Table 1 also shows that firms with large shares of their workers on awards tend to be smaller, as measured by their total wage bill. This can be seen from the fact that, the unweighted average of firm award shares is higher than the wage-bill weighted average. Regressions show that this is the case even when focusing within industries (see Appendix Table A1). This finding is relevant as systematic differences in the nature of firms that use awards intensively could suggest that systematic differences in their ability to absorb recent award changes.

4 At the time of writing, we only had access to the data for the EEH conducted in May 2018, rather than the more recent EEH from May 2021. We adjust the May 2018 EEH data for the FWC adjustments that have occurred in the intervening period to June 2022.

5 This was based on analysis of EEH microdata presented in the Australian Government submission to the Annual Wage Review.

6 Our estimates are little changed if we exclude jobs on EBAs and individual arrangements paid the minimum wage and focus on award only.

7 This can be motivated using a model in which firms face menu costs when they adjust their prices and, therefore, have a range of inaction in response to shocks (see, e.g., the classic QJE paper by Ball and Mankiw (1995)). In this type of model, firms respond to large shocks but not to small shocks and the distribution of cost shocks across firms matters for the price level in the short run.

Table 1: Distribution of award shares across firms[(a)]

	Headcount share Unweighted firm average	Wage share Unweighted firm average
Median	0	0
75th percentile	0.5	0.35
90th percentile	1	1
Unweighted firm mean	0.24	0.22
Firm wage-weighted mean	0.13	0.11
Observations	5,138	5,138

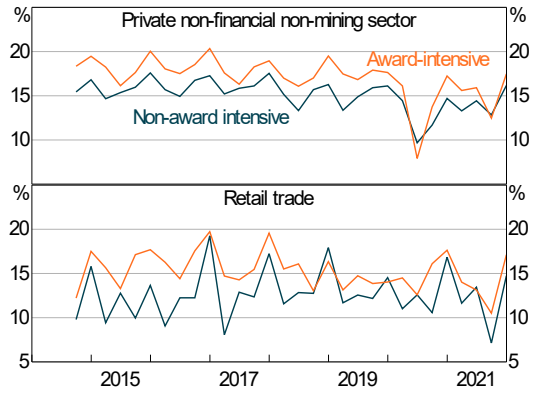
(a) Based on 2018 EEH data. Firms aggregated to Enterprise Group level .
Sources: ABS; RBA

These firms have similar margins to other firms

To consider whether award-intensive firms are more or less likely to be able to absorb recent award wage increases, we link Business Activity Statement (BAS) data to the EEH. This allows us to separate firms into those with high (>50 per cent) or low (<50 per cent) shares of workers on award wages (based on 2018 EEH data), and look at their margins over time. For this analysis we define margins as sales less wages and inputs, divided by sales, and focus on the non-mining, non-financial private sector, where measuring margins is more feasible.[8]

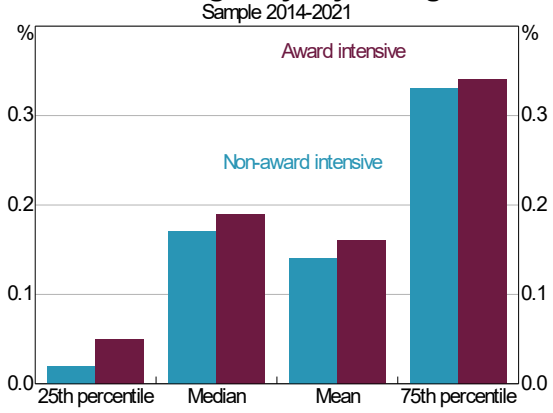
Focusing on the median, those firms with a high share of workers on awards tend to have slightly higher margins, while margins have tracked fairly similarly over the past few years for both groups (Graph 2; top panel). This does not appear to reflect differences in the industry composition of the two groups; the same pattern is evident when focusing just on the retail sector (Graph 2; bottom panel), or when using a simple regression focusing on differences within industries. The distributions are also reasonably similar (Graph 3).

