No free lunch: Higher superannuation means lower wages

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Overview

Conventional wisdom in Australia, informed by economic theory, history, and international experience, is that compulsory superannuation ultimately comes at the expense of workers' wages. But there has been little empirical analysis on the relationship between higher super and lower wages. This working paper, using administrative data on 80,000 federal enterprise agreements made between 1991 and 2018, shows that the long-held conventional wisdom is right.

We find that, on average, about 80 per cent of the cost of increases in compulsory super is passed to workers through lower wage rises within the life of an enterprise agreement, typically 2-to-3 years. Our finding is conservative: it ignores the prospect that employers pass on some of the cost of super into higher prices, or by reducing other non-wage benefits to workers. And the proportion of compulsory super that comes from wages is likely to be even higher in the longer-term.

This paper directly measures the super-wages trade-off only for workers on federal enterprise agreements – nearly a third of employees. But other workers are also likely to bear the cost of higher compulsory super in the form of lower wages growth. The Fair Work Commission has made clear that when super goes up, award wages grow more slowly than they otherwise would. State enterprise agreements are unlikely to differ much from federal agreements, while workers covered by individual arrangements are likely to see a similar trade off.

It is unlikely that future super increases will be different from past increases. Wages growth has slowed in recent years, but nominal wages are still growing by more than 2 per cent a year, so employers have scope to slow the pace of wages growth if compulsory super contributions are increased. And none of the plausible reasons for lower wages growth – whether slower growth in productivity, technological change, globalisation, an under-performing economy, or weaker bargaining power among workers – helps explain why employers would foot any more of the bill for higher compulsory super this time around. In fact, if workers' bargaining power has fallen, employers could be expected to be even *less* likely to bear the cost of higher compulsory super than in the past.

Under legislation supported by both sides of federal Parliament, compulsory super contributions are scheduled to increase incrementally from 9.5 per cent of wages now to 12 per cent by July 2025. Grattan Institute's 2018 report, *Money in retirement: more than enough*, showed that the trade-off between more super in retirement and lower living standards while working isn't worth it.

Most Australians can already look forward to a comfortable retirement, and raising compulsory super would force many Australians to save for a higher living standard in retirement than they enjoy when working. The new evidence in this paper reinforces our recommendation that the planned increase in compulsory super to 12 per cent of wages should be abandoned.

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1   What does economic theory say about who pays for super?

Employers in Australia are required to make contributions to their employees' retirement savings accounts. Compulsory superannuation was introduced as part of an explicit trade-off with wages – unions accepted a real wage cut in return for its creation. Given this history, it has long been conventional wisdom in Australia that workers would bear much of the cost of super through lower wages, even though employers are the ones who write the cheque. This reflects conventional wisdom among economists about the economic burden of 'mandated benefits' schemes like super.[1]

For 25 years Australian governments have asserted or assumed that higher compulsory super contributions come at the expense of wages.[2] The Henry Tax Review, the Australian Treasury, and many others have assumed that higher compulsory super would be paid for via lower wage growth.[3] This has been a consistent assumption in Treasury and others' modelling of retirement incomes.[4] Grattan Institute's 2018

report, *Money in retirement*, similarly assumed that higher compulsory super contributions were likely to come at the expense of lower wages.[5] Yet in recent months a number of commentators and analysts have argued that higher compulsory super won't come at the expense of workers' wages.[6]

The question matters, because policy makers should know the costs and benefits of an increase in compulsory super – including what it means for workers' incomes while they're working, and their incomes in retirement – before deciding to increase compulsory contributions.

1.1   A brief history of superannuation in Australia

Australia has had an age pension, paid out of general government revenue and not tied to recipients' pre-retirement earnings, since 1909.[7] But superannuation was far from universal throughout most of the 20th century, covering only a third of employees in the mid-1970s.[8]

Compulsory super contributions were introduced in the 1980s. As part of the 'Accord', the Australian Council of Trade Unions (ACTU) agreed with the then-Labor government that it would accept reductions in real wages; in return, employers were to be required to contribute to super funds on behalf of their employees.[9]

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1. For example, a survey in the late 1990s asked labour economists at major US universities what proportion of the burden of payroll tax they thought was borne by employers; the median response was 20 per cent: Fuchs et al (1998).
2. For example, the government paper announcing the SG in 1992, *Security in Retirement: Planning for Tomorrow Today*, was explicit that the intention was for workers to pay for compulsory super via lower growth in their wages: 'No loss of remuneration is involved... What is involved, rather, is forgoing a faster increase in real take-home pay in return for a higher standard of living in retirement.' Dawkins (1992). The second reading speech for the SG legislation by ALP Senator Nick Sherry made it clear that the cost of super would be offset against wages: Australian Senate (1992). For a summary of past government statements on this issue see: Coates (2019a).
3. Henry et al (2010, pp. 109–110). Past assessments by Treasury officials of the macroeconomic consequences of higher compulsory super have also assumed that super came at the expense of wages. See: Gruen and Soding (2011); Treasury (2019).
4. For example, see: Gallagher (1995), and Gallagher (2012). Rothman (2012, p. 5) states: 'RIMGROUP assumes that as the Superannuation Guarantee increases,

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wages, rather than profits, are adjusted, so that total remuneration in a given year is unchanged.' Rothman (2011) is even more explicit: 'We assume the incidence of the extra super contributions is upon employees (immediately). Thus wages growth is lower than in the counterfactual.'
5. Daley et al (2018, p. 88).
6. Keating (2018); Taylor (2019); and Stanford (2019).
7. *Invalid and Old-Age Pensions Act 1908* (Cth). See: Millane (2019).
8. ABS (2009).
9. ACTU (1986).

This requirement was not legislated, but was rather included in awards, the legally-binding sets of minimum wages and conditions that apply to particular occupations or industries. Employer super contributions were made compulsory in awards as a result of the 1986 National Wage Case.[10] By 1988, 55 per cent of employees were covered by superannuation; this rose to 78 per cent by 1991.[11]

In 1992, the federal government legislated to ensure that almost all employees would be entitled to receive contributions to their super fund made by their employers, and to mandate an increase in compulsory contributions.[12] The legislation is known as the 'Superannuation Guarantee' or SG.[13] By November 1993, 89 per cent of employees were covered by superannuation.[14]

The 1992 legislation set a path for compulsory contributions to rise from 3 per cent or 4 per cent of wages in that year[15] to 9 per cent in 2002-03. The SG was later increased to 9.5 per cent, as shown in Figure 1.1.

The SG is scheduled to rise incrementally from 9.5 per cent, where it is now, to 12 per cent by July 2025.[16] The Coalition Government has twice delayed increases in the Super Guarantee, but further increases remain on the statute books.

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10. Nielson and Harris (2010).
11. ABS (2009).
12. This followed a ruling by the Australian Industrial Relations Commission in 1991 that rejected the ACTU's claim for higher compulsory contributions in awards.
13. *Superannuation Guarantee (Administration) Act 1992* (Cth).Employers are not required to make super contributions for employees who earn less than $450 in a given month. Contributions are required to be made on salary only up to a 'maximum super contribution base', which was $20,000 per quarter in 1992-93 and $55,270 in 2019-20: see ATO (2019a). Different rates apply in Norfolk Island, which was not previously subject to the SG: see ATO (2019b).
14. ABS (2009).
15. The SG rate varied by firm size in the 1990s; see Table 3.1.
16. ATO (2019b).

Figure 1.1: The Superannuation Guarantee: actual, legislated and proposed
Per cent of ordinary time earnings
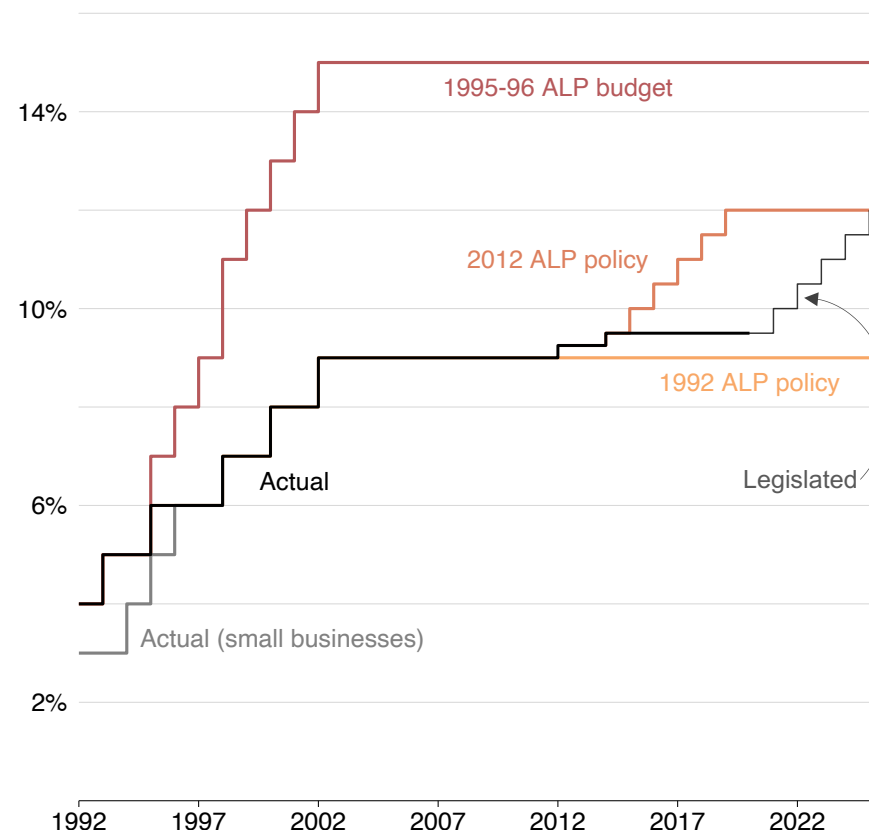
Note: In the 1990s, the Super Guarantee increased at different rates, and at different times, for small and large firms.
Source: Daley et al (2018, Figure 9.1).

1.2   The 'legal' burden of the Superannuation Guarantee

The SG is paid by employers on top of the employee's normal wages.[17] The Australian Taxation Office (ATO) provides an example on its *Super for employers: how much to pay* information page:[18]

> During the first quarter of the 2014-15 financial year (1 July to 30 September 2014) Danni's ordinary time earnings were $8,000$. The super contribution Danni's employer had to pay for Danni for this quarter was: $8,000 \times 9.50\% = \$760$.

This is the 'legislated' burden or 'legal incidence' of the Super Guarantee: the employer is responsible for paying super contributions to the employee's fund.

But just because employers write the cheque to super funds doesn't mean they ultimately bear the cost of compulsory super. Economic theory distinguishes between the *legal* burden of a tax or compulsory contribution – who writes the cheque – and the *economic* burden – who bears the real cost.[19] Sometimes the legal and economic burdens of a tax or compulsory contribution are the same, but often economists think they differ. Generally, the economic burden – who ultimately bears the cost – is not affected by the legal burden.[20]

1.3   The 'economic' burden of the Superannuation Guarantee

An increase in the Super Guarantee raises the cost of employing a worker. This cost can be passed on to:

1. workers through lower nominal wage growth ('back-shifting');

2. consumers through higher prices ('forward-shifting'); or

3. investors through lower profits (and those investors might respond by reducing investment and employment).[21]

Economic theory suggests that super's economic burden depends on how employers and workers respond when super is increased.[22] In particular, the economic burden of compulsory super depends on two factors.

First, the degree to which workers value super contributions compared to receiving the same amount of money as wages.[23] The more workers value super, the more they can be expected to respond to a super increase by supplying more labour at a given wage rate, and the more the cost of super will be passed to them through lower wages.[24]

Second, the economic burden of super also depends on how responsive workers and employers are to changes in wages. If workers' willingness to work doesn't vary much when wages change – if their labour supply is relatively 'inelastic' – then they would be expected

17. Their 'ordinary time earnings': ATO (2019c). Section 3.2.1 provides more detail about super rates and bases.
18. Ibid.
19. 'The statutory burden of a tax does not describe who really bears the tax': Gruber (1997, chapter 19).
20. In some circumstances, economists have found that the legal incidence can affect the economic incidence of a tax, at least in the short run. See: Chetty et al (2009) and Saez et al (2012).

21. The theory is discussed in Atkinson and Stiglitz (1980, p. 132).
22. The economic incidence of 'mandated benefits', such as employer-provided health insurance or superannuation, is discussed in Musgrave (1959), Summers (1989) and Gruber and Krueger (1991). For analysis of Australian superannuation specifically, see Freebairn (1998).
23. Surveys suggest Australians support the compulsory super system and, by extension, value the super contributions made on their behalf. See: Keane (2019) and Industry Super Australia (2019) for recent examples. Past surveys point to strong support for compulsory super since its inception. For example, see: Hoyle (1993).
24. If workers value a dollar in super contributions equally to a dollar in wages, the shift in labour supply will fully offset the fall in labour demand, shifting the full burden to workers. It's also possible some workers could value a dollar in super *even more* than a dollar in wages, given that super is taxed at a lower rate and that some workers may substitute super for voluntary savings.

to bear a larger share of the cost of super. Similarly, if employers' willingness to hire people doesn't vary much when wages change – inelastic labour demand – more of the burden will fall on employers.

