A (Closer to) Real Time Labour Quality Index

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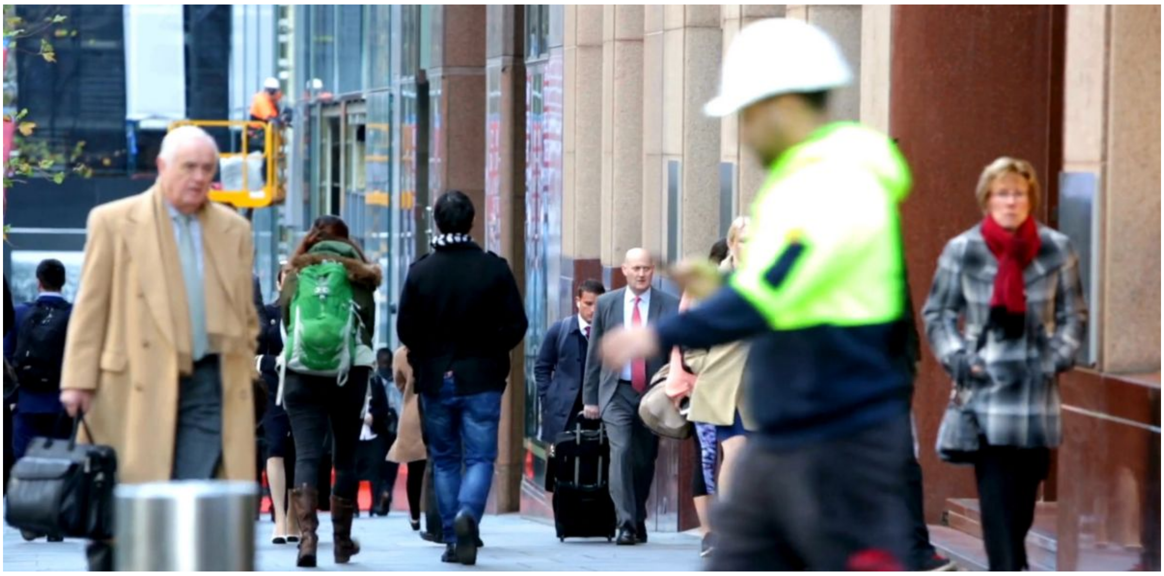

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Abstract

One explanation that has been put forward for weakness in productivity growth over the past few years is the entry of less experienced or less educated workers to the strong labour market. However, existing labour 'quality' statistics that capture such dynamics use delayed information and so can be hard to interpret in real time. To address this problem, we used microdata sources to construct a timely version of the existing labour quality statistics. In doing so, we found evidence that labour quality has actually increased strongly since the COVID-19 pandemic and supported growth in market sector productivity over recent years. While initial work suggests that standard approaches may miss some relevant dimensions of human capital, such as time outside employment, these do not appear substantive enough to overturn the main findings.

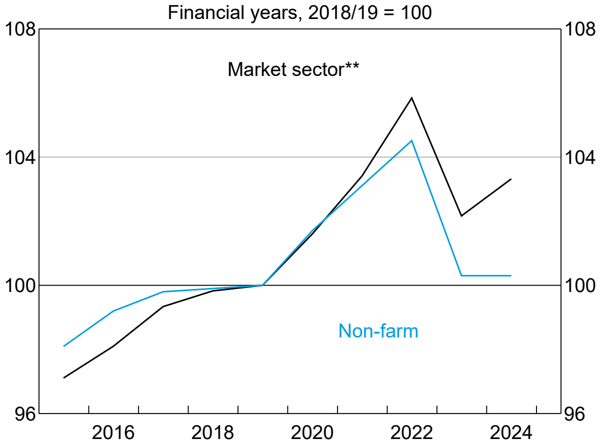
Introduction

Productivity growth is the key driver of rising living standards over time. Looking through recent volatility, productivity growth has been slow over recent years – focusing on the entire economy, it was broadly unchanged over the five years to June 2024 (Graph 1). Even if we remove industries like health care where measuring productivity can be quite hard, growth has been slower than previous decades.