Graph 2
Net Margins by Pay Setting
Median



* Net margins defined as (sales-wages-input costs)/sales. Input costs constructed by scaling up GST paid. Excluded mining, utilities, finance, public adminstration, health and education.
Sources: ABS; RBA

Graph 3
Net Margins by Pay Setting
Sample 2014-2021



* Net margins defined as (sales-wages-input costs)/sales. Input costs constructed by scaling up GST paid. Excluded mining, utilities, finance, public adminstration, health and education.
Sources: ABS; RBA

Taken alone, this suggests that award-reliant firms are no less-likely to be able to absorb changes in wage bills, compared to other firms. That said, there may be other differences that make them more or less able/willing to absorb changes in wage costs, such as their size, or power in product or labour markets.

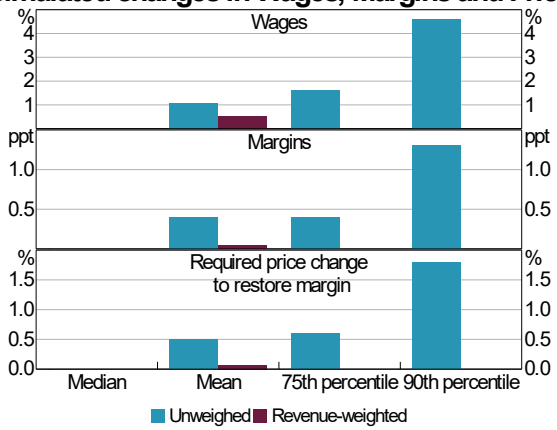
8 From 2017 small firms stopped reporting total operating expenditure in BAS. As such, we scale up GST paid on purchases to construct a proxy for expenses. While not ideal, pre-2017 this approach and an approach using observed expenses data follow very similar trajectories, even if levels differ slightly, suggesting the approach is valid (Appendix Graph A1). Reproducing the simulation exercise focusing on the sample of larger firms for whom operating expenses are still reported also leads to very similar results (when compared to the same sample of firms). See Appendix Graph A2 for a comparison to ABS aggregate data.

To maintain current margins, firms would need to raise revenue/prices only modestly

To understand the impact of increases in award wages on margins more directly, we use information on worker-level changes in wages from above to simulate the firm-level changes in wage bills and margins. We then calculate the change in revenue required to return margins to December 2021 levels.[9] Assuming quantities don't respond (a strong assumption), this is the price change required to restore the firm's margin.

Graph 4 shows the results of this simulation. Consistent with the above finding that award-workers are heavily concentrated within a small share of firms, there is no change in wage bills or margins for the median firm. For the mean firm in the sample, wages increase by around 1 per cent, leading to a slight fall in margins of a little under 0.5 percentage points (as wages make up around 40 per cent of sales for the mean firm) To recoup this, the firms would need to raise their prices by 0.5 per cent. For a small share of firms the change in wage bills and prices is substantially larger at over 1 per cent.

Graph 2
Simulated changes in Wages, Margins and Price



* Net margins defined as (sales-wages-input costs)/sales. Input costs constructed by scaling up GST paid. Excluded mining, utilities, finance, public adminstration, health and education. Price change restores margin to December 2021 level. Weighted numbers not reported outside of mean.

Source: RBA

Changes are smaller if we weight firm-level outcomes by firm revenue, which provides a better sense of the aggregate economic impact. The weighted-average increase in wages is 0.5 per cent, and the required rise in prices a bit over 0.05 per cent.[10] The smaller increase reflects the fact that larger firms are less likely to have workers on awards, and wages tend to make up a lower share of their expenses.