If workers value super contributions, and employers' demand for labour is more elastic than than the supply of labour from workers, then workers are likely to incur much of the cost of higher compulsory super in the form of lower-than-otherwise wages (Box 1).

Super, and other 'mandated benefits', differ from taxes where workers don't receive a direct benefit. For example, payroll taxes in Australia are levied on employers and the revenue from them goes into consolidated revenue – workers do not receive a direct benefit that is linked to the tax paid by their employer. This means the economic burden of a payroll tax with no direct benefit to the worker would be expected to differ from a payment like super contributions, because super induces workers to supply more labour, while payroll tax doesn't.

When employers bear some of the cost of a mandated benefit, economists typically assume this will result in reduced employment.[25] The cost of employing a given number of workers goes up when super increases, so employers will be less willing to employ people at a given wage rate. They could also, in some circumstances, shift costs to their consumers, by charging higher prices. They might also reduce non-wage benefits provided to their workers. Even where some of the economic burden of super doesn't fall on wages, workers can still suffer through these other channels of adjustment.[26]

Economic theory by itself doesn't provide an answer to the question of who bears the cost of mandated benefits such as super – it depends on how much workers value them, and how workers and employers

respond to changes in wage rates. This is the case whether you use a model of a 'perfectly competitive' labour market, or a 'monopsonistic' model in which employers have power over wage setting.[27] In a monopsonistic labour market, the economic burden of super still depends crucially on how much workers value super compared to wages, and therefore how super affects their supply of labour. In both models, the question of the burden of super cannot be resolved by theory alone – it is an empirical question.[28]

When wages can't fall, theory predicts workers will bear less of the burden of mandated benefits such as super – perhaps even none of the burden in the short run. This can happen when *nominal* wages are already not growing at all, leaving no scope for further cuts in wage growth without actually cutting the wage level.[29] This can also happen when workers are paid at the minimum wage, though it is less applicable in Australia where minimum wages are adjusted each year taking super into account.[30]

Ultimately, how much falls on wages depends on exactly how much workers value super and how responsive employers and workers are to changes in wages. These are empirical questions that can only be resolved by data.

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25. For example, see Gruber and Krueger (1991).

26. If taxes or contributions reduce employment, this could have 'second-round' effects on wages, as higher unemployment tends to reduce wages. See: Desbordes and Azémar (2010, p. 17).

27. There is evidence that the Australian labour market is monopsonistic. See: Booth and Katic (2011).

28. For some discussion of the incidence of social security contributions in various labour market models, see Bozio et al (Appendix A 2019).

29. See discussion in Sommers (2005) and Summers (1989).

30. See Section 4.2 for a discussion of the Australian minimum wage setting system.

Box 1: A stylised example of the wage impacts of an increase in compulsory super

Figure 1.2 depicts a labour market in which a 'mandated benefit' like super is imposed. If the payment is imposed on employers, they will be less willing to hire labour at a given wage rate. In other words, the labour demand curve shifts downwards by the cost of the increase in compulsory super – in Figure 1.2 this is shown as a shift from D_1 to D_2. The effect on wages is determined by how workers respond.

Provided workers value super contributions to some degree, workers will be more willing to supply labour at a given (ex-super) wage rate. In other words, compulsory super causes the labour supply curve to shift outwards. If workers don't value super at all, then their willingness to work won't vary when super is imposed, which means the burden will be shared more equally between workers and employers.

If workers value a dollar of super contributions, but less than they'd value a dollar in wages, then some, but not all, of the cost of super will come out of their wages (Figure 1.2). Workers' willingness to work at a given post-super wage increases, reflected in a shift from labour supply curve S_1 to S_2. The new supply and demand curves intersect at point B. Wages have fallen from W_1 to W_2 – offsetting most, but not all, of the cost of super. Because employers bear some of the cost, employment is assumed to fall, from L_1 to L_2.

The economic burden of super also depends on how responsive workers and employers are in general to changes in wages. If workers' willingness to work doesn't vary much when wages change – if their labour supply is relatively 'inelastic' – then they would be expected to bear a larger share of the cost of super. Similarly, if employers' willingness to hire people doesn't vary much when wages change – inelastic labour demand – more of the burden will fall on employers.

Figure 1.2: If workers value super, economic theory predicts they'll bear at least some, if not most, of the cost of it via lower wages
Stylised example of a labour market with a 'mandated benefit' that is valued by workers, but valued less than an equivalent amount in wages.
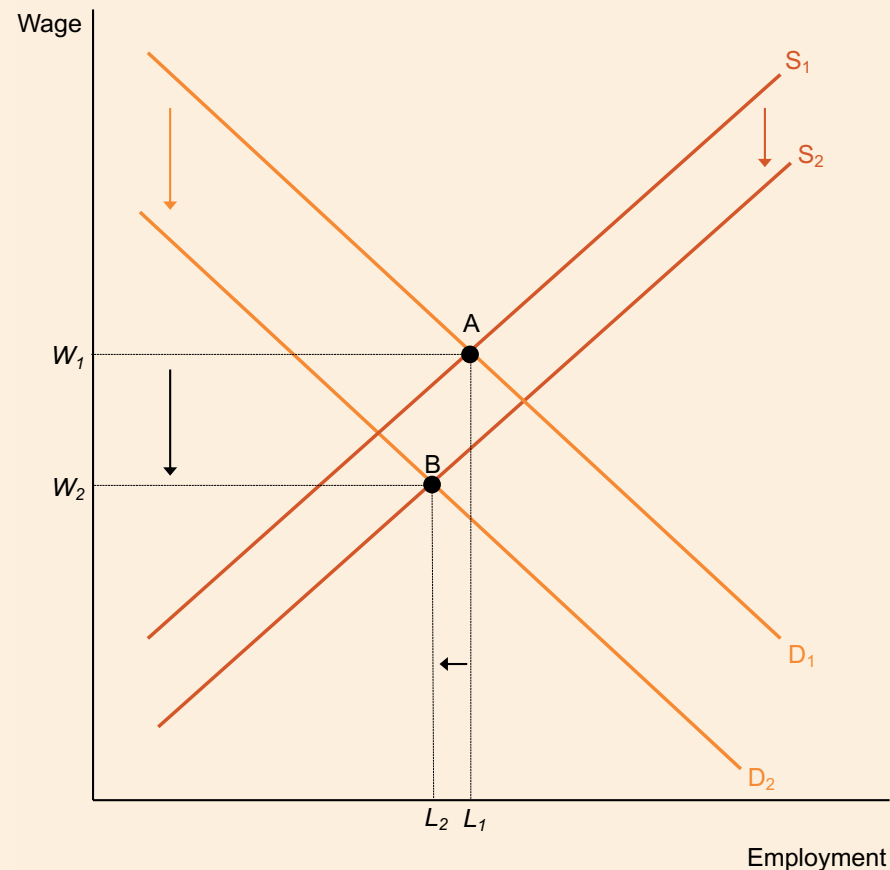
Notes: Diagram depicts a competitive labour market. The broad conclusions from theory do not differ for other models of the labour market, such as 'monopsony'.
Source: Based on Summers (1989, Figure 1) and Gruber (1997, Figure 1).

2   What does the existing evidence say?

There is limited empirical evidence about who ultimately bears the cost of higher super in Australia. In the absence of such evidence, researchers and policy makers have had to look to research on the economic burden of other policies – such as payroll tax in Australia, and various forms of mandated benefits overseas.

There is an extensive literature from overseas on who bears the cost of payroll taxes or compulsory contributions levied on employers. The most relevant work from this literature relates to 'mandated benefits' schemes – ones where workers receive some benefit from the tax or payment, as is the case for super.[31] Most of this research finds that workers bear most – or even all – of the cost of taxes or compulsory payments that are strongly linked to workers' benefits.

The literature on Australian payroll taxes does not provide much guidance. The results of payroll tax studies are mixed, and the policy differs from super in a key respect – workers receive no direct mandated benefit from the policy. This means that little can be inferred about the likely burden of super from this literature.

There has been limited empirical work in Australia on who bears the cost of super. Two recent papers approach this question using variations on the same approach – time series models that seek to explain total wage growth in the economy using a small number of macroeconomic variables and information about changes to the SG. This approach is not well-suited to answering this policy question.

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31.   See Section 1.3 for a discussion of why workers getting some benefit from a payment, and how much they value this benefit, matter for the economic burden of the payment.

2.1   The evidence from overseas mostly finds workers bear the burden

The burden of payroll taxes and mandated benefits schemes has been studied extensively overseas. These studies generally find that workers bear much of the cost. Studies of schemes that closely resemble super – in that the payments by employers are directly linked to benefits received by workers – find that pass-through to wages is large, and more often than not complete.

In general, studies find that pass-through is bigger in the long-run than the short-run, and bigger in the public sector than the private sector. There is some evidence that pass-through is lower in countries with industry-level bargaining than in those with centralised (national) or decentralised (enterprise-level) bargaining. A broad range of methodologies have been employed in the literature, with the most persuasive studies using detailed microdata on firms and/or workers.

2.1.1   The most relevant studies find workers bear the burden

Many countries require employers to pay taxes or make other compulsory payments on top of their workers' wages. These payments can be grouped into two broad categories: those that have a strong link to a benefit that workers receive; and those that don't. Super clearly falls into the first category. Australian workers receive a direct benefit from super contributions – the money is deposited in their super fund and will be available for them to withdraw once they reach retirement age. The most relevant international studies are therefore those that relate to systems that resemble super, in that the payments made by employers have a strong link to benefits that will ultimately be received by workers.

Figure 2.1: International studies find strong pass-through to wages of payments linked to workers' benefits
Pass-through from higher payments to lower wages (100% = full pass-through, 0% = no pass-through)
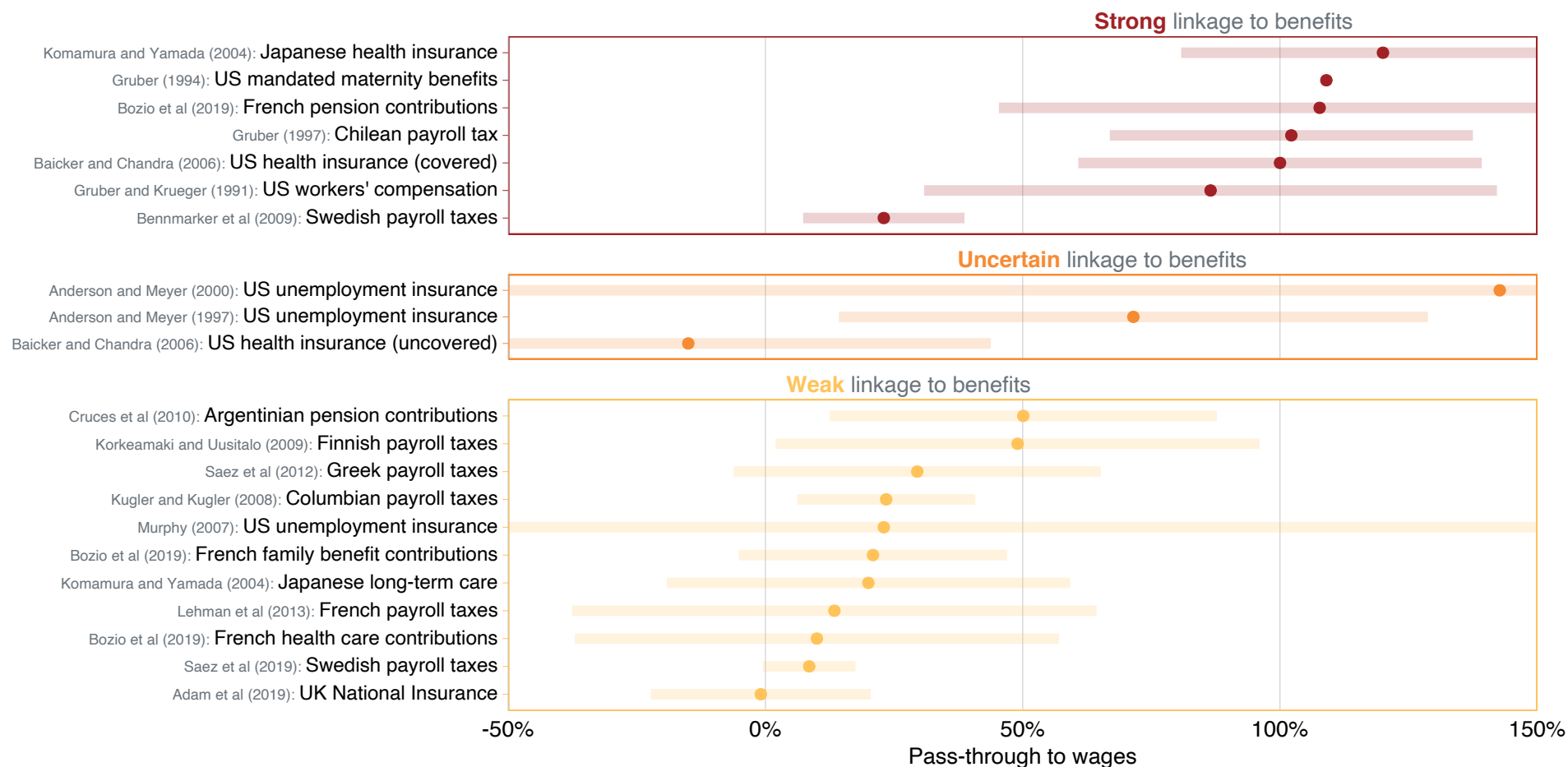
Notes: Classification of degree of linkage to benefits is taken from Bozio et al (2019). Shaded areas are 95 per cent confidence intervals. Some intervals extend beyond the range shown. Degree of linkage to benefits can differ across studies for the same policy (e.g. 'US unemployment benefits', 'Swedish payroll taxes') because the studies are examining different reforms or population sub-groups.
Source: Bozio et al (ibid).