Graph 1

Labour Productivity*

Financial years, 2018/19 = 100



* Using financial year data.

** Market sector excludes health, education and public administration industries.

Sources: ABS; RBA.

One potential explanation that has been put forward for the slow productivity growth over recent years is the entry of younger, less educated or less experienced workers into the very strong labour market (Productivity Commission 2025). These workers may have fewer accumulated skills – or less 'human capital' – making them less productive. If this is the case, we might expect productivity to pick up over coming years if the labour market weakens, or as some of these workers build up new skills.

One way to consider these dynamics is to look at quality-adjusted labour input (QALI) indices. When measuring labour productivity – that is, how much output is produced for every hour of input – all hours tend to get treated the same, no matter what type of worker is completing them. But QALI indices try to account for changes in the types of workers doing these hours, in terms of how much 'human capital' they have. So, if output increases, but this reflects more hours being worked by highly educated workers, on face value it looks like productivity has gone up. But we might equally argue the amount of labour inputs in terms of the amount of human capital and skills actually going into production has risen, and so maybe productivity did not actually rise. QALI indices capture this, so would rise as the amount of human capital increases. By measuring labour inputs using a QALI index rather than total hours, we can get a sense of the role that changing labour 'quality' had in supporting productivity.

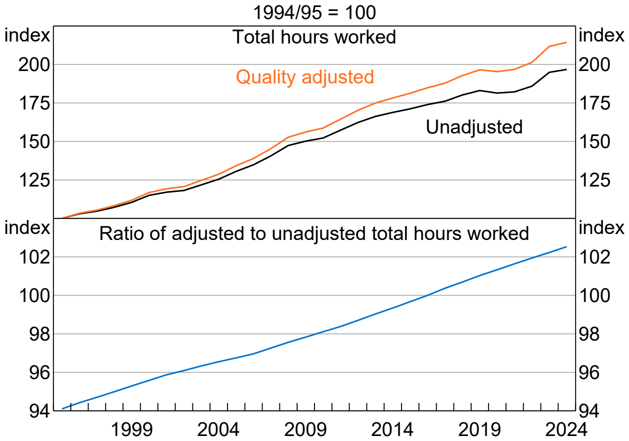
The Australian Bureau of Statistics (ABS) constructs and reports on such measures. However, the ABS index relies on lagged data from five-yearly Censuses, which could lead to misleading results during exceptional periods, such as the past five years. To address this issue, we developed a higher frequency measure of labour quality using the microdata underlying the Longitudinal Labour Force Survey (LLFS) to assess how changes in labour quality have affected productivity.

Current approaches to adjusting for labour quality in productivity measurements

QALI indices attempt to account for compositional changes in the number of hours worked by different types of workers with different levels of human capital. In constructing their measure, the ABS (2005) focuses on two determinants of worker human capital and productivity: their age (a proxy for experience); and their education. They measure the share of hours worked by each age and education cohort using the Census, and take the average wage earned by each cohort as a measure of their human capital.[1] The share of hours and average wages are then combined using a Tornqvist index, which is a particular way of combining changes in several different groups into a single number. As this approach relies on the five-yearly Census, the ABS must interpolate the number of hours and pay between Censuses and extrapolate out from the 2021 Census based on what happened over the previous five years.[2] The ABS only constructs a QALI index for the market sector (ABS 2022).

