

UPWARD TRENDS IN THE PROFIT SHARE

Although low wage growth is puzzling, recent sharp rises in business profits are not. Since the early 1990s, most of the variation in business profits can be explained by shifts in the economic cycle and the terms of trade. Over a longer period, however, profits have trended higher as a share of national income, particularly in the goods sector. Panel regressions using industry data point to technological progress as a key driver, but other factors, such as changes in wage bargaining power, may have been important too.

Introduction

Business profits have increased by 25 per cent over the past two quarters. In the history of the quarterly national accounts, profits have never grown as fast. The flipside to rapid growth in profits is slow growth in wages. Indeed, perhaps the most remarkable fact to have emerged from the recent national accounts is that the share of wages in national income has fallen to around the lowest levels in 50 years (Graph 1).

Why wages are growing so slowly remains a mystery. By contrast, unusually rapid growth in private non-financial business profits is easily explained by changes in the terms of trade and the business cycle. Table 1 and Graph 2 show the results of an OLS regression of the profit share against trend GDP growth, the terms of trade and the terms of trade interacted with a time trend, which captures the growing influence of the mining sector over time.¹ The regression explains about three-quarters of the variation in profits since the mid 1980s. From that baseline, adding a linear time trend should pick up any structural changes not accounted for; however, the trend is insignificant. As far as profits are concerned, there appears to be little mystery.

This is a convenient conclusion, but not a wholly sound one. The time period is short and the measure of profits fairly narrow. Globally, profit shares have been trending upwards since around the mid 1980s. As not every country has had a boom and bust in its terms of trade, presumably something else is going on that is common to most of them. There is growing debate overseas about what that could be, but relatively little work has been done on Australia. Using Ellis and Smith (2010) as a guide, I fill some of that void by considering two obvious questions: has the profit share trended higher in Australia, and if so, why?

Table 1: Profit Share Regressions^(a)

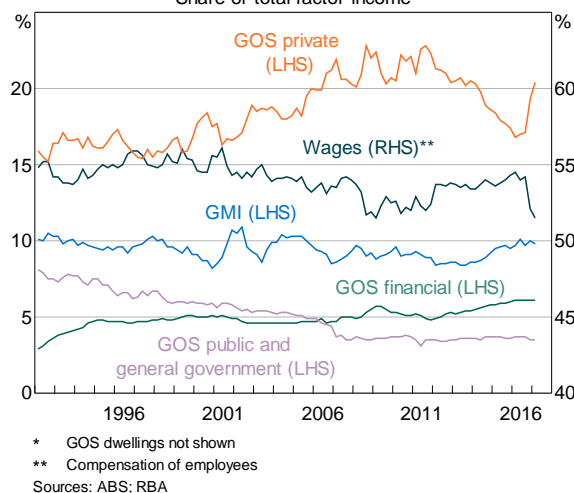
Percentage points

| Variable | Baseline | Time trend |
|-----------------------------|-----------------|-----------------|
| Constant | 9.14 (0.00) | 5.33 (0.09) |
| Trend GDP growth | 0.40 (0.05) | 0.41 (0.04) |
| Terms of trade | 0.14 (0.00) | 0.19 (0.00) |
| Terms of trade × time trend | -0.00 (0.00) | -0.00 (0.05) |
| Time trend | -- | 0.02 (0.21) |
| R ² | 0.78 | 0.78 |

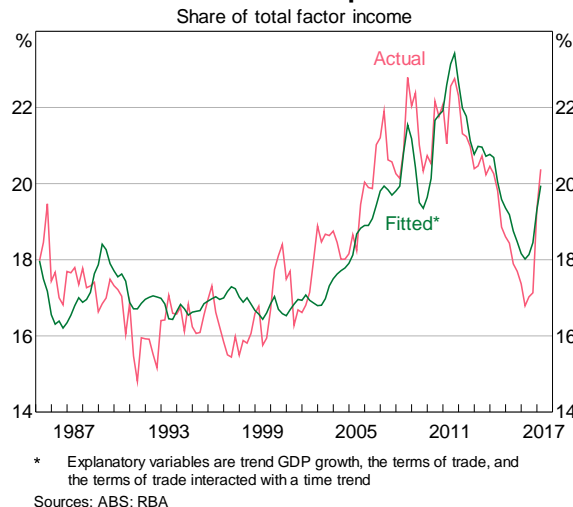
(a) Numbers in parentheses are *p*-values