This is a very simple exercise, and there are a number of additional factors that are not considered. For example, we have assumed sales quantities remain unchanged. But in practice if only some firms raise prices they may lose market share, meaning the aggregate effects could be smaller. Working in the other direction, the EEH tends to under-sample small firms, who are more likely to have workers on awards and therefore require larger price changes.[11] More generally, we are only accounting for the direct effect of the FWC on award workers' wages, not any flow on affects to directly linked wages or the labour market more generally, and these may be more significant.

9 This is calculated as $\Delta Revenue = (1 + \Delta wages_{t+1} + \frac{wages_t}{wages_t + other\ expenses_t}) / (1 + \frac{wages_t}{wages_t + other\ expenses_t}) - 1$.

10 This is slightly below what would be obtained taking a simple calculation using aggregates. The share of the wage bill directly affected by the FWC decision is around 15 per cent. The average wage rise is 4.65 per cent, and the national wages share of expenses is around 20 per cent in the sample. Combing these suggests a required price increase a bit above 0.1 per cent.

11 The EEH microdata do not currently contain sample weights. Work is being considered to develop in-house weights for ABS survey microdata based on the characteristics of the population of firms in BLADE.

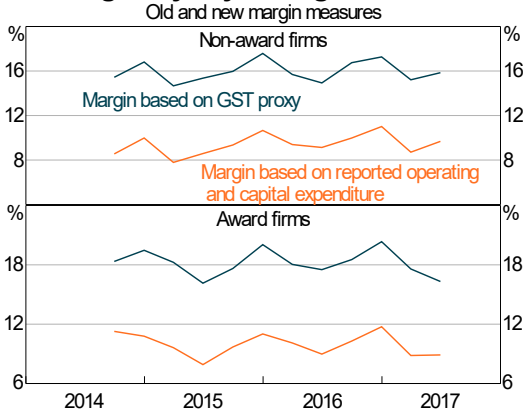
Appendix

Table A1: Award Share Regression

	Coefficient (standard error)
Turnover (log)	-0.023***
	(0.001)
Observations	80,341
R^2	0.27

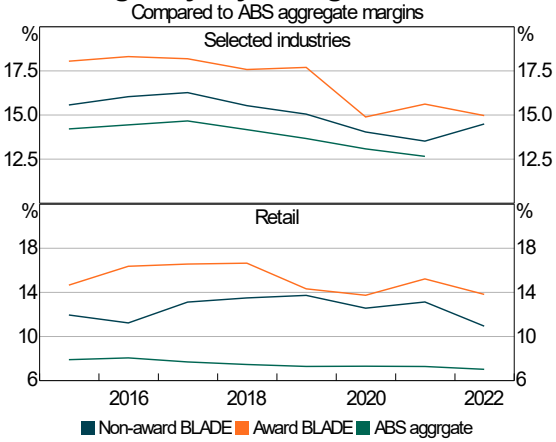
(a) Regression includes 4-digit industry fixed effects. Sample period 2014-2021 for size. Award take-up based on 2018 data
Sources: AS; RBA

Graph A1
Margins by Pay Setting Mechanism
Old and new margin measures



* Net margins defined as (sales-wages-input costs)/sales. Input costs constructed by scaling up GST paid, or based on reported operating and capital expenditure (for comparability). Excluded mining, utilities, finance, public adminstration, health and education.

Graph A2
Margins by Pay Setting Mechanism
Compared to ABS aggregate margins



* Net margins defined as (sales-wages-input costs)/sales. Input costs for BLADE-EEH sample constructed by scaling up GST paid, or based on reported operating and capital expenditure (for comparability). Median reported to BLADE-EEH sample, but weighted avefrage for ABS data. Both exclude mining, utilities, finance, public adminstration, health and education.