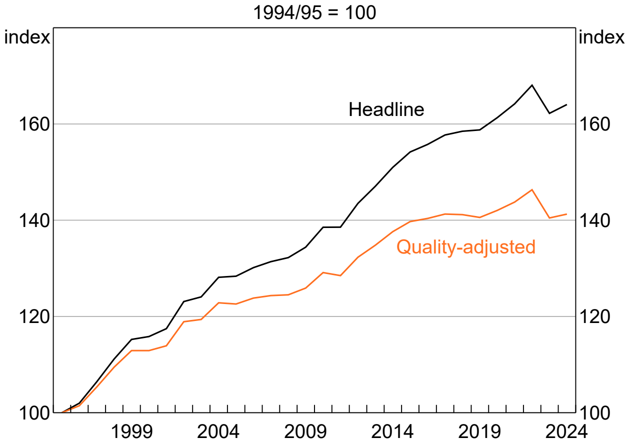
Over time, the ABS QALI index has grown more quickly than an unadjusted labour input index (i.e. total hours worked) (Graph 2). In part, this reflects growth in the share of hours worked by workers with higher education. This means that standard labour input metrics understate the growth in labour inputs, at least in terms of the total amount of human capital used in production. If we use the ABS's QALI index as our measure of labour inputs when constructing productivity rather than just total hours, productivity growth since the mid-1990s would be around one-third lower (Graph 3). While crude, this suggests that growth in the 'quality' of labour inputs accounted for one-third of the growth in labour productivity in the market sector since the mid-1990s.

Graph 2
Labour Input Indices*



* Market sector.
Sources: ABS; RBA.

Graph 3
Labour Productivity*



* Market sector.
Sources: ABS; RBA.

While QALI-adjusted productivity data are not generally what people focus on, they can be used to assess the contribution from changing labour quality or 'labour composition' to headline productivity and economic growth (D'Arcy and Gustafsson 2012; Duretto, Majeed and Hambur 2022). Given the indices are fairly simple, such calculations should be interpreted with some caution. However, they can still provide a useful sense of how human capital could be contributing to productivity growth.

Constructing a timely QALI index using more frequent data

As noted, the ABS uses Census data to construct its QALI index. As the last Census was in 2021, for outcomes in the past three years they extrapolate using growth between 2016 and 2021. While this may be reasonable in normal times, it may be misleading in the context of recent unusual labour market dynamics.

To overcome this issue, we turn to the person-level Longitudinal Labour Force Survey (LLFS) microdata asset. This dataset contains deidentified person-level responses to the ABS Labour Force Survey at a monthly frequency. It contains information on hours worked, education, age and other characteristics. As such, it contains all the information we need to replicate the official ABS index at a higher frequency.

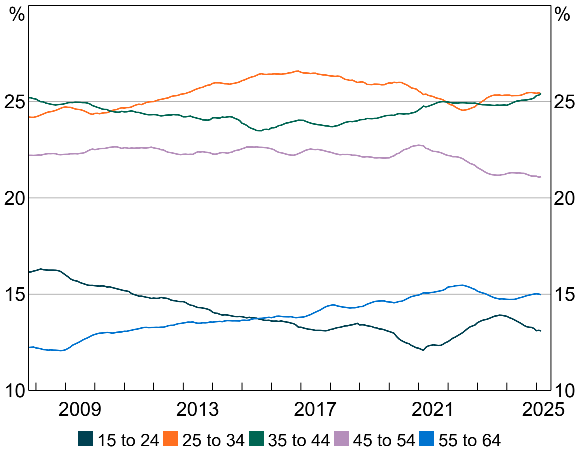
As discussed before, there are two key components in the QALI index: the average wage rate for different groups, which reflect their productivity level; and the share of hours worked by different groups. The former we take directly from the official index. For the latter, we construct measures of the share of hours worked in all jobs in the market sector by different age and education cohorts using the LLFS.