The linkage between payments and benefits matters a lot in theory (see Section 1.3). It also matters a lot in practice. A recent meta-analysis of high-quality studies of payroll taxes and compulsory contributions found a substantial difference between the economic burden of payments with a strong link to workers' benefits and those without. It found that, on average, the pass-through from social security contributions to wages is 103 per cent in systems with a strong link to benefits, and only 15 per cent for payroll taxes that aren't clearly linked to benefits.[32]

Figure 2.1 on the previous page summarises the findings from these high-quality studies. Seven of these examined reforms to taxes or contributions that had a clear and strong link to workers' benefits. All but one of these studies found that pass-through to wages was full, or close to full. Where the link to workers' benefits was weaker, most of the studies found that workers bear *some* of the cost of the tax or contribution, but pass-through is generally less than a half.[33]

Other reviews of the pass-through from payroll taxes to wages have found that workers bear most, but not all, of their burden. A meta-review by Melguizo and González-Páramo (2013) found that, on average, workers bear two-thirds of the cost of payroll taxes and similar contributions. This is substantial pass-through to wages – but less than the complete pass-through found in studies of payments strongly linked to workers' benefits (Figure 2.1). This is because the Melguizo and González-Páramo meta-analysis includes a studies of payroll taxes that aren't strongly linked to benefits, as well as studies of varying quality.[34]

2.1.2 Pass-through to wages is bigger in the long run

A consistent finding in the literature is that the effect of taxes or compulsory contributions on wages is bigger in the long run than the short run. This is due to delays in workers and employers adjusting to changes in compulsory payments.[35] The meta-review by Melguizo and González-Páramo found that the average long-run pass-through of social security contributions to wages (74%) is substantially larger than the short-run pass-through (43%).[36]

Bozio et al's study of a reform to French supplemental pensions – a defined contribution scheme, like super – found that there was no effect on wages a year after contributions were increased. Five years after the reform, however, the cost had been fully passed through to workers.

The finding that wages are more affected by compulsory contributions in the long-run than the short-run is unsurprising: wages take time to be renegotiated, there are frictions in the labour market that can prevent costs from being passed on in the short-run, and employers' demand for labour is generally thought to be more responsive than workers' supply of labour in the long-run.

2.1.3 Pass-through to wages is bigger in the public sector

The review by Melguizo and González-Páramo (ibid) found that, on average, studies of the whole economy tend to find a larger degree of pass-through from higher social security contributions to lower wages than studies that only examine the private sector. They found that studies of the private sector contain an average pass-through to wages of 0.52, whereas studies of the total economy have an average pass-through of 0.73.

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32. Bozio et al (2019, p. 28).
33. Note that the selection of studies, and classification of reforms as having a strong, weak, or uncertain linkage to benefits is from Bozio et al (ibid).
34. Melguizo and González-Páramo (2013) finds that, on average, the effect on wages is 10 percentage points larger for 'mandated benefits', though this result isn't statistically significant.

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35. See Hamermesh (1993) and Arpaia and Carone (2004).
36. Melguizo and González-Páramo (2013, p. 260).

2.1.4 Pass-through is smaller in systems with industry-level bargaining

A recent literature review for the European Commission found that decentralised systems of wage bargaining tend to have a similar degree of pass-through to wages as centralised systems, but bargaining at the intermediate level tends to produce lower pass-through.[37] Australia has a decentralised system: bargaining over wages is generally done at the enterprise level.[38]

2.1.5 Pass-through works both ways

Most studies have examined who bears the cost of an *increase* in taxes or compulsory contribution. But what would happen if contributions were to be cut. Would wages increase in response?

Some studies have examined this question. The seminal study by Gruber (1997), for example, examined the consequence of a large cut in payroll taxes on employers in Chile. He found that wages rose to fully offset the cut in payroll taxes.

In general, the literature suggests that wages should respond faster to cuts in contributions than to increases. This is because stickiness in wages – the reluctance to cut nominal wages – can prevent pass-through in the short-run, while there is no such constraint on wage increases when contributions are cut.

2.1.6 Pass-through is bigger when schemes apply to all firms

Studies have found that workers are more likely to bear the cost when a compulsory contribution is levied on all employers in an industry

or economy, as is the case with compulsory super, rather than only on some firms. Anderson and Meyer (1997) and (2000) examined changes to social security contributions in the United States that applied at the firm- and industry-level. They found near-full and full shifting of the cost to workers, respectively.

The European Commission report commented on the difference between industry-wide and firm-specific changes in Anderson and Meyer's findings:

> Employers are much less able to shift firm-specific changes in employer [social security] contributions to workers. This may reflect the fact that firms are competing with other firms in the same industries for workers (as well as for customers), and can therefore not pass on firm-specific costs, but only costs that are common across firms in the industry.[39]

This reasoning suggests a full pass-through is more likely for an economy-wide compulsory contribution such as the Super Guarantee.

2.1.7 Studies based on microdata are more convincing

A range of methodological approaches have been employed in the literature. A 2015 report for the European Commission, *Study on the effects and incidence of labour taxation*, distinguishes between 'macro-econometric' and 'micro-econometric' studies. It finds the 'micro-econometric' studies – which are based on detailed data about individual firms and/or workers – more convincing than the macro studies.

Macro-econometric approaches tend to exploit 'cross-country and time-series variation in labour taxation and aggregate measures of the compensation of employees (such as labour income shares)' to identify who bears the cost of taxes or compulsory contributions.[40] This

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37. European Commission (2015).
38. Award wages are centrally determined, but are set by the Fair Work Commission having regard to its legislated mandate, rather than being the outcome of a bipartite bargaining process.

39. Ibid (p. 62).
40. Ibid (p. 53).

high-level approach has been used often since the empirical question of economic burden first arose.[41]

The EC's preference for micro-econometric studies is echoed elsewhere in the literature. For example, Gruber (1997) criticised macro-econometric studies on similar grounds:

> Early studies, which relied on time-series or cross-country variation in national payroll tax rates to identify shifting to wages, produced in-cidence estimates that varied widely. An important problem with such approaches, however, is that of omitted variables bias: there may be contemporaneous time-series changes in other variables which determine wages in a nation, or other cross-country differences in wage-setting institutions, that are correlated with tax rate differences and are not controlled for in the estimation.[42]

2.2   The evidence from Australian payroll tax

Payroll taxes, like super contributions, are paid by employers. However, we cannot learn much about who pays for super by examining the literature on Australian payroll tax. This is because payroll tax is fundamentally unlike super: it is not tied to workers' benefits.

Recent work by a Treasury official examined administrative data on Australian businesses to see if they 'bunch' below payroll tax thresholds.[43] If employers bore the cost of payroll tax, you would expect to see relatively few firms just above payroll tax thresholds – instead, it may be rational for them to keep their payroll costs just below the threshold, such as by hiring contractors rather than employees. Ralston (2019) finds that Australian firms tend not to bunch below the

thresholds. This may be because firms do not bear the economic cost of payroll tax and so are indifferent to whether they are below or above the threshold, or because the cost to going over the threshold is not high.

By contrast, earlier work using less detailed data found that payroll tax thresholds do influence firm size.[44] Recent work from ANU researchers does not find evidence that payroll tax cuts lead to higher wages or employment.[45]

The empirical literature on who bears the cost of Australian payroll taxes is small and mixed. However, Australian payroll taxes differ from super contributions in one important respect: the revenue from payroll taxes goes into general revenue and is not tied to a benefit received by workers, unlike super contributions. This means that the effect of payroll taxes on wages would be expected to be *smaller* than the effect of super on wages, for reasons set out in Section 1.3. Given this, the Australian payroll tax literature is of limited use in inferring who bears the economic burden of compulsory super.

2.3   Recent studies of super's burden have flaws

There is a substantial empirical literature overseas on the burden of social security contributions. Studies of policies that most resemble super generally find that their burden falls predominantly on workers (Figure 2.1 on page 14). However, there has been a lack of empirical evidence in Australia about who bears the cost of compulsory super. Two recent pieces of analysis sought to fill this gap using macro-econometric approaches. But both were flawed.

Industry Super Australia (ISA) commissioned Stanford (2019) from The Australia Institute's Centre for Future Work to explore the

41. See, for example, early work in the American Economic Review: Brittain (1971). For a swift rebuke of this analysis, see Feldstein (1972): '. . . no implication about the incidence of the tax can be drawn from either [Brittain's] theoretical discussion or his empirical analysis'.
42. Gruber (1997).
43. Ralston (2019).

44. Dixon et al (2004); and C. Murphy (1998).
45. Majeed and Sinning (2019).

relationship between super and wages. Taylor (2019) from The McKell Institute used a similar macro-econometric model to explore the same relationship. Neither of these papers found a significant trade-off between higher super and lower wages, and in some cases the authors suggest there is a positive association – higher super being associated with higher wages growth.

The macro-econometric approach means only limited factors can be taken into account

Both Stanford and Taylor's approaches seek to explain changes in average wages at the macroeconomic level. Stanford's econometric approach was based on 32 annual snapshots of the economy between 1987 and 2018, while Taylor uses quarterly data for the period between March 1992 and December 2016, giving him 100 observations.

Stanford's model used changes to the Super Guarantee and three additional variables – inflation expectations, the terms of trade, and the unemployment rate – to explain average national wage rises in each year. Taylor adapts an RBA time series model[46] and uses four variables other than changes in the SG to explain wages growth: the 'unemployment gap'[47] and the change in unemployment rate, plus expected and actual inflation.

With such a small number of observations, both models are constrained in how many variables they can use to try to explain wages growth, a limitation that is much less acute for micro-econometric approaches that use many observations of wages growth for individual workers or firms. It is likely that variables omitted from the models have an effect on the results. All statistical models face this possibility – known as 'omitted variables bias' – but it is more likely to arise in

models with a small number of observations, which cannot use a large number of explanatory variables.

These approaches can only capture the very short-run impact of super on wages

Economic theory suggests that the degree of pass-through from higher taxes or compulsory payments by employers to lower wages is likely to increase over time. This is because wages get re-negotiated only periodically, there are frictions in the short-run that prevent pass-through, and employers' responsiveness to wage changes is generally thought to be greater than workers' in the long-run (see Section 1.3 on page 10). International research has found evidence in support of this theory – the degree of pass-through rises over time (Section 2.1.2 on page 15).

The models used in Taylor (2019) and Stanford (2019) can only capture the short-run impact of increased super on wages. For example, compulsory super went up in the third quarter of 2014. Any adjustment to wages that happened in the first quarter of 2015, or later, would not be captured by the estimates in Stanford (2019). This leads these models to underestimate the effect of super on wages over the longer term.

Average wages growth in one year is strongly influenced by wages growth in the previous year, but this isn't taken into account

It is common for time series models, of the type used by Stanford and Taylor, to include a lagged value of the dependent variable – in this case average wages growth – as an explanatory variable. This reflects the fact that wages growth in one period is strongly correlated with wages growth in the following period.

For example, the RBA's model that explains wages growth using unemployment and inflation (the 'Phillips Curve') includes the prior

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46. Bishop and Cassidy (2017).
47. The unemployment gap is the unemployment rate minus the estimated unemployment rate that corresponds to 'full employment'.

year's wages growth as an explanatory variable.[48] Including the lagged dependent variable – wages growth in this case – means the model's results are less likely to be affected by 'autocorrelation', the serial dependence between one period's data and the next.[49] Using one year's wages growth to explain the following year's data also helps to 'capture persistent factors affecting wage growth'.[50] These factors could include labour productivity growth, and workers' bargaining power, both of which may have an effect on average wages growth and are proxied by using lagged average wages growth as an explanatory variable.