From:
Sent: Friday, 19 August 2022 8:11 AM
To:
Subject: FW: Note ER: Can Wage-setting Mechanisms affect Labour Reallocation and Productivity? Preliminary Evidence Says Yes [SEC=OFFICIAL]
Attachments: Note ER Can wage-setting mechanisms affect labour reallocation and produ....docx

Hey

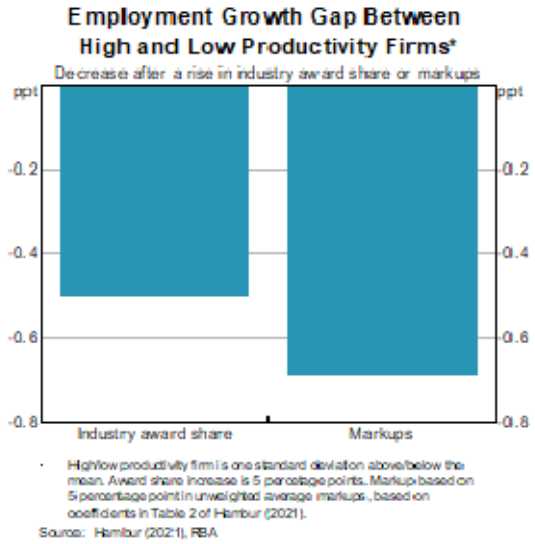
This was the note I flagged to both of you (in context rent-sharing, in context of reallocation). Please don't circulate too widely.

happy to chat through how we could maybe roll this stuff together with some of the other EBA stuff you are doing/best approach to WAD integration at some point when you have some time.

Cheers

From:
Sent: Wednesday, 17 August 2022 4:26 PM
To: Notes policy groups
Subject: Note ER: Can Wage-setting Mechanisms affect Labour Reallocation and Productivity? Preliminary Evidence Says Yes [SEC=OFFICIAL]

This note examines whether the relationship between firm productivity, and firm wages and employment growth, is weaker where industry awards tend to be used as the wage-setting mechanism. Using the limited data available on wage-setting mechanisms, I find that in sectors with greater use of industry awards, the relationship between firm wages and productivity tends to be weaker (as many firms are offering the same industry-award wage). This weaker relationship between productivity and wages feeds through to a weaker relationship between firm growth and productivity. This is likely to weigh on aggregate industry productivity growth as the flow of labour to more productive uses within the industry slows (all else equal). While many factors can affect the choice of wage-setting mechanism, these results suggest that any frictions that make it more costly for firms to use other, differentiated, wage-setting mechanisms could weigh on moderately productivity growth.



Micro Analysis and Data Stream | Economic Research Department

CAN WAGE-SETTING MECHANISMS AFFECT LABOUR REALLOCATION AND PRODUCTIVITY? PRELIMINARY INVESTIGATION INDICATES YES[1]

This note examines whether the relationship between firm productivity, and firm wages and employment growth, is weaker where industry awards tend to be used as the wage-setting mechanism. Using the limited data available on wage-setting mechanisms, I find that in sectors with greater use of industry awards, the relationship between firm wages and productivity tends to be weaker (as many firms are offering the same industry-award wage). This weaker relationship between productivity and wages feeds through to a weaker relationship between firm growth and productivity. This is likely to weigh on aggregate industry productivity growth as the flow of labour to more productive uses within the industry slows (all else equal). While many factors can affect the choice of wage-setting mechanism, these results suggest that any frictions that make it more costly for firms to use other, differentiated, wage-setting mechanisms could weigh on moderately productivity growth.

Introduction

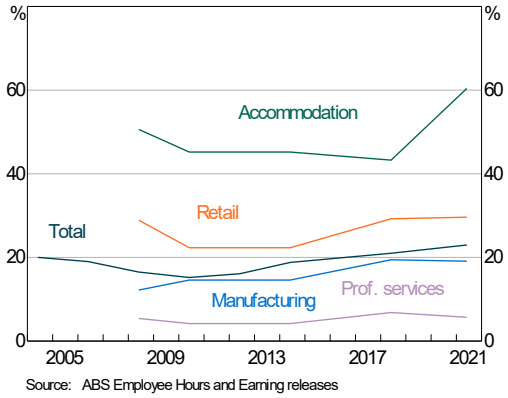
Recent papers have demonstrated that the reallocation of labour from less to more productive firms in an industry plays a crucial role in driving aggregate productivity growth, and that slower reallocation has contributed to the slowdown in Australia's productivity growth (e.g. Andrews and Hansell 2021; Hambur 2021). Much of this reallocation will occur through more productive firms, with higher marginal productivity, offering higher wages to attract staff from low productivity firms (e.g. Bilal et al 2022).[2] As such, wage-setting mechanisms and norms could potentially shape the reallocation process.