Graphs 4 and 5 show some of the compositional trends coming out of the data. Consistent with Brown and Guttmann (2017), older workers have accounted for a growing share of the labour force over time. Over the pandemic period there were some further shifts, with the share of very young workers (aged 15–24 years old) falling and then rebounding, while the share of older prime-aged workers (45–54) fell sharply.[3]

Graph 4

Hours Worked by Age

12-month moving average

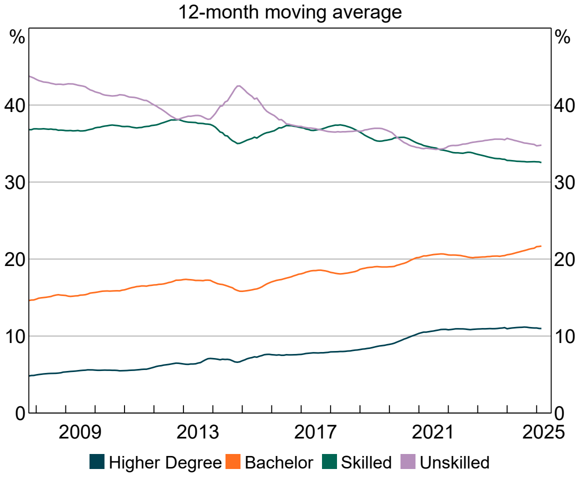


Sources: ABS; RBA.

Graph 5

Hours Worked by Education*

12-month moving average



* Level of highest educational attainment.

Sources: ABS; RBA.

Focusing on education, as noted above, the share of highly educated workers in the labour force has increased over time. Over the pandemic period, there was a further shift up in the share of hours worked by those with Bachelor degrees or higher. This was offset by a fall in the number of skilled workers (those with non-university post-secondary qualifications) and unskilled workers (those with secondary equivalent education or lower qualifications); at least in part, this likely reflected disruption in many contact-intensive industries such as hospitality during the pandemic (Bruno, Dunphy and Georgiakakis 2023). Most of the industry compositional change over 2020/21 had unwound by the 2021/22 financial year. Nevertheless, the labour quality index remained above pre-pandemic levels, in part reflecting an increase in the share of highly educated workers in most industries (see Table A1 in Appendix A). These patterns are interesting, but it is hard to assess how they could affect the overall productivity of the labour force by simply looking at them directly. Incorporating them into a QALI index can provide a framework to assess the net effects.

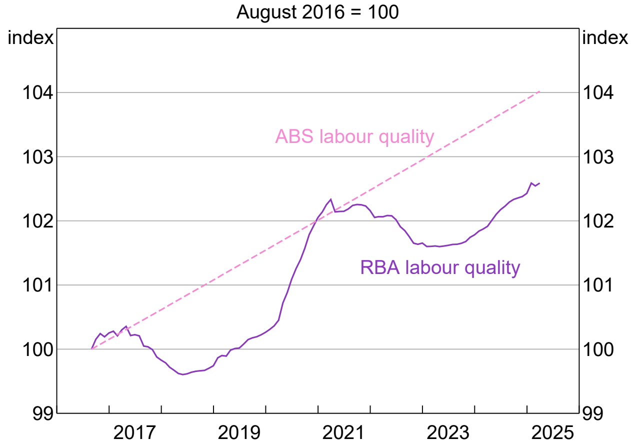
We constructed our QALI index by combining the wage and hours data using the same Tornqvist index methodology as used in the ABS index. We then took a 12-month moving average and index to August 2016 to smooth out seasonal volatility.

Graph 6 compares our higher frequency QALI index to the ABS index. The two are very similar in mid-2016 and mid-2021 – that is, the dates of the Censuses underlying the official index. This provides a good check that our approach is capturing the same underlying information. However, the patterns look very different between and after the Census dates. While the official index interpolates linearly between 2016 and 2021, our index shows that growth in labour quality was slow over the years leading up to the COVID-19 pandemic. It then increased sharply over 2020, catching up to the official index. This likely reflects the level shift up in the share of hours worked by higher educated workers as hospitality and other face-to-face services were closed during lockdowns (Graph 5). After peaking in 2021, our QALI index then declined slightly over 2022 and 2023 as industry compositional changes unwound, before ticking up over 2024 and early 2025. This is in stark contrast with the ABS index, which assumes that labour quality continued to grow quickly.