Taylor's model contains all the same explanatory variables as the RBA's, but omits the lagged wages growth term. Stanford also does not used lagged wages growth as an explanatory variable.

Assuming no compulsory super before 1992 can affect results

Compulsory super existed before the SG was introduced in 1992. From 1986, employers were required to make super contributions of 3 per cent on behalf of employees covered by awards (see Section 1.1 on page 8). By 1991, 78 per cent of workers were covered by super.[51]

This means that, when the SG was introduced, most workers did not go from no super to 4 per cent super. Instead, most affected workers went from 3 per cent to 4 per cent super, with some workers unaffected.[52]

This can affect the estimated relationship between super and wages. Taylor (2019) erroneously assumes that there was no superannuation before the SG in 1992.[53]

The mathematical relationship between super and wages changes as super rises, but this isn't taken into account

Both Stanford and Taylor assume there is a linear relationship between changes to SG and wages. This is incorrect and will cause their models to underestimate the degree of pass-through from super to wages. As the SG rises, the reduction in wages required to offset the rise – to maintain total labour costs – falls. The required decrease in wages to offset an SG increase from 1 per cent to 2 per cent is less than from 3 per cent to 4 per cent, and so on. This is explained fully in Section 3.2.1.

The models' results are not robust to small changes in approach

Stanford and Taylor each estimate multiple models of wages growth. The difference between the models within each paper is the measure of wages growth used as the dependent variable. Stanford uses Average Weekly Ordinary Time Earnings of full-time employees ('AWOTE') and average weekly earnings of all employees. Taylor also uses AWOTE, along with the change in average wages and salaries per employee from the National Accounts ('AENA') and Average Annualised Wage Increases in collective agreements ('AAWI').[54]

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48. Bishop and Cassidy (2017).
49. Stanford (2019) and Taylor (2019) make no mention of having calculated their standard errors in a manner that is robust to autocorrelation.
50. Bishop and Cassidy (2017).
51. ABS (2009).
52. Some workers are not entitled to compulsory contributions (e.g. because they earn below $450 per month) or are paid contributions in excess of the compulsory rate.

53. Section 3.2.1 shows that the analysis in this working paper uses muted increases in 1992 to deal with this issue. Appendix B on page 61 shows that our results are robust to excluding the early years of the SG to avoid this issue.
54. Taylor (2019) estimates a fourth model using the average of AENA and AWOTE growth as the dependent variable, stating that this is done to 'reduce volatility'. But the resulting number is not economically meaningful: it is the average of two overlapping but structurally different measures of wage growth.

The results of these models vary. Both of Stanford's models find a positive relationship between super and wages – when super goes up, wages grow faster – though the results have wide confidence intervals and therefore the author cannot rule out that there is no relationship between the two variables. Taylor's results vary in each of the models.

Figure 2.2 shows the results from the Taylor (2019) and Stanford (2019) models and our re-creation of them. Variations on their models are also tested. Relatively minor variations to their modelling approach – adding an explanatory variable, changing the period of estimation – affect the results noticeably. This is not a desirable feature in econometric work.

For Taylor (2019), a pre-SG rate of 2 per cent is added to reflect the majority super coverage in 1991. The next model varies how the SG enters the model: it now lasts for three months and is lagged by half a year (allowing time for wages to adjust). The RBA's full specification is added to the last model, which produces substantial variance.

For Stanford (2019), assumptions around the introduction of the SG are tested in alternatives (1) and (2). Alternatives (3) and (4) use RBA specifications.

Under different assumptions and small changes to their modelling techniques, the approaches of Taylor (2019) and Stanford (2019) suggest that the pass-through of super to wages is somewhere between -2 per cent (where workers receive a substantial pay *rise* when the SG increases) and 1 per cent (full pass-through to workers).

The macro-econometric approaches used in these models are not well-equipped to measure the trade-off between super and wages.

Figure 2.2: Recent macro-econometric approaches to the super/wages trade-off produce unstable results
Coefficients and 95% confidence intervals on the super/wages trade-off from Taylor (2019) and Stanford (2019)
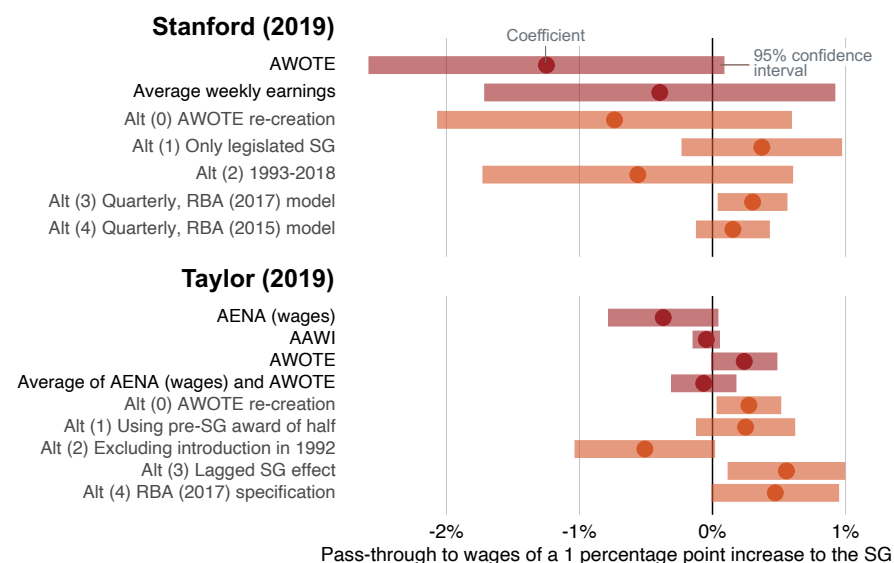
Notes: The results from Taylor (2019) and Stanford (2019) have been 'flipped' to show the pass-through to wages. 'AENA' refers to 'Average Earnings National Accounts' for all employees; 'AAWI' is 'Average Annualised Wage Increases' for employees covered by registered federal enterprise agreements; 'AWOTE' is 'Average Weekly Ordinary Time Earnings' of full-time employees; and 'AWE' is 'Average Weekly Earnings' of all employees.

Sources: Taylor (2019, Annex Table 1). Stanford (2019, Tables 5-6). See also Nolan et al (2019).

3   Has higher super led to lower wages growth?

As Chapter 2 showed, there are sound reasons to expect much, if not all, of any increase in compulsory super contributions to come at the cost of workers' wages. International evidence points to a trade-off between social security contributions and wages. Yet there has been a lack of empirical evidence of the super/wages trade-off in Australia.

This chapter fills that gap. We use administrative microdata from the *Workplace Agreements Dataset* (WAD) maintained by the Commonwealth Attorney-General's Department.[55] We use this detailed microdata to fit statistical models that estimate the effect of super on wages, while holding constant a range of other things that affect wages growth. Our approach is 'micro-econometric' – it looks at the outcome of firm-level negotiations – and is complemented with data about the state of the macro-economy.

We find that, on average, about 80 per cent of the cost of increases in compulsory super contributions is borne by workers through lower wage rises over the life of the enterprise agreement. This result is broadly consistent in a range of alternative models.

Our approach is conservative: it ignores the prospect that employers pass on some of the costs of super into higher prices, or by reducing other non-wage benefits to workers. Nor does it capture any further adjustment to wages that occurs beyond the life of an individual enterprise agreement. In the long run, the reduction in wages caused by higher compulsory super is likely to be even higher than we find.

The remainder of this chapter sets out in greater detail the data and the methodology we employ, as well as key results and sensitivity analysis.

3.1   Using workplace agreements to explore the super/wages trade-off

The WAD contains information about 160,000 collective agreements registered between 1991 and 2018. This period spans the introduction of the Superannuation Guarantee in 1992 and all subsequent increases in the SG rate. We use about 80,000 of these agreements, matched with relevant economic conditions around the time the agreement was certified.[56] Each of these agreements covers a defined period of time and has a pre-defined schedule of nominal wage rises.

Each agreement's certification date – the date it was lodged or approved by the Fair Work Commission[57] – depends on factors including the expiry or termination of a previous agreement, the negotiation period, and the beginning of a new business.[58]

Figure 3.1 on the next page shows that aside from a slight bump at the ends of the financial and calendar years – and the expected silence around Christmas and on ANZAC Day and Australia Day – there is no clear pattern regarding *when* an agreement is certified during the year.

The randomness of the certification date and duration of an agreement means we can think of agreements as almost 'randomly assigned' to a change in the Super Guarantee. There are otherwise-similar workplace

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55. The dataset is available from the Attorney-General's Department on request: Attorney-General's Department (2019a).

56. Agreements that didn't contain information such as a quantifiable wage increase were not able to be used. Non-quantifiable wage increases include increases that are explicitly tied to CPI or the decisions of the Fair Work Commission, which are not known at the time the agreement is registered.

57. Before 2010, this approval was given by the Australian Industrial Relations Commission. The date of lodgement is used if approval wasn't required. See the data documentation at Attorney-General's Department (2019b).

58. For a more detailed discussion about how agreements begin and end, see Bishop and Chan (2019, section 4.1).

Figure 3.1: There is no clear pattern to when agreements are signed
Number of agreements by certification day of year
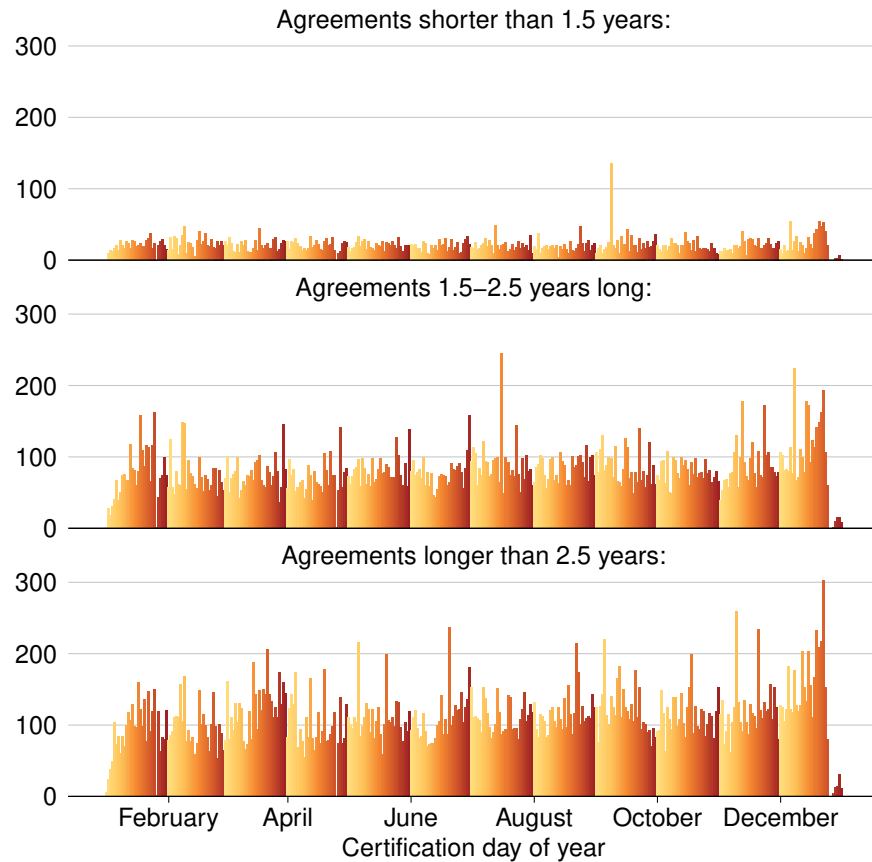
Figure 3.2: An illustrative look at agreements starting between 2010 and 2015
Random sample of 100 agreements
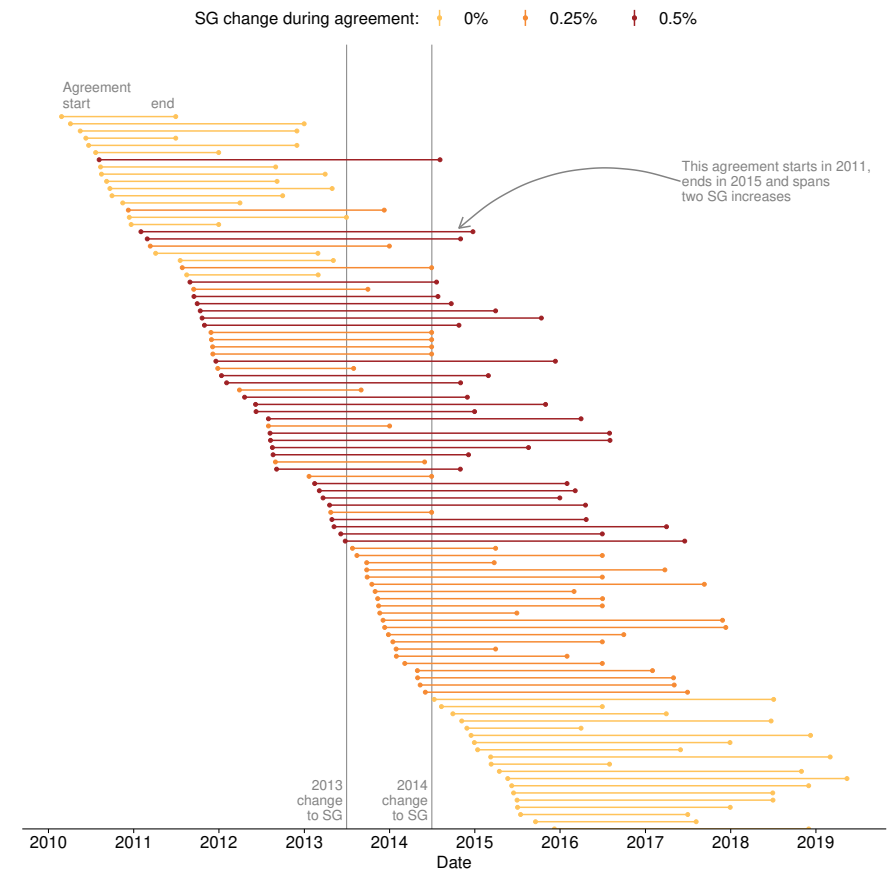
Source: Grattan analysis of the Workplace Agreements Database: Attorney-General's Department (2019a).

