"Wage Growth in Australia: Lessons from Longitudinal Microdata"

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(Australian Treasury draft)

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The paper provides four main contributions. First, it provides a demonstration research project contribution using a new Australian prototype administrative linked employer-employee database (LEED). Second, using this data, the paper's main research contribution is to estimate the first firm-productivity or rent-sharing wage equations for Australia, and finds a recent decline in rent-sharing to wages. Third, the paper explores several possible explanations for this apparent decline. And, finally, it estimates firm-productivity related employment reallocation relationships, and again concludes there has been a recent decline in the reallocation from low to high productivity firms.

In my discussion, I want to first address the background of low wage growth which provides the motivation both for this paper, and the workshop more broadly. I will then discuss the paper's contributions, before rounding off will some general comments.

1. Background motivation

Although the analytical focus of this paper is the decline in real wage growth in Australia, the background motivation provided is mainly in terms of a recent decline in <u>nominal</u> wage growth. (The decline in nominal wage growth was the motivation for much of the workshop.) To provide some sense of how much of the decline in nominal wage growth was associated with real wages versus declining inflation, Figure 1 shows the annual growth rates of both nominal average wages and CPI-adjusted real average wages since 2001. The decline in nominal wage growth following the global financial crisis (GFC), and particularly after 2011, is clear in this figure, with a peak-to-trough fall of about 2%. However, the pattern for real wage growth is less obvious: the fitted (quartic) trend line suggests real wage growth peaked in 2006, and has declined quite gradually since. (The real wage growth trends are broadly similar if wages are deflated by the producer price index (PPI).)

Table 1 summarises the average growth rates over three subperiods: 2001–2007, 2008–2012, and 2013-2018. This shows average annual nominal wages was about 3.7% from 2001 and 2012, and declined by more than one-third to 2.4% since then. In contrast, recent average real wage growth, as measured in either CPI-adjusted or PPI-adjusted terms, fell more modestly. In fact, the fall in CPI-real wage growth accounts for only one-third of the recent fall in nominal growth, while the fall in PPI-real wage growth accounts for less than 20%. Given these patterns, my sense is that labour market contributions to understanding the declining nominal wage growth are likely be modest.

Figure 1: Annual wage growth in Australia, 2001–2018
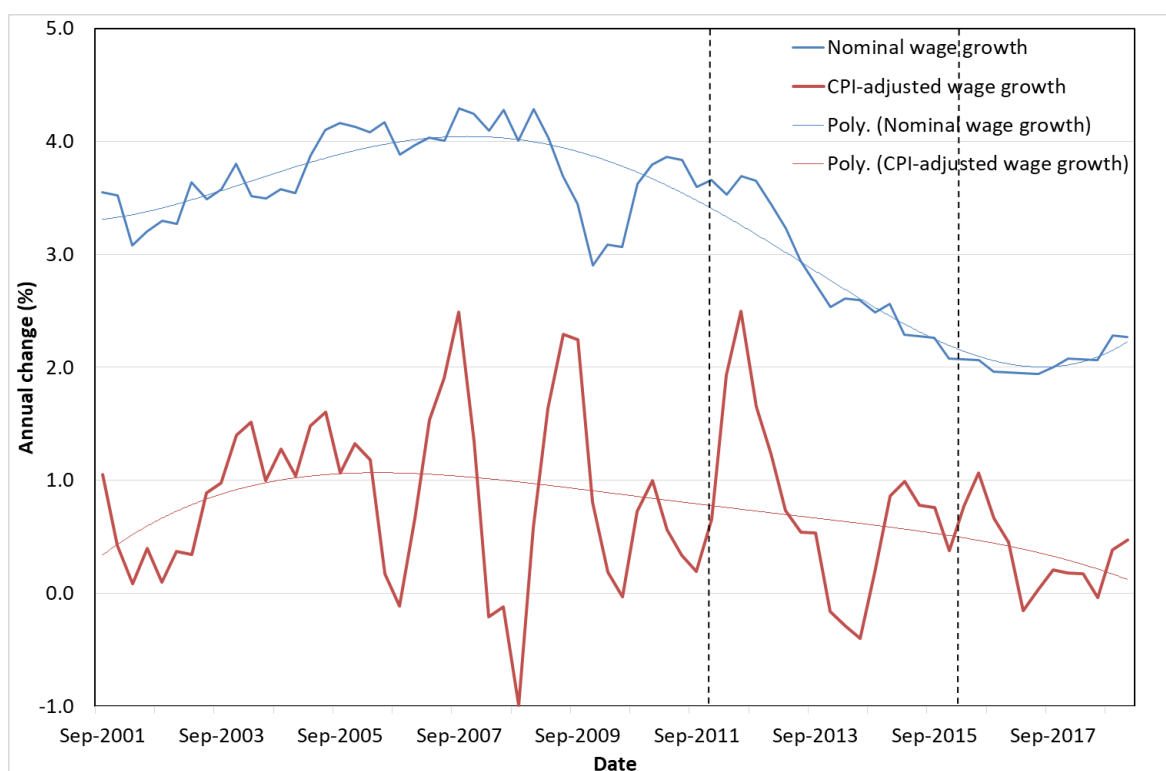
Notes: The nominal wage series index is total hourly rates of pay excluding bonuses for all industries (ABS series A2603609J); and the CPI series is the all groups CPI (ABS series A2325847F); and annual changes are calculated as 4-quarter differences. Each of the fitted trend lines are quartic polynomials. The vertical dashed lines represent the period of wage growth decline assumed in the paper under discussion.