Graph 6

Labour Quality Indices*

August 2016 = 100



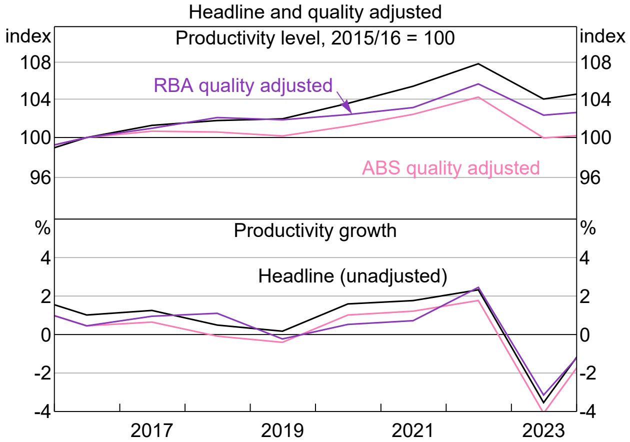
* Market sector.

Sources: ABS; RBA.

Overall, according to our higher frequency QALI index, labour quality increased over the pandemic period – rather than decreased, as some have argued – though the increase was smaller than implied by the ABS index. This has implications for our understanding of recent developments in productivity growth. Using our QALI index as the measure of labour inputs leads to a smoother pattern in productivity, with the spike and then fall in productivity during the pandemic becoming smaller. Moreover, average growth in market sector productivity is slower than implied by the ABS headline index, at around 0.3 per cent per year from 2018/19 to 2023/24, compared with around ¾ per cent per year in the official ABS statistics (Graph 7). This suggests that, according to this measure, growth in labour quality accounted for around two-thirds of the growth in labour productivity over the period, and that actual productivity growth was substantially worse than suggested by the headline index.

Graph 7

Labour Productivity*



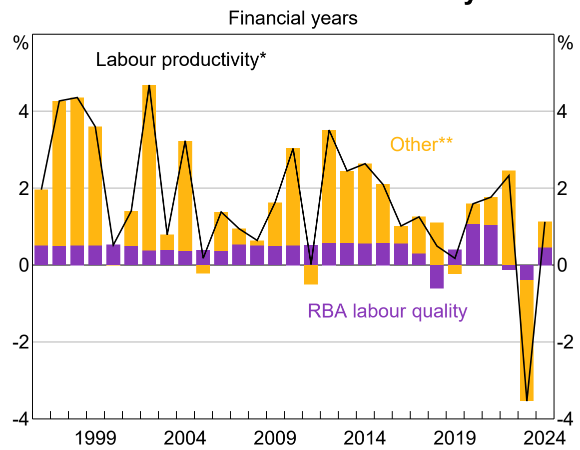
* Market sector.

Sources: ABS; RBA.

That said, changes in labour quality can potentially account for some of the weakness in productivity in 2022/23, as the labour market rebounded strongly from the pandemic period. The tick down in labour quality may have subtracted around 0.4 percentage points from productivity growth, but this is only a small share of the 3.5 per cent fall during this period (Graph 8). This means that factors other than fluctuations in labour quality contributed to the fall in productivity growth over the 2022/23 financial year.

Graph 8

Contributions to Labour Productivity Growth



* Headline ABS measure of labour productivity growth.

** Non-labour quality related factors, including but not limited to capital deepening, allocative efficiency and technology adoption.

Sources: ABS; RBA.

So far, we have discussed how changes in the composition of the labour force (labour quality) affected actual observed productivity. However, is this the right way to look at things? For example, while labour quality has continued to grow over the past five years, maybe this growth was slower than normal? This would be consistent with our index being below the ABS index since 2021 (where the ABS index extrapolates the 2016–2021 period forwards).