Source: Grattan analysis of the Workplace Agreements Database: Attorney-General's Department (ibid).

agreements – same industry, same size, same union involvement – that have different aggregate SG requirements because they vary slightly in duration or start date.

To illustrate, Figure 3.2 on the preceding page shows a random sample of 100 agreements with a certification date between 2010 and 2015. Depending on the start date and duration, some agreements are affected by both the 2013 and 2014 SG increases of 0.25 percentage points each. Others are affected by just one of the increases. The rest do not span any increases to the SG.

Our model looks for these variations in changes to the SG and wages. A full pass-through of SG changes to wages would mean that – all else being equal – an agreement spanning only the 2013 SG change would have *lower* wage rises than an agreement that spanned neither of the SG changes. And that same agreement that spanned one SG change would have *higher* wages rises – all else being equal – than an agreement that spanned both.

3.2 Four key pieces of information are required to answer this question

We need four key pieces of information to explore the relationship between superannuation and wage growth:

1. information about the level of and changes to the Super Guarantee at each point in time;

2. information about wage growth over the life of each agreement;

3. specific characteristics of individual firms and agreements that affect wage growth;

4. information about broad economic factors that affect wage growth.

3.2.1 The Super Guarantee

To measure the effect of changes in the SG on wages over the life of an enterprise agreement, we need to know how the SG changed over time. The timing of SG increases was complex in the early to mid-1990s. The legislated SG was introduced in July 1992, but most workers already had superannuation coverage before its introduction.[59]

Ideally, we would know what the parties to each agreement – employers, employees, and unions – *expected* the SG to be over the course of each agreement. In the absence of this information, we use the *actual* changes to the SG. Changes to the SG are generally legislated several years in advance, meaning the expected and actual paths of the SG have been aligned for most of its history.

The paths might have differed in a couple of specific instances. For example, the 1995-96 (ALP) Budget promised incremental increases in the SG to 15 per cent by 2002 (Figure 1.1 on page 9), but this was never legislated. In reality the SG increased to 6 per cent in 1995 and only reached 9 per cent by 2002 and 9.5 per cent by 2014. The possibility that this promise, and a similar issue around the delay to further increases from 9.5 per cent,[60] affected employer-employee wage negotiations is difficult to determine. The effect of this uncertainty is explored in Appendix B.

Between 1992 and 1995, the SG rate differed between 'small' businesses (less than $1 million in payroll) and 'large' businesses

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59. Department of Parliamentary Services (2014). This means it is not appropriate to assume that compulsory super increased from 0 per cent to 4 per cent in 1992. The modelling in Section 3.3 uses a SG of half its introductory rate before July 1992, as shown in Table 3.1. Changes to this assumption, and excluding 1992 altogether, have no material impact on the estimate (Appendix B).
60. In 2013 the Coalition announced a policy to "defer by two years the increase in compulsory employer-funded superannuation" legislated for 2014: ABC Fact Check (2016). The deferral never happened and the rate rose from 9.25 to 9.50 per cent in 2014.

(more than $1 million).[61] The WAD does not contain information about employers' total payroll costs, nor the average wages paid by firms. To estimate the SG rate that would have applied to particular firms during the period when the SG differed by firm size, we must estimate employers' total payroll. Our analysis estimates an employer's payroll using industry-level average weekly ordinary time earnings from the ABS multiplied by the number of employees an agreement covers. We then apply the appropriate small or larger business SG rate.[62]

Table 3.1 shows the SG rates used in our analysis. These rates are paid on top of an employee's 'ordinary time earnings'.[63]

Changes to the SG have generally been legislated years in advance. This means that changes in the SG are not affected by economic conditions at the time the change takes effect – they can be regarded as 'exogenous'.

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61. *Superannuation Guarantee (Administration) Act 1992, s 20-21.*
62. This estimation is imperfect: it will classify some employers as small when they're large, and some large when they're small. This complication is avoided in Appendix B by restricting our analysis to 1997 onwards, when the SG didn't vary by firm size, and by excluding businesses with fewer than 100 employees. Robustness checks in Appendix B show that neither approach significantly change our findings. In the first few years of the SG, the rate was slightly different for employers who were not 'an employer for the whole of the 1991-92 year': *Superannuation Guarantee (Administration) Act 1992, s 20-21.*
63. ATO (2019d). This includes shift-loading, commissions, and bonuses, but excludes overtime: ATO (2019c) and *Superannuation Guarantee (Administration) Act 1992, s 11.* Super is required only for employees who earn more than $450 per month: ATO (2019d). There is an upper-limit to the amount of super an employer is required to pay for an employee: ATO (2019a) and *Superannuation Guarantee (Administration) Act 1992, s 15.* Some datasets do not include information on employees' ordinary time earnings, which makes it difficult to discern whether the super contributions being made on their behalf are below, equal to, or above the compulsory level. We do not face this difficulty with the dataset used in our analysis approach.

Table 3.1: Super Guarantee rates used in our modelling, 1992-2025

Date	Super Guarantee (less than $1m payroll)	Super Guarantee (more than $1m payroll)
Assumed:		
Before 1 July 1992	1.50	2.00
Enacted:		
1 July 1992	3.00	4.00
1 January 1993	3.00	5.00
1 July 1993	3.00	5.00
1 July 1994	4.00	5.00
1 July 1995	5.00	6.00
1 July 1996	6.00	6.00
1 July 1998	7.00	7.00
1 July 2000	8.00	8.00
1 July 2002	9.00	9.00
1 July 2013	9.25	9.25
1 July 2014	9.50	9.50
Scheduled:		
1 July 2021	10.00	10.00
1 July 2022	10.50	10.50
1 July 2023	11.00	11.00
1 July 2024	11.50	11.50
1 July 2025	12.00	12.00

Source: Superannuation Guarantee (Administration) Act 1992, s 20.

How wages change when the SG is fully paid for by wages

A full pass-through of an SG increase to wages does not mean a 'one-for-one' trade-off with wages. A full pass-through means employers keep their total cost per worker constant while their super obligations increase, thereby pushing wages lower than they otherwise would have been.

To demonstrate, consider a worker with pre-superannuation wages of $100,000. If the SG is 4 per cent, the total labour cost to the employer is $104,000. If the SG increases by 1 percentage point to to 5 per cent and the employer passes this cost *fully* to the employee – i.e. maintaining labour costs at $104,000 – the worker's wage will decrease 0.952 per cent to $99,047. They will be paid 5 per cent SG on top of their wage, i.e. $4,952, for a total labour cost of $104,000.

If, instead, the SG increased from 9 per cent to 10 per cent, total labour costs would start at $109,000, with wages of $100,000. A 1 percentage point increase in the SG that was fully passed through would lower wages by 0.909 per cent to $99,091, so that the amount contributed to super was $9,909 and total labour costs remain at $109,000.

This introduces a complexity to our model. A change to the SG does not have a linear effect on wages, and modelling it linearly will *underestimate* the size of the pass-through from super to wages.[64]

The effect of super on wages can be expressed by the equation:

$$\Delta(w|sg) = \frac{SG_{t0} + 1}{SG_{t1} + 1} - 1$$

where $\Delta(w|sg)$ is the change to wages expected with full pass-through, SG_{t0} is the old SG rate, and SG_{t1} is the new SG rate.

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64. The modelling done by both Taylor (2019) and Stanford (2019) uses a linear relationship between wages and the SG. We examine the difference between the two approaches in Appendix B.

This relationship indicates that, for example, a 1 percentage point increase in the SG from 4 per cent to 5 per cent will have a larger effect on wages than an increase from 9 per cent to 10 per cent. The effect of one percentage point increases are shown in Figure 3.3.

We use $\Delta(w|sg)$ itself as the explanatory variable in our econometric models shown in Section 3.3, rather than the simple change in the SG rate. This allows a clear interpretation of the regression coefficient: 1 is a full pass-through of the SG to workers, and 0 is complete absorption by the employer.

Figure 3.3: Change to wages $\Delta(w|sg)$ with full pass-through of an SG increase
Per cent

With full pass-through, increasing SG from 4 to 5% will decrease wages by 0.95%

Change in SG approach

One percentage point change to Superannuation Guarantee
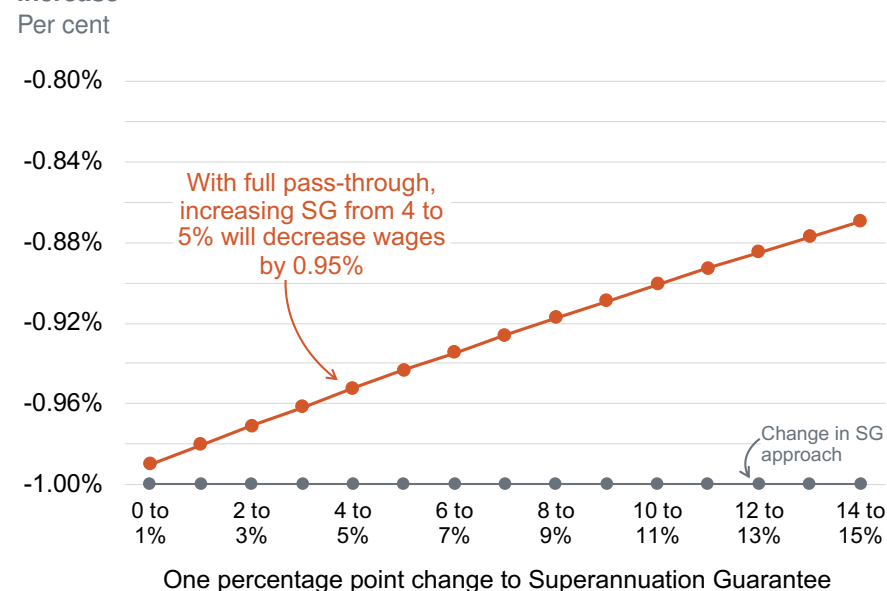
Source: Grattan Institute.

3.2.2 Nominal wage growth

The WAD variables used in our analysis are detailed in Appendix C.[65] The 'dependent' variable – the variable our models attempt to explain – is nominal wage increases, annualised over the life of an agreement. Each nominal wage increase in an agreement is listed in the WAD.[66] Figure 3.4 shows the distribution of wage increases in agreements in the WAD for each year between 1992 and 2018 – the mean and the dispersion of wage increases have both fallen in recent years.

The total wage increase over the life of each agreement, annualised over its duration, is used as the dependent variable in our regressions. This is a deliberate model design choice that allows a change to the SG to be reflected in wages throughout the life of an agreement, rather than in the immediate quarter or year of the SG change.

There are some complications in the WAD. Agreements with non-quantifiable wage increases are excluded from official Average Annualised Wage Increase (AAWI) calculations and cannot be used in our analysis. These agreements account for about 30 per cent of agreements in the database. About half of these are non-quantifiable because they include increases that are not consistent between groups of employees, while the remainder contain increases linked to performance or CPI, or were non-quantifiable for some other reason.[67]

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65. Full documentation of variables in the WAD dataset is available: Attorney-General's Department (2019b).
66. This wage increase variable is used by the Department of Employment to construct the Average Annualised Wage Increase (AAWI), the headline figure for their quarterly 'Trends in Federal Enterprise Bargaining Report': Attorney-General's Department (2019c).
67. Attorney-General's Department (2016). The Department examined these agreements and concluded that excluding them from the calculation of AAWI has only a 'small impact on the representativeness' of the data.