Sources: ABS; RBA

Graph 1
Wages and Profits*
Share of total factor income



Graph 2
Private Non-financial Corporations Profits
Share of total factor income



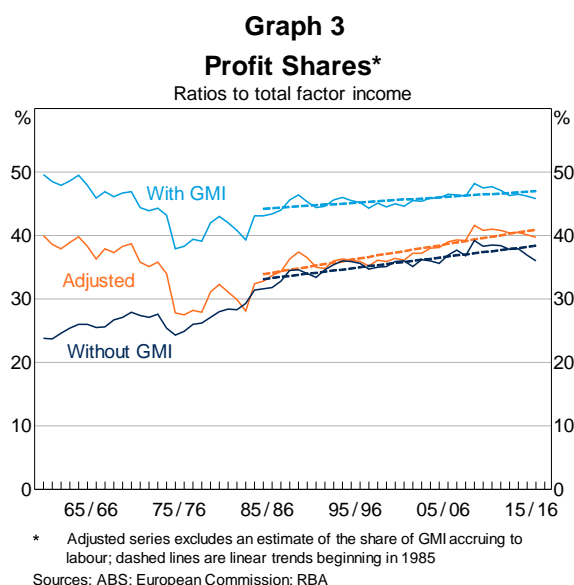
1 Ideally, one would use a direct measure of the mining sector, but our preferred measures typically have short histories. The results are similar when using other indicators, however, such as the share of exports in GDP.

Measuring profits

To begin with, it is necessary to define what we mean by the profit share (also known as the capital share). As total factor income is the sum of profits and labour income – or gross operating surplus (GOS) and compensation of employees (COE) in national accounts jargon – the profit share is simply GOS over total factor income. The labour share is then one minus the profit share.

The problem with this definition is it fudges the treatment of gross mixed income (GMI). GMI is defined separately in the national accounts as the income of the self-employed. As such, it includes a mixture of COE and GOS. To obtain genuine measures of the labour and profit shares, we must therefore split up GMI and re-apportion it to COE and GOS. Where this becomes difficult is that such a split is not provided in the national accounts and must instead be estimated.

Box A discusses the treatment of GMI in more detail. Regardless of how it is treated, there does appear to have been an upward trend in Australia's profit share since the mid 1980s, although the size of the trend varies from one measure to another (Graph 3). We prefer the adjusted measure, which adds an estimate of self-employed wages to the labour share and self-employed profits to the profit share. As discussed in Box A, the upward trend in this measure has a steeper slope, reflecting stronger growth in self-employed profits relative to self-employed wages.



Can we explain higher profits?

Repeating the earlier regressions using the adjusted profit share and a longer time series confirms what we see in Graph 3: having accounted for the business cycle, there remains a positive and significant upward trend in the profit share.² Our task is to explain why.

In answering that question, the temptation is to plug into our regression a few variables that might conceivably affect the profit share and also trend higher over time. If doing so makes the time trend insignificant, then we would seemingly have our answer.

The problem with that approach is that just about any trending variable will do. Odds are you will pick up a spurious correlation rather than identifying a *bona fide* determinant of the profit share. My solution is to examine profit shares at the industry level. The industry profit shares show more variation than the aggregate data, which helps to avoid spurious correlations, while also linking the ratios more closely to their theoretical determinants.

As to the theory, Karabarbounis and Neiman (2014a) provide a simple model of the profit share. In their model, long-term trends in the capital share are explained by three key variables:

- the rental rate of capital, reflecting the relative price of investment goods, interest rates and so on;
- mark-ups of price over marginal cost; and
- capital-augmenting technological change.³

2 Specifically, I repeat the earlier regressions using GDP growth and the terms of trade (with and without a time trend) as explanatory variables. Adding a linear time trend makes the interacted time trend insignificant. I therefore drop the latter term and keep the linear time trend, which is shown to be positive and significant.

3 Whether or not a fall in the relative price of investment goods leads to an increase in the profit share depends on the elasticity of substitution between capital and labour. Most estimates in the literature are below one, but Karabarbounis and Neiman estimate an elasticity of 1.25. Declines in relative investment prices therefore lead to an increase in the profit share.