Australia has three main wage-setting mechanisms: individual awards; enterprise bargaining agreements (EBA); and industry awards. For the former two, worker wages can differ across firms. But for industry awards all workers doing the same role will receive the same wage.

In theory, shifts in the prevalence of these wage-setting mechanisms over time could affect the rate of labour reallocation. Overseas work has shown that the relationship between firm productivity and wages is weaker where centralised wage-setting mechanism are used (Guertzgen 2009). If firms become more likely to offer the same centralised industry-award wage, which is unrelated to their specific productivity level, poaching of staff from low to high productivity firms could decrease.

To understand whether this is the case, I examine whether the relationships between employment growth and productivity, and between wages and productivity, are weaker where industry award use is more prevalent. I find evidence that both relationships are weaker, suggesting that increases in the use of industry awards over the past decade could have contributed to slower productivity-enhancing reallocation, and therefore lower productivity growth (Graph 1).

Graph 1
Share of Workers on Industry Awards
Selected sectors



Source: ABS Employee Hours and Earning releases

[1] Thank you to for his comments. This is early work, and comment/suggestions for future directions are very welcome.

[2] Another mechanism will be low productivity firms closing and freeing up labour for high productivity firms.

That said, these results provide no evidence regarding the underlying drivers of increased use of industry awards, and understanding these underlying drivers is crucial in thinking about the macroeconomic implications and potential policy responses.[3] However, the results do suggest that if some 'exogenous' frictions have, or in the future do, increase use of industry awards, this is likely to contribute to slower reallocation and productivity growth. Examples of such frictions could include increased costs of entering EBAs or individual awards, or firms increasingly using industry awards as a 'signal' of the appropriate price of labour.[4]

This note uses data on firm employment and labour productivity constructed from Business Income Tax (BIT) and Pay As You Go (PAYG) data for the near universe of non-financial market sector firms in the BLADE (for more details see Appendix). I also use data from the ABS Employee Earning and Hours (EEH) survey. I use division-level industry award shares published for 2008, 2010, 2014 and 2018, and construct my own shares from the microdata for 2012, 2014 and 2018. I also use the microdata to construct firm- and worker-level industry award shares.

Labour flows more slowly to productive firms when industry award usage goes up …

To examine the relationship between employment growth and productivity I use the standard approach from Decker et al (2020), regressing firm-level employment growth ($Growth_{i,t+1}$) on firm productivity ($Prod_{i,t}$), expressed as a (log) deviation from the industry average to focus on within-industry differences:

$$Growth_{i,t+1} = \alpha_0 + \beta * Prod_{i,t} + \gamma * Prod_{i,t} * Award\ share_{m,t} + X'_{i,t}\theta + \varepsilon_{i,t+1}$$

The regression contains a number of additional controls $X'_{i,t}$, including firm size and age, sales growth over the previous year, and industry*year dummies to strip out the effect of the industry performance, or other structural changes. I also include an interaction between productivity and state-level unemployment, to account for the fact that the rate of reallocation may be cyclical. As such, the regression focuses on 'structural' changes in industry award usage, rather than ones driven by labour market strength.[5]

The coefficient of interest is γ. If $\gamma < 0$ the relationship between employment and productivity is weaker in industries with a higher share of workers on awards. I express the divisional industry award shares as a deviation from the division-level average, to abstract from structural differences in reallocation and wage-setting across industries, and instead to focus in on changes in award usage.[6]