Figure 3.4: Over time, agreements have contained lower annual wage increases
Distribution of annualised wage increases in enterprise agreements, 1992-2018, weighted by employees
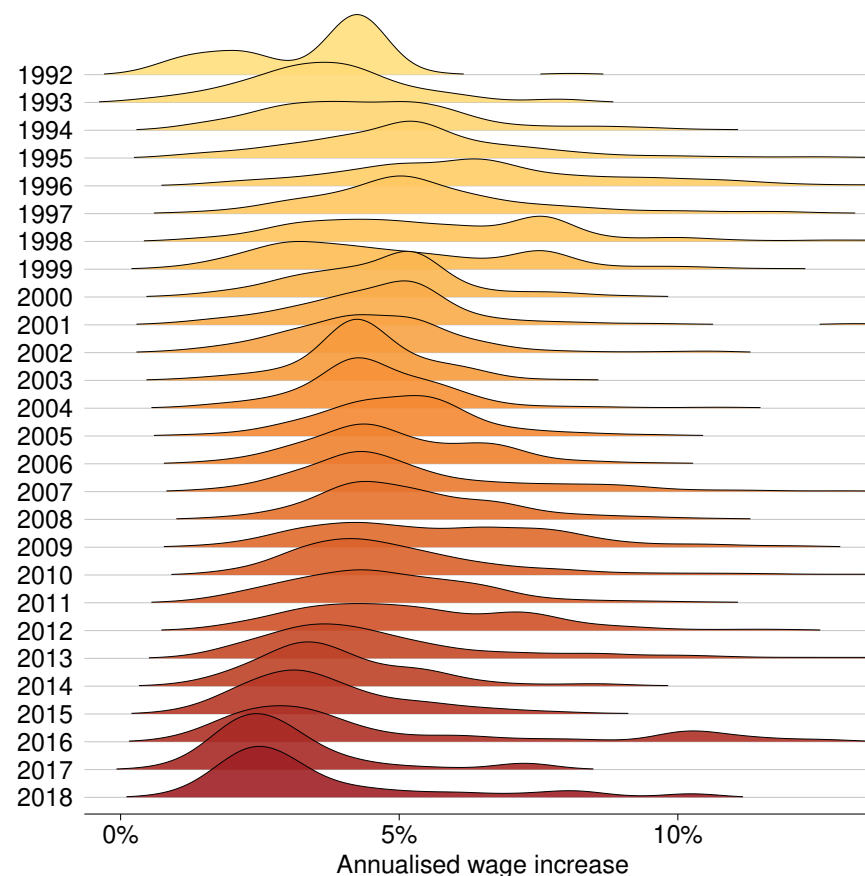
Source: Grattan analysis of the Workplace Agreements Database: Attorney-General's Department (2019a).

Expired agreements are not included in our analysis. A large number of employees are covered by 'expired but not terminated' agreements.[68] This will affect the *real* duration of agreements. But because our analysis is concerned with the determination of wage increases at the beginning of an agreement, this murkiness should have little impact on our findings.[69]

3.2.3 Specific information about firms and agreements

The WAD provides detailed information about firms and agreements, and the employees they cover.[70]

Each agreement has a 'start' and 'end' date set out when it is lodged with the Fair Work Commission. The duration of an agreement is the time (in years) between these two dates. Figure 3.5 shows that agreements are typically about two-to-three years long.

The database includes information on the number of employees covered by each agreement. This is used as the weight in the weighted least squares specification. The natural logarithm of the number of employees is also used as a control variable in all our models.

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68. See Gilfillan (2019): 'While the number of employees on current federal enterprise agreements in the private sector has fallen steadily in recent years, this is partly due to many employees being covered by agreements that have expired (but not terminated). Some of the very large retailers (such as Coles, Woolworths, Kmart, and Bunnings) and large fast food companies (such as McDonalds, Dominos, and KFC) would come under this category.'

69. Our analysis also does not take account of the limited cases in which employees paid according to an enterprise agreement can be entitled to receive pay increases greater than specified in the agreement. This can happen if their rate of pay specified in the agreement falls below the relevant award rate, or if the Fair Work Commission orders that pay be raised in a particular industry, as in FWC's *Social, Community and Disability Services Industry Equal Remuneration Order 2012*. The latter case is rare. The former case will mean that pass-through is determined by the FWC's decisions; see Section 4.2 for discussion of this.

70. The complete data documentation can be found at Attorney-General's Department (2019a).

Figure 3.5: Distribution of employees covered by agreements by duration
Employees
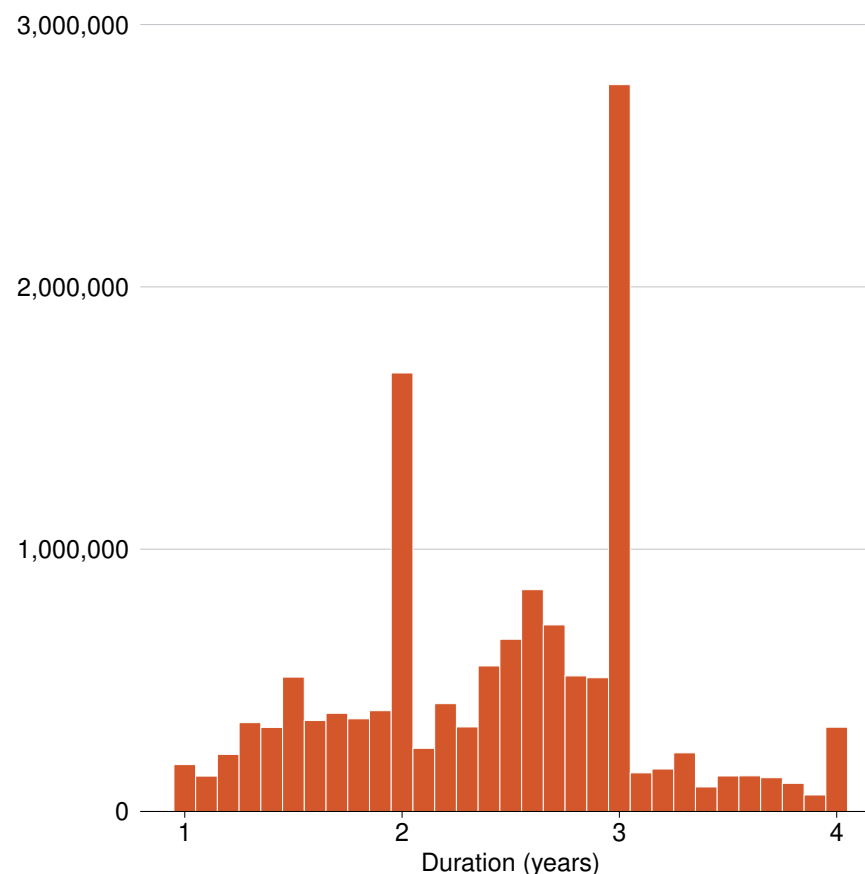
Source: Grattan analysis of Attorney-General's Department (2019a).

Figure 3.6 shows the distribution of agreements by the number of employees covered.

Each agreement also includes information about the firm's industry. This information is in the form of two-digit codes from the 2006 version of the Australian and New Zealand Standard Industrial Classification (ANZSIC). The detailed industry code for each agreement is added to the model to account for persistent wage growth differences in different areas of the economy. This is important: recent work by Kalb and Meekes (2019) finds that industry explains a large proportion of differences in wage growth in Australia over time.

As well as industry, the WAD provides the detailed 'type' of agreement, which has been used to generate variables for greenfield and multi-enterprise agreements.[71] State is also included in our modelling.[72]

Union involvement plays an important role in wage setting.[73] The WAD lists each union that is involved in an agreement's negotiation. We create a categorical variable with levels for each of these unions. This variable is used in several of our models (see Section 3.3) to account for any effect of individual unions on wages growth.

The sector of an agreement – public or private – is listed in the WAD. There were 726,000 public-sector employees covered by EBAs at the end of 2018,[74] out of a total of 1.9m public sector employees.[75]

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71. Enterprise agreements set up by a 'genuine new enterprise' yet to employ anyone are called 'greenfield agreements': Fair Work Commission (2019a). Multi-enterprise agreements cover more than one employer.
72. Agreements that covered employees in more than one state were classified as 'multi-state'. Some agreements were Australia-wide. The state was unknown for a small proportion of agreements, and these observations were classified as 'unknown' rather than excluded.
73. Bishop and Chan (2019) use the WAD to show that the 'union wage growth premium' exists and has been stable over the 1992-2017 period.
74. Attorney-General's Department (2019c).
75. ABS (2019a).

Figure 3.6: Distribution of agreements by number of employees
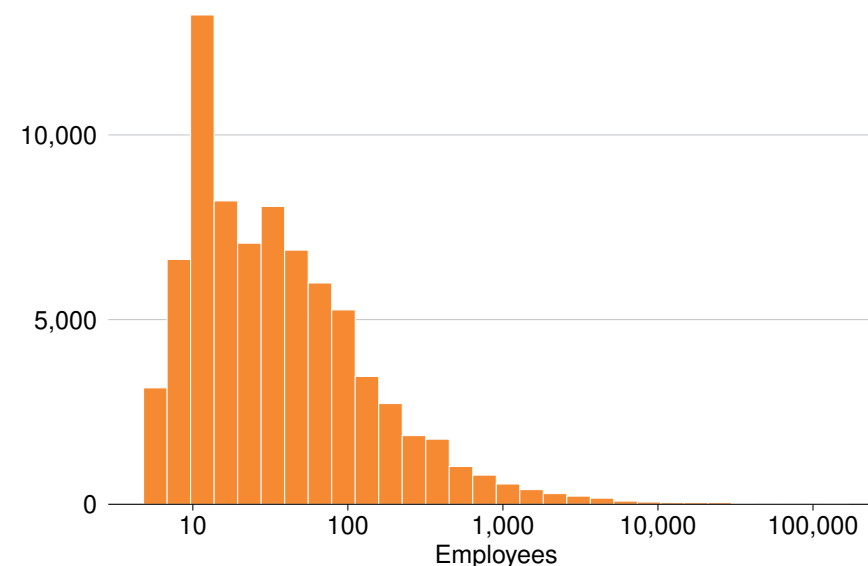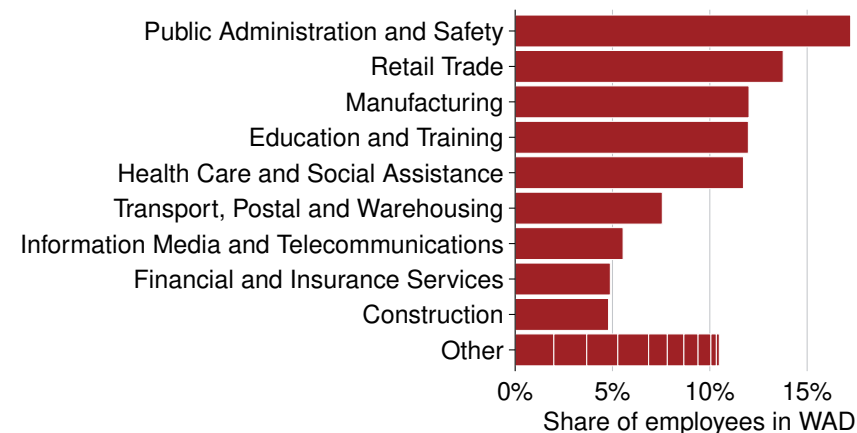Agreements

Figure 3.7: Distribution of WAD employees by industry

Source: Grattan analysis of Attorney-General's Department (2019a).

About 60 per cent of employees covered by EBAs were in the private sector, compared to 85 per cent of total employees.[76]

The WAD spans the period since 1991, which has seen considerable change in Australia's labour law framework. For analytical purposes, we have divided the period into four broad eras of labour law. We use these eras in our models, to account of any effect that the different frameworks of labour regulation had on wages growth.

The first, the period before 1997, encompasses the beginnings of collective bargaining in the federal industrial relations system. The second era began on 1 January 1997 with the commencement of the Howard government's *Workplace Relations Act 1996*. The third era began on 26 March 2006, when the Howard government's extensive amendments to the *Workplace Relations Act* – known as *WorkChoices* – took effect. The current era began on 1 July 2009, when the *Fair Work Act 2009* came into effect.[77]

3.2.4   Economic variables

Economic conditions such as inflation, productivity growth, and unemployment play a substantial role in wage setting. All else being equal, nominal wages growth will tend to be higher when inflation is higher; and more unemployment will push wages growth down. To better isolate the relationship between the Super Guarantee and wages, we must first account for economic factors that also explain wage growth.