Box A: Adjusting the profit share

I follow Ellis and Smith (2010) in adjusting the profit share to include self-employed profits but exclude self-employed wages. That is, the profit share is defined as:

$$\text{Profit share} \equiv \frac{\text{Gross operating surplus} + \text{profits}_{UE} - \text{wages}_{UE}}{\text{GDP} - \text{net indirect taxes}} = 1 - \text{wage share}$$

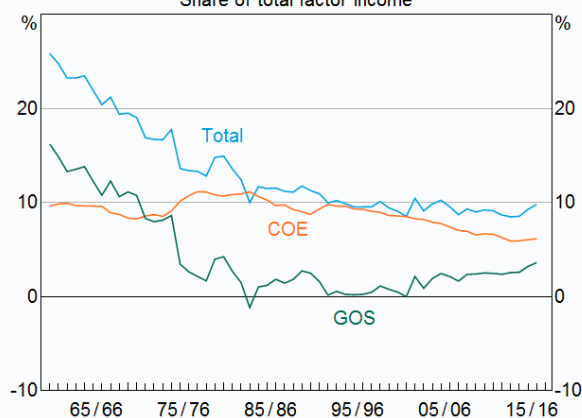
where *UE* stands for unincorporated enterprises (ie the self-employed), *wages_{UE}* is estimated as averages wages times the number of self-employed, and *profits_{UE}* is GMI less *wages_{UE}* (see the [Appendix](#) for more detail).

Shifts in the *level* of profits notwithstanding, such an adjustment wouldn't be necessary if GMI were a constant share of factor incomes and if the profit and wages components grew at similar rates over time. In practice, however, the long-running trend towards incorporation has reduced the relative size of GMI quite substantially, and trends in self-employed profits and wages have likewise been quite different (Graph 4). One reason is the farm sector, which has shrunk from a large share of the economy in the 1960s to a much smaller share today (Graph 5). Another has to do with the share of workers who are self-employed, which has also fallen over time ([Appendix](#)).

Two other issues are worth noting. The first is whether to measure profits gross or net of depreciation. Karabarbounis and Neiman (2014b) discuss the issue in some detail. In Australia, depreciation has remained a fairly stable share of GDP over time, so the trends in profits aren't much different either way (Graph 6). Perhaps the biggest change is to the dip in profits after the mining boom, reflecting greater wear and tear on the much larger stock of mining capital.

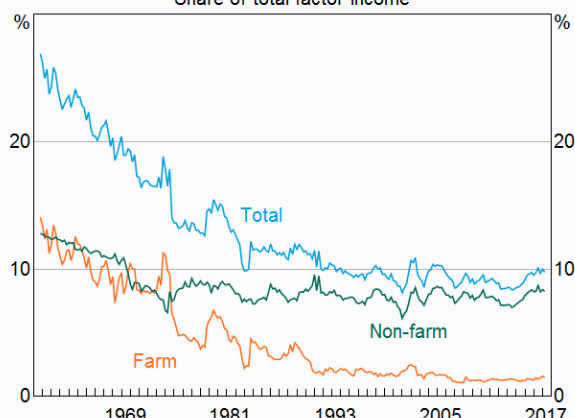
The second issue concerns the role of housing capital. Following Piketty (2014), research has found that rises in the profit share over long periods have been mainly due to a larger share of income accruing to the housing sector (that is, rents accruing to landlords and owner-occupiers). A fuller explanation can be found in the effervescently written La Cava (2016) looking specifically at the US case. For Australia, however, the matter appears to be less important: the housing profit share has trended higher over time, but has been reasonably flat since the mid 1980s (Graph 7).

Graph 4
Gross Mixed Income*
Share of total factor income



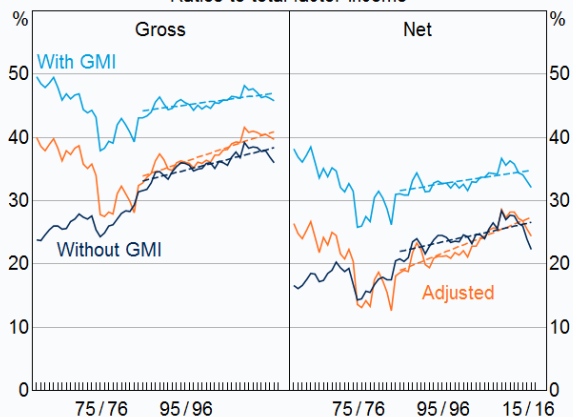
* Split between COE and GOS estimated by the RBA
Sources: ABS; European Commission; RBA