Our index can also be useful in assessing this question. In particular, it shows that there was almost zero growth in labour quality from 2016 to 2019, before the sharp increase in 2021. If we were to take the 2016–2019 period to be 'normal', it would suggest that labour quality growth has actually been quite strong in recent years. This is obviously very simplistic, and the only way of assessing what 'normal' is going forward will be to continue to monitor the index.

Caveats and extensions

There are two key caveats to keep in mind with this analysis. The first is that the QALI index is a measure of the human capital of workers. It does not consider how well matched workers are to a job. So, for example, if we have a big increase in the number of people trained as doctors, but they are doing something completely unrelated to their training, the QALI index will increase, but the amount of skills and training going into production might not be, due to a mismatch between the skills of the workers and the jobs they are doing. While it is possible that this could have happened in recent years, there is no evidence that it has. In fact, evidence suggests that the quality of job matching outcomes did not deteriorate in 2022 as productivity declined, though it did fall in 2020 (Wiley and Wang 2024).

The second caveat is that there may be many important factors that determine a person's human capital and productivity that are not captured in QALI indices. For example, while age may be a good proxy of experience for most people, some people may have spent extended periods out of the labour force (e.g. due to caring responsibilities or unemployment spells). So, our index could be missing drivers of human capital. This is an area of ongoing work, but evidence to date suggests that it is likely not a major issue. Bruno, Hambur and Wang (2024) explore several additional factors that may affect human capital accumulation, such as spells outside of employment. While they found that these affect wages, our measure of productivity and human capital, they also found that there had not been a large increase in the share of hours worked by those with these characteristics. As such, while the exclusion of some of these characteristics from our main index may lead to some bias, this does not appear to be great enough to change the overall conclusions.

Conclusions

Understanding productivity outcomes – and in particular the weakness in productivity growth – over recent years is important, as it can give us some insights into what might happen to productivity going forward. Overall, we found little to no evidence that the entry of workers with less skills and human capital can explain weak productivity growth over recent years. In fact, human capital grew over the period, contributing to productivity growth, and this growth was if anything faster than what was observed over the years leading up to the COVID-19 pandemic. This suggests that productivity is unlikely to pick up as recent dynamics unwind – for example, through some of these workers gaining new skills or leaving the labour market. More generally, it suggests that other factors – including those evident before the pandemic – are contributing to the recent weak productivity outcomes.

Appendix A: Industry composition from 2019 to 2024

Table A1: Change in Employment Share of Bachelor (or Higher Degree) Holders, by Industry
Percentage points

Industry	2019–2024	2019–2022	2021–2024
Agriculture	–0.20	–1.86	1.67
Mining	–0.74	–0.14	–0.60
Manufacturing	2.71	0.09	2.62
Utilities	7.60	–3.44	11.04
Construction	2.67	0.25	2.42
Wholesale	6.58	2.10	4.47
Retail	–0.66	–0.08	–0.58
Hospitality	1.24	2.03	–0.79
Transport	4.28	2.72	1.56
Info media	1.68	–3.21	4.90
Finance	3.22	0.35	2.87
Rental	–2.02	4.88	–6.91
Professional	3.42	0.37	3.05
Admin and support	1.49	0.66	0.83
Arts and recreation	–4.31	–0.74	–3.57
Other services	2.70	1.44	1.26

Sources: ABS; RBA.

Endnotes

* Angelina Bruno is from Economic Analysis Department, Jonathan Hambur is from Economic Research Department and Lydia Wang completed this work while in Economic Analysis Department.

1 This is a fairly standard assumption, that wages reflect productivity. But it might be imperfect in some cases – for example, in the non-market sector where productivity is harder to measure. That said, we exclude the non-market sector.

2 For more details, see Annex B, Chapter 19 of ABS (2021).

3 The uptick in the share of very young workers may in part reflect the brief 'baby boom' that occurred in the mid-2000s to mid-2010s, with many of these children now entering the labour market (Australian Treasury 2023).

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