We use six main macro-economic variables in our models, plus three industry-specific variables. Each variable is averaged over the 12

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76. Attorney-General's Department (2019c).
77. There are important changes *within* these eras, such as before and after the passage of the *Industrial Relations Reform Act 1993*, and the various changes between 2006 and 2009. But these four eras broadly capture the changes in labour law over the period.

months leading up to an agreement's 'certification date' (rather than its 'start' date), as shown below. This is intended to capture the influence of economic conditions on wage setting during an agreement's negotiation phase. Changes in conditions after an agreement has been certified are immaterial; they can't affect wage setting. A sharp rise in unemployment midway through an agreement, for example, will not have an effect on wages paid under that agreement, whereas high unemployment during negotiations is likely to affect wages.

Agreement variables contain information about **an individual agreement**: industry, employees, sector, state, union, etc.

Certification date

Agreement **start** date

Agreement **end** date

Negotiation period (unknown duration)

Agreement duration

Economic variables are matched to the '**negotiation period**' of an agreement: the 12 months leading up to the certification date.

The six macro-economic variables we use are detailed in the following sections.[78] A time-series and distribution graphic are shown for each. The left panel shows the economic variable over time between 1992 and 2018. The right panel shows the distribution of agreements in our dataset by whether they span a superannuation increase or do not. This allows us to make sure there aren't economic conditions that have solely affected agreements that contained or did not contain changes to the SG.

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78. Complete information about the variables used in our analysis is provided in Appendix C.

Lagged, quarterly AWOTE growth: $awote\_growth_{t-1}$

Average wage growth across the economy in the period leading up to the certification of an agreement is a strong factor in determining future wage rises. Average wage growth reflects macroeconomic trends, such as changes in labour productivity growth or bargaining power.

It is common to include lagged wage growth in a model to explain current wage growth. Bishop and Cassidy (2017) from the RBA, for example, use a lagged wage variable in their Wage Price Index model.

We use the quarterly change in average weekly ordinary time earnings (AWOTE) of full-time employees to help explain wage variation in our model.[79]

Figure 3.8: Quarterly AWOTE growth

Per cent over time

Distribution of agreements **with**/**without** change to SG
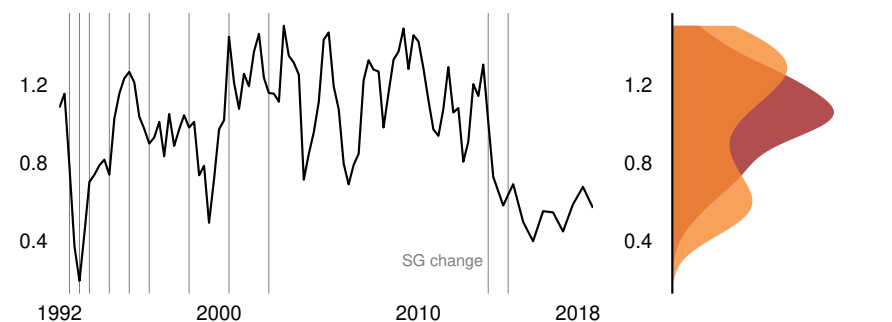
Source: ABS (2019b). See Appendix C.

Inflation expectations: $inflation\_exp_t$

Wage rises in enterprise bargaining agreements are expressed in nominal terms, and inflation is a leading driver of nominal wages. If inflation is high, wages tend to grow faster to keep up.[80]

We are interested in what the parties to an agreement – typically an employer and union(s) – expected that inflation would be during the agreement's term, at the time they were making the agreement. The RBA collects data on the inflation expectations implied by bond market pricing. We use this as a proxy for the inflation expectations of employers and employees.[81] We add the average inflation expectations implied by bond market prices in the 12 months leading up to an agreement's certification date to our dataset to capture inflationary pressures that affect wage determination.

Figure 3.9: Inflation expectations

Per cent over time

Distribution of agreements **with**/**without** change to SG

Source: RBA (2019). See Appendix C.

---

79. We use AWOTE rather than the Wage Price Index (WPI), because the WPI only began in 1997 and therefore does not cover most of the period of interest. We use AWOTE rather than average weekly earnings (AWE) for all employees or average earnings in the national accounts (AENA), because AWOTE is more stable in the face of compositional change in the labour market, such as the increase in recent decades in part-time employment as a share of total employment.

---

80. The effect of inflation on wages also runs in the other direction – faster wages growth, all other things being equal, raises the rate of inflation.
81. We test alternative measure of inflation – business expectations and the consumer price index (CPI) – in Appendix B.

Quarterly GDP per capita growth: $gdp\_percap\_growth_t$

When GDP per capita growth is strong, wage growth tends to be strong, all else being equal.[82]

Expectations about future GDP per capita growth are also likely to influence wage decisions by employers. We therefore include a 'change' variable Δgdp_percap_growth – the quarterly change in non-farm GDP growth – in our modelling. This recognises that falling GDP growth is materially different to increasing GDP growth, even when GDP is at the same level. Although GDP per capita growth is a 'backward-looking' measure, growth and the change in growth are likely to be highly correlated with expected or forecast growth.
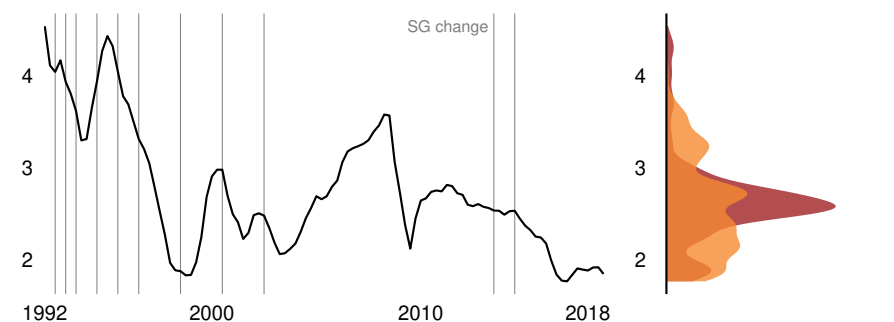
Unemployment via the NAIRU-gap: $nairu\_gap_t$

The degree of slack in the labour market exerts a significant influence on the pace of wage growth.[83] If there are many unemployed workers, wages growth is likely to be slower than if unemployment is low. We measure the degree of slack using the 'NAIRU gap', which is the difference between the actual unemployment rate, as reported by the ABS, and the 'non-accelerating inflationary rate of unemployment', as estimated by the OECD.[84]

As with GDP per capita, we include a 'change' variable $\Delta nairu\_gap$ – the quarterly change in the NAIRU gap – in our modelling to enable decreasing or increasing labour capacity to play a role in explaining wage setting.

Figure 3.10: Quarterly GDP per capita growth
Per cent over time

Distribution of agreements
with/**without** change to SG

Source: ABS (2019c). See Appendix C.

Figure 3.11: NAIRU gap
Percentage points over time

Distribution of agreements
with/**without** change to SG
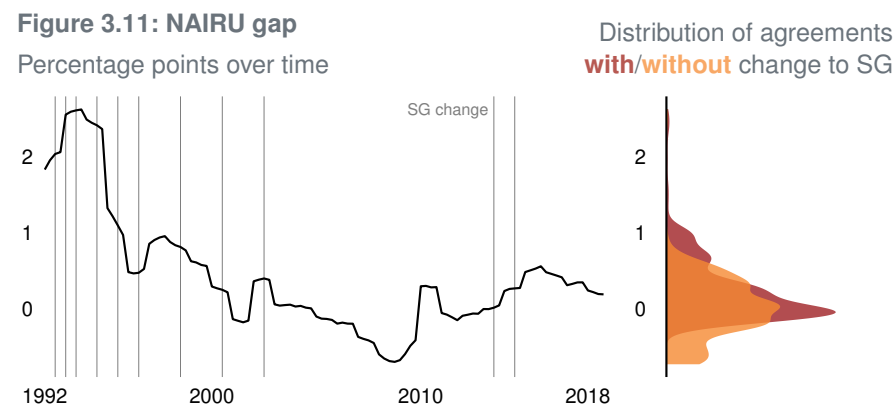
Source: OECD (2019) and ABS (2019a). See Appendix C.

---

83. This has been widely known since at least Phillips (1958). For recent discussion in the Australian context, see: Cusbert (2017).

84. We use the OECD estimate of the NAIRU, as the RBA's NAIRU time series has not been released publicly.

---

82. Andrews et al (2019).

Underemployment: $underemployment\_rate_t$

Underemployment has become an increasing concern in Australia. High underemployment puts downward pressure on wages.[85] The unemployment rate – and hence the 'NAIRU gap' – does not fully capture the extent of slack in the labour market, because it does not take account of underemployed workers.

Our preferred model includes a 'change' variable for underemployment, measuring the level of underemployment compared to the previous quarter, to capture the effect of underemployment direction on wage setting decisions.

Figure 3.12: Underemployment rate

Per cent over time

Distribution of agreements **with**/**without** change to SG
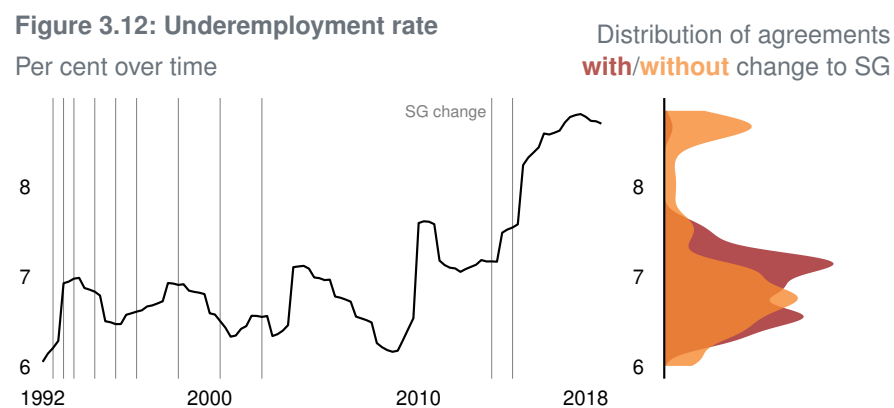
Source: ABS (2019a). See Appendix C.

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85. Bishop and Cassidy (2017, pp. 14–15).

3.3   Models to identify the super/wage trade-off

Our aim is to estimate the effect of changes to the SG on wage increases over the life of an enterprise agreement. We do this using a series of models, increasing in complexity.

Each observation in our dataset – a federally-registered enterprise bargaining agreement – provides the wage change for a group of people. Some agreements cover 5 workers, others cover 70,000. Giving more 'weight' in our analysis to agreements that cover more people allows us to look at the average effect for workers, rather than agreements. Each of the regressions presented in this section are modelled using weighted least squares, weighted by the number of employees an EBA covers. Unweighted versions are tested in Appendix B and have broadly consistent results with their weighted counterparts.

Model (1)

Model (1) uses a short list of standard macroeconomic variables to help explain wage growth:

$$
\begin{aligned}
wage\_inc_{i,t} = \beta_0 \\
+ \beta_1 \Delta(w|sg)_i \\
+ \beta_2 awote\_growth_{t-1} + \beta_3 inflation\_exp_t \\
+ \beta_4 gdp\_percap\_growth_t + \beta_5 nairu\_gap_t \\
+ \beta_6 underemploy_t + \beta_7 tot\_change_t \\
+ \varepsilon_i
\end{aligned}
$$

where i is an agreement in the WAD certified during quarter t. $wage\_inc_{i,t}$ is the sum of nominal wage increases during the agreement, annualised over the duration of the agreement.

$\Delta(w|sg)$ is the full pass-through effect on nominal wages resulting from a change to the SG between the start and end dates of the

agreement, annualised over the duration of the agreement (see Section 3.2.1).