Graph 5
Gross Mixed Income
Share of total factor income



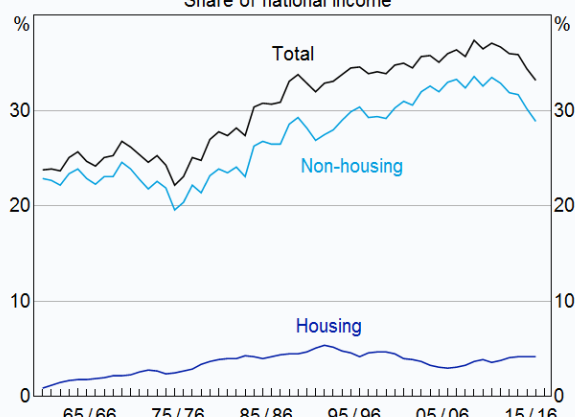
Source: ABS

Graph 6
Profit Shares*
Ratios to total factor income



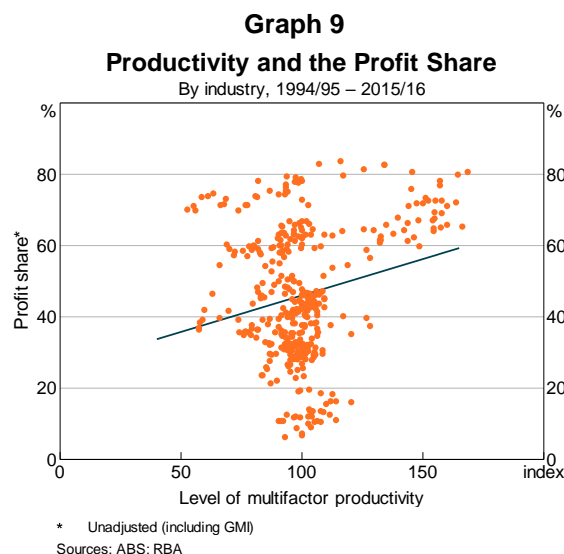
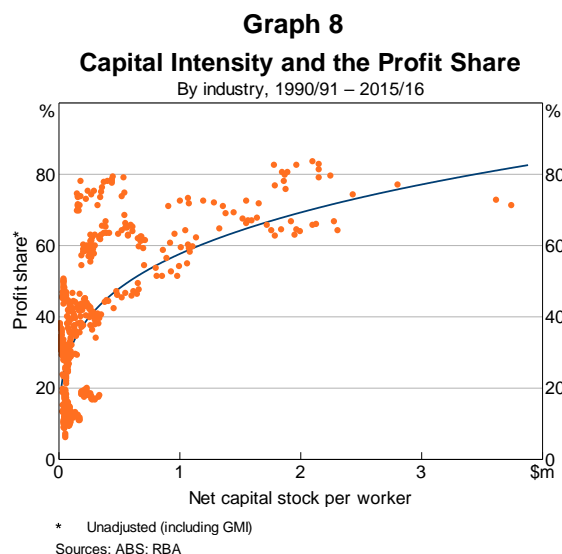
* Adjusted series excludes an estimate of the share of GMI accruing to labour; dashed lines are linear trends beginning in 1985
Sources: ABS; European Commission; RBA