Table 1 shows the results. As demonstrated in previous work, more productive firms tend to grow more quickly, as evidenced by the positive coefficient on productivity. However, when sectors increase their use of industry awards, the relationship between employment growth and productivity weakens ($\gamma < 0$). While the coefficient is insignificant using the published shares over the full sample (column 1), it is significant if I remove 2008 from the sample (column 2). This brings the sample period more in line with the internally constructed industry award shares (column 3), where the relationship is again significant. This suggests that the 2008-2010 period may be unusual, potentially reflecting the inclusions of the Global Financial Crisis, or the unusually sharp change in award shares in many

[3] For example, Hambur (2021) finds that declining firm entry rates contributed to greater monopsony power, lowering wages and potentially pushing more firms to the industry award wage floor. Alternatively, frictions that lead to more use of industry awards could contribute to lower firm entry and competitive pressure.
[4] For example, Morris and Shin (2002) show that the provision of a public information can lower welfare when agents have access to independent private sources of information.
[5] Interacting productivity with division-level measures of performance did not appear to change the results.
[6] For example, industry awards are heavily used in Retail, which is a sector that tends to have high labour turnover. I want to abstract from these structural differences across sectors.

divisions over this period (Figure 1). Taken together, these results suggest that reallocation tends to be weaker when award use is higher.

Table 1: Reallocation regressions

	Published share – demeaned (1)	Published share – demeaned (no 2008) (2)	Constructed shares – demeaned (3)
Productivity[b]	0.032***	0.031***	0.031***
(t-stat)	(14.67)	(14.74)	(15.31)
Productivity*Award share[c]	-0.026	-0.050**	-0.047**
(t-stat)	(-1.41)	(-2.58)	(-2.62)
Observations	755,094	588,491	597,211
R-squared	0.065	0.062	0.068

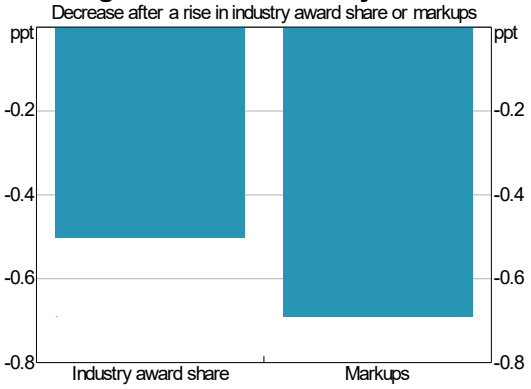
(a) All regressions include controls for firm demographics (size, age and past sales growth), industry*year FE, and state-level unemployment*productivity (cyclicality of reallocation). *, * and *** show significance at the 10, 5 and 1 per cent level, respectively. Errors clustered at division level (1-digit ANZSIC). Column 1 and 3 include 2008, 2010, 2014 and 2018. Column 2 and 5 contain 2012, 2014, 2018. Colum 4 contains 2010, 2014 and 2018. Top and bottom percentile of productivity distribution trimmed.
Source: RBA

To quantify the effect, I construct employment growth rates for high and low productivity firms (one standard deviation above/below industry mean) in industries with different industry award usage, based on the coefficients in Column 2. For an industry with average award usage, employment growth is 6.4 percentage points higher for high productivity firms. Assuming the industry award share rose by 5 percentage points, around the average increase from 2010 to 2018, the gap between high and low productivity firms falls to 5.9 percentage points, a ½ percentage point drop (Graph 2). To put this in context, Hambur (2021) shows that the increase in markups from 2005-2017 was associated with a ¾ percentage point decline in the gap between high and low productivity firm employment growth. And that this had a sizeable effect on labour productivity growth.