2. The paper's contributions

The paper provides a very good application as a research demonstration of the value of administrative LEED data in Australia using the prototype. However, it would be good to provide more documentation and summary statistics of the data, particularly as this is one of the first research papers using the prototype data.

The primary research focus on estimating the relationship between firm productivity and workers' wages is both topical, given growing concern about labour market imperfections and possible monopsony power of firms, and provides an Australian contribution to the international literature. The authors' estimates of the productivity or rent-sharing pass through to their workers' wages is on the order of 10%, which is roughly in the mid-range of recent international estimates surveyed in Card et al. (2018). It would be interesting to know consistent this pass through is across the economy – e.g., does it vary systematically across sectors according to the expected degree of competition, etc.

Table 1: Average annual wage growth in Australia, 2001–2018

	Annual wage growth		
	Nominal wages	Real wages (CPI-adjusted)	Real wages (PPI-adjusted)
2001-2007	3.75	0.98	0.73
2008-2012	3.69	0.79	0.82
2013-2018	2.40	0.46	0.59

Notes: PPI-adjusted series used is the Intermediates (Total: ABS series A2314876L).

My main critical comments on the paper's analysis concern the finding of the change in rent-sharing after 2012, and the authors' preferred specifications for the firm-productivity (or rent-sharing) wage regressions. These regressions use LEED worker-firm annual wage observations. The authors' preferred specification is to model workers' annual wage <u>growth</u>, although they acknowledge that the more standard approach in the literature is to model log(wage) <u>levels</u>.[1] The distinction is potentially important when considering whether or not include worker level (especially) fixed effects. In particular, if unobserved differences in workers' wages are primarily associated with heterogeneity in levels, as is commonly assumed, then a levels specification with worker fixed effects will be appropriate. Furthermore, such fixed effects would "difference-out" in changes, and a growth specification would not need worker fixed effects. In contrast, a wage growth specification including worker fixed effects implies that wage levels include important worker-specific linear trends. In principle, whether the main source of worker heterogeneity is in levels or growth is an empirical question, although my priors align with the standard approach in the literature of modelling levels.[2]

In light of this, and in contrast to the authors' preferred wage growth specifications, my *preferred* specifications are either log(wage) (levels) regressions that include worker and firm fixed effects to control for unobserved heterogeneity, or thwage growth regressions that exclude worker fixed effects.[3] A selection of estimates from the paper for alternative log(wage) level and wage growth specifications is presented in Table 2. These results provide no evidence that there was a change in firms' productivity-sharing pass through to workers' wages after 2012. (Incidentally, I suspect the relative difference in the estimated productivity coefficients in the levels versus growth regressions may reflect the dynamic properties of the measurement error in the data.)

Consequently, I find the third focus of the paper to explain such a decline in the firm productivity with workers somewhat moot. Nonetheless, there's value in considering the alternative hypotheses in a broader context of labour market pressures. First, I find it plausible that the slowdown in the mining sector following the end of the boom contributed to low wage growth pressures, although no specific evidence was presented for this hypothesis. But, given this hypothesis and discussion in the paper, the mining sector is one area where it could be profitable to investigate the firm productivity-sharing estimates further, and whether there was any slowdown following the end of the mining boom. Second, I find the authors' critique of uneven technology diffusion as an explanation for the slowdown in wage growth convincing.