Graph 7
Net Capital Income
Share of national income*

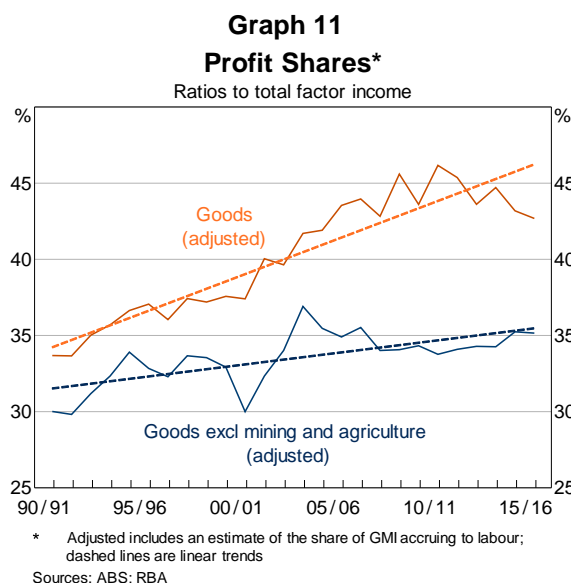
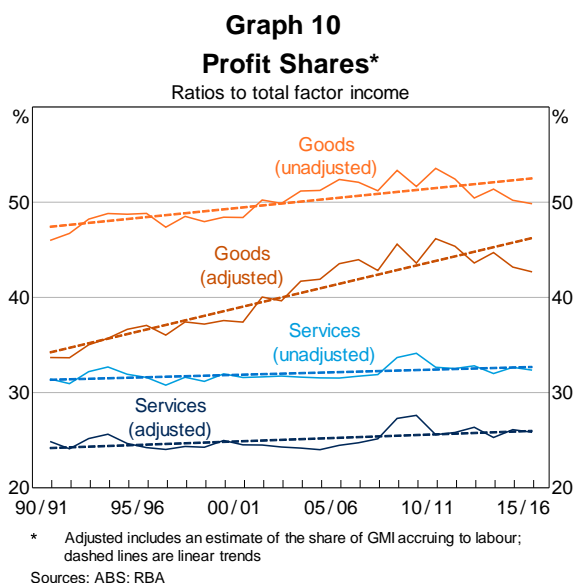


* Nominal GDP less depreciation
Sources: ABS; RBA

Before running any regressions, it is worth checking whether the basic predictions of the Karabarbounis and Neiman model are supported in the Australian data. Generally speaking, they are. For instance, industries using large sums of capital per worker tend to have much higher profit shares (Graph 8). Industries experiencing capital-augmenting technological change (as proxied by long-run changes in their multifactor productivity) have also shown the largest increase in profit shares over the past two decades (Graph 9).⁴



As goods industries tend to be relatively capital intensive (and have higher productivity growth), we might expect these industries to show a larger upward trend in profits. Again, that is what we see. Profit shares have trended higher in the goods sector while being generally little changed in the services sector (Graph 10). Moreover, the increase in the goods sector is dominated by mining and agriculture. Excluding those industries reveals a more modest increase in the goods sector's profit share over time (Graph 11).



Industry panel regressions

As a more formal test, I estimate a number of panel regressions using the industry data. I alternate between two specifications: one using industry fixed effects and period fixed effects (a non-linear time trend) and another using industry fixed effects and a linear time trend.⁵ Table 2 summarises the results.

4 Total factor income by industry is available from 1990 as the sum of COE and GOSMI (combining GOS and GMI). For some industries, adjusting GOSMI to remove $wages_{UE}$ results in labour shares above 100 per cent, highlighting the approximate nature of the adjustment. State-based estimates are also available, but mainly vary due to different industry composition.

5 Industry fixed effects add dummies for each industry, effectively giving each industry its own constant. This allows the explanatory variables to explain changes in profit shares without having to explain the levels (which vary due to factors specific to each industry). The period fixed effects add a dummy for each year. These dummies act like a non-linear time trend, soaking up year-to-year variation common to all industries. As before, the point is that if the period fixed effects are still significant when including other explanatory variables, then there must be an omitted factor driving structural shifts in the profit share.

The starting point is again a baseline regression using GDP growth and a linear time trend as explanatory variables (the first column of Table 2). Both are positive and significant. The next two columns add variables for multifactor productivity growth – using ABS estimates of industry multifactor productivity indexes – and capital-to-labour ratios.⁶ The second column includes period fixed effects whereas the third uses a linear time trend. Both the productivity growth and capital-to-labour ratio variables are positive and significant. However, the linear time trend is also significant, as are the period fixed effects, which increase over time.

As a final test, I include variables for relative investment prices – specifically the ratio of computer software prices to output prices – and the depreciation rate. Both variables could conceivably proxy for capital-augmenting technological change and hence explain some of the increase in the profit share. Of the two, relative investment prices work best, being both significant and having the expected negative sign (columns four and five). The time trends also turn negative and insignificant. This is perhaps not surprising, as relative investment prices have fallen across industries and hence resemble a negative time trend. However, it does highlight a shortcoming of the industry data: because there are relatively few industries, there is limited cross-sectional variation for the regressions to work with, meaning the industry regressions are not so different to regressions at the aggregate level. Moreover, in some cases re-running the regressions using unadjusted profit shares or different combinations of variables changes the significance of the time trends.