Graph 2

Employment Growth Gap Between High and Low Productivity Firms*

Decrease after a rise in industry award share or markups



* High/low productivity firm is one standard deviation above/below the mean. Award share increase is 5 percetage points. Markup based on 5 percentage point in unweighted average markups, based on coefficients in Table 2 of Hambur (2021).
Source: Hambur (2021), RBA

Again, it is important to highlight that part of the increase in the use of industry awards over the period might reflect other factors (including declining competitive pressures), and as such we should not interpret this as the economic impact of the rise in industry awards. However, it does suggest that frictions that increase the use of industry awards can potentially have moderate negative implications for productivity and economic growth.

… and firm/worker wages are less related to productivity

To better understand the mechanisms behind the above finding, I look at the relationship between firm- or worker-level wages, and firm productivity, often referred to as 'rent-sharing'. If the above finding is driven by high productivity firms being less willing or able to offer differentiated wages and poach staff when industry award usage is more prevalent, this should show up as a weaker relationship between productivity and wages.

To examine this, I run a simple regression of firm (average) or worker i's wage, on the firm's (*j*) productivity, allowing this relationship to differ based on the wage-setting mechanism, and accounting for other firm- or worker-related factors that can influence wages (e.g. worker age or occupation, firm industry, and cyclical controls):

$$log(wage_{ijt}) = \propto + \beta log(LP_{jt}) + \gamma log(LP_{jt}) * Wage - mechanism_{i,t} + \delta X' + \varepsilon_{ijt}$$

I run two sets of regressions for the above equation. First, I run this regression looking at worker-level (ordinary time) wage rate for the sample of firms and workers in the EEH survey. For this regression, I focus on whether or not the particular worker was on an industry award or a different wage-setting mechanism. I control for various factors that could affect the workers wage, such as age, education and occupation, and also allow for different occupations to have differing rent-sharing by interacting occupation and productivity.

Table 2 shows the results. The relationship between worker wages and firm productivity is weaker for workers on industry awards. This finding is fairly robust, though the evidence is weaker if we include firm fixed effect, and so effectively compare workers on different wage-setting mechanisms within the same firm (columns 3 and 4). These latter specification could help us to abstract from some firm-specific factors that are driving the results and so be more robust. However, the sample of firms is relatively small (around 2,000 per period), which may also contribute to the result.

Table 2: Worker Rent-sharing Regressions

	Base (1)	**Allow occupation specific rent-sharing** (2)	**Firm effects** (3)	**Firm effects and allow occupation specific rent-sharing** (4)
Productivity	0.034***	--	0.016**	--
(t-stat)	(10.60)		(2.25)	
Productivity*Industry Award (1=on ind. award)	-0.028***	-0.018***	-0.011*	-0.010
(t-stat)	(-5.10)	(-3.16)	(-1.94)	(-1.40)
Controls				
4-digit ANZSCO*productivity	N	Y	N	Y
Firm FE	N	N	Y	N
Observations	47,586	47,586	47,325	47,325
R-squared	0.670	0.678	0.786	0.789

(a) All regressions include controls for worker demographics (quadratic in age, and gender), and wage-setting mechanism, and division, state and 4-digit occupation by year, to account for prevailing economic conditions. *, * and *** show significance at the 10, 5 and 1 per cent level, respectively. Errors clustered at firm level. Regressions cover 2012, 2014, 2018. Industry award workers relationship expressed relative to individual award. EBA interaction not shown. For columns 2 and 4, overall response captured in occupation*productivity controls.
Source: RBA

To expand the sample, and to get a better sense of the overall firm-level effects, I also run the model using firm-level average wages (total wage bill/full-time equivalent employees). For this regression, I consider the average share of workers in the firm on industry awards. In this sense, I am comparing firms who tend to use industry awards intensively, versus those that do not.[7]

[7] I focus on the firm-level share, not the division-level share as in the reallocation regression. Reallocation is likely to depend both on my and my competitor's wage-setting mechanisms, as this will determine the degree of wage differentiation. But my wages will depend on my wage-setting choice. I use the average share to allow

Table 3 shows the relationship between firm productivity and wages is weaker in firms that tend to have more workers on award wages across all specifications.[8] For a firm with all workers on industry awards, the relationship between firm productivity and worker wages is around 1/3 weaker.