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[1] They appeal partly to Card et al. (2018) who also estimate wage growth regressions. However, Card et al. (2018) do not include worker or firm fixed effects in either levels or growth regressions, and prefer the growth specification because it will difference out fixed worker-specific heterogeneity.

[2] The results also provide some statistical support for this view. Although the R-squared of both the log(wage) level and growth regressions increase noticeably when worker fixed effects are included, I suspect the contribution to the wage growth regression is largely illusory due to the large number of worker fixed effects. For example, if the number of worker fixed effects is 11 million (the reported number of distinct worker), the degrees of freedom adjusted R-squared of the wage growth regression with worker fixed effects is -0.19! Even assuming there are only 5 million worker fixed effects, the adjusted R-squared will be 0.12, substantially lower than the reported R-squared of 0.28. In contrast, compared to the reported R-squared of 0.78 for the levels regression, assuming between 5 and 11 million worker fixed effects, the adjusted R-squared will lie between 0.65 and 0.73.

[3] Although firm fixed effects in wage levels would also difference out of (firm-worker) job level wage growth, because the paper analyses workers' annual wage growth between their main-jobs in each year, this will include some firm changes. As a result, there may be firm-specific effects in wage growth, although I suspect this is probably of second order importance.

Table 2: Firm-productivity sharing estimates on workers' wages

Estimated coefficients	Log(wage) regressions		Wage growth regressions	
	(1)	(2)	(3)	(4)
Productivity	0.072***	0.072***	0.122***	0.120***
	(0.002)	(0.002)	(0.003)	(0.003)
*Post-2012	0.002	0.003	-0.002	-0.004
	(0.003)	(0.003)	(0.003)	(0.003)
Controls:	Observables	Observables	Observables	Observables
	Firm FEs	Firm*		Firm FEs
	Worker FEs	Worker FEs		

Notes: All regressions include common controls. Results reported in columns (1) and (2) are from the appendix Table B1, columns 4 and 5; results in columns (3) and (4) are from Table 1, columns 2 and 3. *** p-value < 0.001.

Third, I agree with the authors that a change in labour market fluidity has potentially contributed significantly to a drop in wage pressures, either because job mobility may be a substantial driver of wage growth, or indirectly because of a fall in workers' sense of job security (e.g. Faberman and Justiniano 2015; Karahan et al. 2017; Moscarini and Postel-Vinay 2016b). Partly, the relatively sudden drop in job-switching rate following the GFC is compelling, and has been a common international phenomena – e.g. Moscarini and Postel-Vinay (2016a) document similar patterns in the US, and Karagedikli (2018) and Maré (2018) in New Zealand after the GFC, that have recovered only slowly.

Karahan et al. (2017) estimate a strong link between job-to-job flows and wage growth in the US, and conclude that a 1 percentage point higher job-to-job flow rate implies 2.4–5.0 higher quarterly earnings. Similarly, Karagedikli (2018) documents a strong drop in the ratio of job-to-job flows to new employees after the GFC, and also shows that job-changers experience higher wage than non-changers in the lower half of the wage distribution. Karagedikli argues that as new employees likely have less bargaining power than job-changers, this provides one explanation for the slower than expected recent wage growth in New Zealand.

The declining labour market fluidity is also potentially related to labour hoarding during slowdowns (e.g. Bishop, Gustafsson, and Plumb 2016). That is, such labour hoarding will cause declining productivity and, in the presence of downward nominal wage rigidities, deferred wage declines during the slowdown and, consequently, any subsequent productivity growth effects on wages will be delayed.

Declining labour market fluidity also helps motivate the paper's final focus on the relationship between firm productivity and employment reallocation. Estimating regressions of firm-level employment growth on productivity, the authors' find a 15% drop in the difference in employment growth between relatively high- and low-productivity firms (defined as having +/- 1 standard deviation from the industry-specific mean) after 2012. It would be interesting to explore this further and directly assess the link to firm-level job-turnover.

3. Concluding discussion

Although I am sceptical of the significance of labour market contributions to the recent decline in nominal wage growth in Australia, I think there are puzzles and contributions to real wage growth to worth exploring. In particular, the slow and muted recovery in job-to-job flows since the substantial post-GFC drop is a puzzle that deserves attention, both in Australia and internationally. In addition, the recent literature's demonstrated importance of

contributions to wage growth from this source, compared to other standard indicators of labour market utilisation such as unemployment, appears to be an important area for further research and policy consideration.

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