Table 2: Profit Share Panel Regressions^{(a)(b)}

Percentage points

| Variable | Baseline | Period effects (a) | Linear trend (a) | Period effects (b) | Linear trend (b) |
|--|----------------|--------------------|------------------|--------------------|------------------|
| GDP growth | 0.13 (0.00) | 0.20 (0.00) | 0.19 (0.00) | 0.14 (0.01) | 0.13 (0.01) |
| MFP indexes | -- | 0.19 (0.00) | 0.18 (0.00) | 0.26 (0.00) | 0.20 (0.00) |
| Capital-labour ratio | -- | 4.74 (0.00) | 3.94 (0.00) | 4.16 (0.01) | 2.78 (0.07) |
| Relative investment prices | -- | -- | -- | -0.04 (0.00) | -0.02 (0.00) |
| Depreciation rate | -- | -- | -- | -0.49 (0.18) | -0.69 (0.05) |
| Time trend | 0.26 (0.00) | -- | 0.31 (0.00) | -- | -0.07 (0.47) |
| Period: <i>p</i> -value ^(c) | -- | (0.00) | -- | (0.26) | -- |
| Within R ² | 0.13 | 0.49 | 0.47 | 0.53 | 0.50 |
| Cross-sections | 19 | 16 | 16 | 16 | 16 |

(a) Numbers in parentheses are *p*-values; constants not shown; profit shares are adjusted for the share of GMI accruing to labour

(b) The 'period effects' regressions include period fixed effects; the 'linear trend' regressions include a linear time trend

(c) Chi-squared test

Sources: ABS; RBA

Assessment

That the results see-saw like this is somewhat concerning. There are good theoretical grounds to expect some regressions to work better than others, but when small variations in inputs lead to big variations in outputs, it is hard to not be sceptical of the results. Still, a few things seem clear. First, there does appear to have been an upward trend in Australia's profit share since the mid 1980s. Second, profit shares also look to have increased most in industries with high productivity growth, typically in the relatively capital-intensive goods sector. The sticking point is that some of the panel regressions still find a role for an unexplained time trend, suggesting an omitted factor may have contributed to rising profit shares. A likely candidate is changes in mark-ups, reflecting changes in wage bargaining power or market concentration – a topic I conveniently leave to future research.

Elliott James / Economic Analysis Department / 14 July 2017

⁶ Multifactor productivity indexes are not calculable for the three non-market sector industries (public administration & safety, education & training and health care & social assistance), reducing the number of cross-sections from 19 to 16.

References

- Ellis L and K Smith (2010), '[The Global Upward Trend in the Profit Share](#)', Applied Economics Quarterly, 56(3), pp 231–255.
- Karabarbounis L and B Neiman (2014a), '[The Global Decline of the Labor Share](#)', Quarterly Journal of Economics, 129(1), pp 61–103.
- Karabarbounis L and B Neiman (2014b), '[Capital Depreciation and Labor Shares Around the World: Measurement and Implications](#)', Working Paper, University of Chicago.
- La Cava G (2016), '[Housing Prices, Mortgage Interest Rates and the Rising Share of Capital Income in the United States](#)', RBA Discussion Paper No 2016–04.
- Piketty T (2014), Capital in the Twenty-First Century, trans A Goldhammer, The Belknap Press of Harvard University Press, Cambridge.

Appendix

To estimate $wages_{UE}$, I first divide aggregate COE by total employees (that is, total employment less the self-employed) to calculate average wages per head. I then multiply average wages by the number of self-employed to estimate $wages_{UE}$. This assumes the self-employed earn the same wage as the employed, which may not be a good assumption (as evidenced by some adjusted labour shares exceeding 100 per cent). Nonetheless, this seems to be the general approach taken in the literature.

Measures of self-employment published by the ABS only extend back to the early 1990s. To obtain longer-run estimates of self-employment, I follow Ellis and Smith (2010) in backcasting the official ABS data using estimates of self-employment from the European Commission's AMECO database (Graph A1). The AMECO data line up well with the official data, apart from an obvious structural break in the early 1990s.

Graph A2 illustrates why these adjustments are worth the effort. Since the late 1990s, the share of the workforce that is self-employed has declined quite substantially, which is one reason why GMI has declined as a share of total factor income. If factor incomes were all growing at the same rate, then a structural shift away from self-employment could be enough to drive a downward trend in the profit share and an upward trend in the labour share.