Table 3: Firm Rent-sharing Regressions

	Base (1)	**Firm Fixed Effects** (2)
Productivity	0.091***	0.088***
(t-stat)	(31.76)	(18.78)
Productivity*Industry award share	-0.039***	-0.031***
(t-stat)	(-7.5)	(-3.73)
Controls		
Firm FE	N	Y
Observations	59,413	59,100
R-squared	0.367	0.617

(a) All regressions include controls for wage-setting mechanism, firm demographics (age and size), and industry and state by year, to account for prevailing economic conditions. *, * and *** show significance at the 10, 5 and 1 per cent level, respectively. Regressions cover 2002-2018. Industry award workers relationship expressed relative to average of individual award or EBA.
Source: RBA

Conclusions and directions for further work

The results suggest that in sectors with higher use of industry awards, the relationship between firm productivity, and firm or worker wages, tends to be weaker This feeds through to slower productivity-enhancing reallocation, which could contribute to slower productivity growth (all else equal).

It is worth highlighting that this finding is not a foregone conclusion. For example, if industry award wages were a binding wage floor for low productivity firms, they could actually cause low productivity firms to shed more workers, raising reallocation in sectors with high industry award usage.

In either case, the results do not necessarily suggest that industry-wide awards are economically harmful. For example, through acting as a minimum wage these awards can potentially offset the effects of monopsony, or firm labour market, power (e.g. Berger et al 2022). However, to the extent that increased use of industry awards reflects some type of friction that prevents firms from using other mechanisms and offering differentiated wages, it could be economically harmful.

To this end, additional work could be done to better understand the drivers of firms' choices of wage-setting mechanisms. Linking of the EBA database to BLADE and other administrative datasets could open up new directions here. More generally, better data on wage-setting mechanisms would allow for more robust analysis to be undertaken on a larger sample of firms.

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me to extrapolate to non-survey years in a consistent manner for firms that appear in the EEH survey once, and firms that appear multiple times.

[8] The estimated degree of rent-sharing is a bit higher than estimated in Penrose (2021) and slightly closer to the estimates from worker level regressions in Andrews et al (2019).

Appendix

While BLADE has data on the (near) universe of Australian firms, I have to make some exclusions. First, I focus on the market sector, and so exclude the Health, Education, and Public administration divisions of the economy. Government plays a large role in these divisions, and so focusing on market power is potentially questionable. I also exclude the Finance division, given conceptual difficulties in measuring output in this sector.

Second, I have to exclude all non-employing firms, given these firms will have undefined (log) labour inputs, productivity and wages.

I measure productivity as the ratio of value-added to full-time equivalent employees (FTE), where FTE is provided in BLADE based on ABS calculations. Value-added is measured as income less expenses other than labour, depreciation and some other fixed expenses. Value-added is deflated using division-level deflators.

For growth in labour, I measure growth in FTE. Rather than using a standard growth rates, I use the bounded growth rate that is common in the literate:

$$Growth_{i,t+1} = \frac{L_{i,t+1} - L_{i,t}}{0.5 * (L_{i,t+1} + L_{i,t})}$$

The advantage of this approach is that it is bounded by -2 and 2, and is an approximation of the log change. While this measure can also accommodate firm entry and exit (2 and -2 respectively), I focus on the intensive margin of growth for this note.

As noted, for some of the analysis I construct firm- or division-level industry award wage worker shares. For these shares I use unweighted counts of workers on industry awards, and on other wage-setting mechanisms. Ideally I would use a weighting scheme similar to that used by the ABS in the EEH survey, but weights are not provided in the microdata. Nevertheless, the internally constructed and published division-level metrics appear similar to the overlapping periods, and give similar results.