Model (2)

Model (2) uses the full suite of macroeconomic, industry-level economic and agreement-specific variables that are likely to explain wage growth:

$$
\begin{aligned}
wage\_inc_{it} = \beta_0 &+ \beta_1 \Delta(w|sg)_i \\
&+ \beta_2 awote\_growth_{t-1} + \beta_3 inflation\_exp_t \\
&+ \beta_{4a} gdp\_percap\_growth_t + \beta_{4b} \Delta gdp\_percap\_growth_t \\
&+ \beta_{5a} nairu\_gap_t + \beta_{5b} \Delta nairu\_gap_t \\
&+ \beta_{6a} underemploy_t + \beta_{6b} \Delta underemploy_t \\
&+ \beta_7 tot\_change_t + \beta_8 labour\_law_t \\
&+ \beta_{9a} \Delta industry\_share\_1year_{it} \\
&+ \beta_{9b} \Delta industry\_share\_2year_{it} \\
&+ \beta_{10} \Delta industry\_awote\_growth_{it-1} \\
&+ \beta_{11} \Delta industry\_unemployment\_rate_{it} \\
&+ \beta_{12} duration_i + \beta_{13} \log employees_i \\
&+ \beta_{14} industry_i + \beta_{15} sector_i + \beta_{16} state_i \\
&+ \beta_{17} greenfield_i + \beta_{18} multi\_enterprise_i \\
&+ \beta_{19} union_i + \varepsilon_i
\end{aligned}
$$

The $union_i$ variable is a vector of dummy variables for each of the 82 unions mentioned in agreements. Unions play an important role in wage setting, and play a direct role when wages are set by collective bargaining.[86]

Model (3)

Model (3) builds on Model (2) by adding three 'interaction terms':[87]

$$
\begin{aligned}
wage\_inc_{it} = \beta_0 &+ \beta_1 \Delta(w|sg)_i \\
&+ \beta_2 awote\_growth_{t-1} + \beta_3 inflation\_exp_t \\
&+ \beta_{4a} gdp\_percap\_growth_t + \beta_{4b} \Delta gdp\_percap\_growth_t \\
&+ \beta_{5a} nairu\_gap_t + \beta_{5b} \Delta nairu\_gap_t \\
&+ \beta_{6a} underemploy_t + \beta_{6b} \Delta underemploy_t \\
&+ \beta_7 tot\_change_t + \beta_8 labour\_law_t \\
&+ \beta_{9a} \Delta industry\_share\_1year_{it} \\
&+ \beta_{9b} \Delta industry\_share\_2year_{it} \\
&+ \beta_{10} \Delta industry\_awote\_growth_{it-1} \\
&+ \beta_{11} \Delta industry\_unemployment\_rate_{it} \\
&+ \beta_{12} duration_i \\
&+ \beta_{13} \log employees_i \\
&+ \beta_{14} industry_i + \beta_{15} sector_i + \beta_{16} state_i \\
&+ \beta_{17} greenfield_i + \beta_{18} multi\_enterprise_i \\
&+ \beta_{19} union_i \\
&+ \beta_{20} sector_i \times state_i \times union_i \\
&+ \beta_{21} industry_i \times industry\_unemployment\_rate_{it} \\
&+ \beta_{22} industry_i \times industry\_awote\_growth_{it-1} \\
&+ \varepsilon_i
\end{aligned}
$$

The β_{20} interaction term accounts for the time-invariant effects of each unique state-sector-union combination. For example, if the

---

86. See Bishop and Chan (2019) on the relationship between wages and union membership.

87. An interaction term, denoted by '$\times$', allows a variable to have a different effect for different groups. For example, $industry_i \times inflation\_exp_t$ allows the inflation to affect wage growth in the accommodation industry differently to the administrative services industry.

union-represented private sector in Victoria had below average wage growth in this period, it would be captured by this interaction term.

The β_{21} and β_{22} terms reflects the fact that industries may respond differently to their changing economic conditions – unemployment and lagged AWOTE growth, respectively. These interaction effects help explain much of the variation in wage growth seen in the data, as shown in Section 3.4.

3.4 The cost of the Super Guarantee is mostly paid by workers through lower wages

The results of our analysis are shown in Table 3.2.[88] A coefficient on $\Delta(w|sg)$ of 1 would imply full pass-through of the Super Guarantee to wages, while a coefficient of 0 implies that wages are unaffected by SG changes, as discussed in Section 3.2.1.

We find a $\Delta(w|sg)$ coefficient of 0.805 in our preferred specification, Model (3). This means that – on average for workers covered by a federal EBA – about 80 per cent of the cost of increasing the SG is paid by employees through lower nominal wage rises over the life of their agreement. This figure is in line with previous international studies (see Chapter 2). It is an average. Some employers will have full pass-through, whereas others will pass-through less than 80%.

The key economic variables used in our modelling show results that 'make sense': wages tend to be higher when inflation expectations are higher and when wages had grown strongly in the previous quarter.

The models show that higher underemployment is associated with lower wage growth, as is an *increase* in underemployment.[89] A larger

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88. Standard errors are corrected for heteroskedasticity using the HC1 method. This correction method is appropriate for large samples: Mackinnon and White (1985) and Long and Ervin (2000). See Appendix A for residual plots.
89. See Section 3.2.4.

Table 3.2: Regression results

	Model (1)	Model (2)	Model (3)
$\Delta(w|sg)$	**0.702*****	**0.771*****	**0.805*****
	(0.158)	(0.124)	(0.119)
$awote\_growth_{t-1}$	0.915***	0.583***	0.559***
	(0.180)	(0.123)	(0.120)
$inflation\_exp_t$	0.163***	0.299***	0.291***
	(0.088)	(0.094)	(0.084)
$gdp\_percap\_growth_t$	0.489***	0.445***	0.396***
	(0.167)	(0.127)	(0.119)
$\Delta gdp\_percap\_growth_t$		-0.073**	-0.070**
		(0.032)	(0.029)
$nairu\_gap_t$	-0.129***	-0.333***	-0.475***
	(0.140)	(0.112)	(0.099)
$\Delta nairu\_gap_t$		0.706***	0.544***
		(0.267)	(0.239)
$underemploy_t$	-0.280***	-0.126	-0.105
	(0.099)	(0.090)	(0.086)
$\Delta underemploy_t$		-0.186***	-0.093***
		(0.238)	(0.224)
$industry\_awote\_growth_{it-1}$		0.097**	*Interaction*
		(0.045)	
$industry\_unemployment\_rate_{it}$		-0.031	*Interaction*
		(0.027)	
$duration$		-0.851***	-0.847***
		(0.046)	(0.040)
$logemp$		-0.033*	-0.036**
		(0.019)	(0.016)
(Intercept)	4.855***	5.291***	4.237
	(0.173)	(0.239)	(3.471)
Observations	78072	78072	78072
Adjusted R2	0.087	0.420	0.479

Notes: ***$p < 0.01$; **$p < 0.05$; *$p < 0.10$. *Standard errors are shown in parentheses. Terms of trade and factor variables (industry, state, sector, union, greenfield, multi-enterprise, labour law period) coefficients are not shown.*

NAIRU gap is also associated with lower wage growth in models (1) and (2).

Model (3) has an adjusted-R^2 of 0.48, meaning it can explain about half of the variation in wage growth across agreements.[90] There is still variation in wage setting that our model cannot explain. While we include information about industry-level economic conditions – such as changes to an industry's share of economic output, as well as unemployment and average wages growth – the model does not have information about factors affecting individual firms. For example, if a firm had a particularly bad year in an otherwise booming industry, its wages growth will probably be lower than we would expect by just looking at the industry. Figure 3.4 on page 26 shows that while there is a clear pattern in annualised wage increases in EBAs between 1992 and 2018, there is significant variance in a given period.

Pay rises in EBAs can also play 'catch up' after long periods of stagnant wages. An EBA that contains a 10 per cent pay rise in a single year may be making up for lengthy periods of negotiation. These idiosyncratic properties of agreements are not picked up by our model, reducing our R^2.

From models (1) to (2) to (3), there is growing explanatory power. As these models get more powerful – as we are able to explain more of the changes to nominal wage rises – the coefficient on $\Delta(w|sg)$ increases.

Behaviour of employers outside of an EBA cannot be captured by our model. If a change to the SG leads to lower wage growth *in future EBAs*, our model will classify this change as being unrelated to the SG. This will cause the $\Delta(w|sg)$ coefficient of 0.805 to be a lower-bound estimate over the longer term.

Longer-term effects of rises to the SG are not captured in our model. Employers may decide to wait to pass changes to SG through to wages. For example, a change to the SG may happen near the end of an agreement and could be left to affect wages in the next round of EBA negotiations.

Employers may not have 'perfect information' about changes to the superannuation guarantee in one or two years' time, even though changes to the SG are typically legislated years in advance. They may sign an EBA without this knowledge, and instead make up for the change through lower wage growth in the next EBA.

Firms could also let agreements lapse, or further delay signing a new agreement, in order to pass the cost of higher compulsory super onto workers. Agreements that are expired, but not yet terminated,[91] do not provide for wage rises for workers until a new agreement takes effect.[92] Such behaviours are not captured in our modelling.

3.5 These results hold with different modelling approaches

3.5.1 Robustness checks

Small changes to econometric modelling can sometimes cause substantial changes to results (see Figure 2.2 for example). It is important to check that our results are not reliant on a particular specification. Figure 3.13 shows the results from some of these checks.

Econometric modelling requires assumptions to be made about the structure of the relationship you are looking to explore, and the elements that affect that relationship. In our model we have included expectations of inflation implied by the bond market, for example, because it has been shown elsewhere to be a reliable predictor of

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90. The adjusted-R^2 measure is not a perfect measure of model 'fit', and it can overestimate the fit of a weighted regression like the models above: Greene (2007, Sections 3.5.1-3.5.3). Models using ordinary-least-squares are explored in Appendix B and show similar coefficients on key variables, but lower 'fit'.

91. Attorney-General's Department (2019b).
92. Gilfillan (2019).

wages.[93] But it isn't the *only* measure of inflation expectations. And using a measure of inflation *expectations* rather than headline CPI figures might not be the right approach in the first place. Our key finding – the relationship between changes to the superannuation guarantee and wage growth – should not jump around too much when we use one estimate of inflation instead of another. We therefore test what happens to our results when we use alternative inflation measures.

The tables in Appendix B show a dozen such tests. Using business expectations of inflation rather than the expectations implied by the bond market keeps the pass-through rate at 80% ($\Delta(w|sg) = 0.804$). Using headline CPI figures also produce a similar result ($\Delta(w|sg) = 0.839$).

Pass-through of SG to wages is similar when we use unweighted ordinary least squares rather than weighting the observations by employees ($\Delta(w|sg) = 0.769$ for firms with 100 or more employees, and $\Delta(w|sg) = 0.931$ for firms with 200 or more employees).

In 1992, the SG was introduced at different rates for small and large businesses (Section 3.2.1). Many employers also paid superannuation before 1992. This makes the exact level and timing of changes to the SG in the early 1990s complicated. Our results hold when we exclude those years to only look at data between 1997-2018 ($\Delta(w|sg) = 1.08$).

Our results also hold when we just look at the past decade ($\Delta(w|sg) = 0.996$).

Figure 3.13: Variations on our model produce consistent results
Pass-through of the SG to wages, by model type
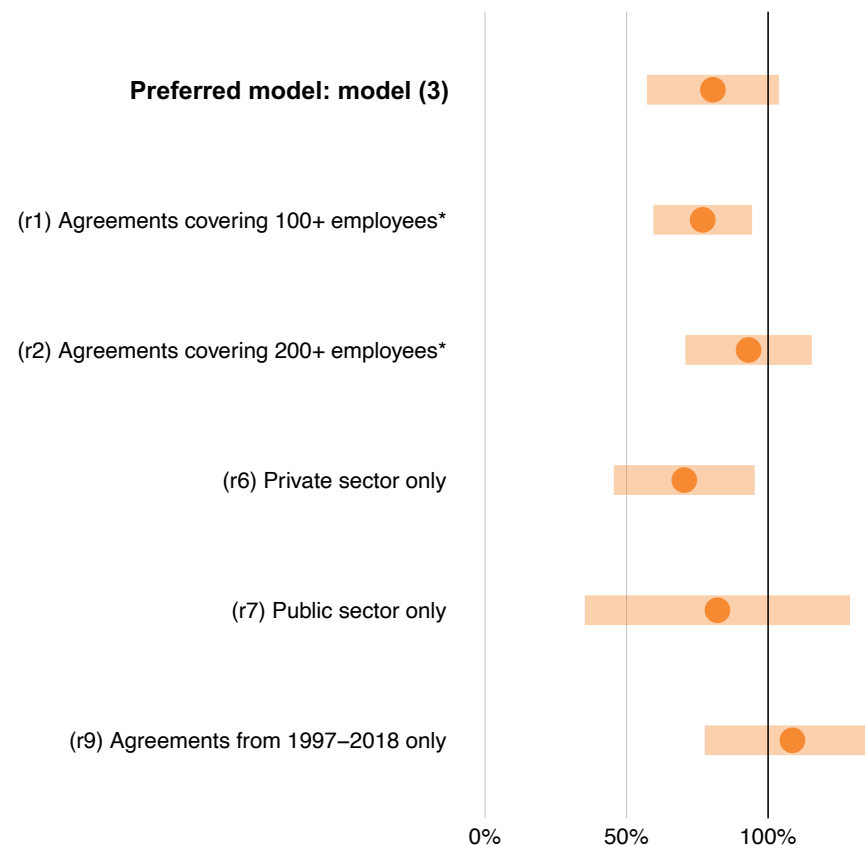
*Notes: *Unweighted OLS is used for models (r1) and (r2). Employee weighted OLS is used for others. See Table 3.2 and Appendix B.*

Source: Grattan analysis.

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93. Jacobs and Rush (2015); and Bishop and Cassidy (2017).

3.5.2   Bootstrapping to establish confidence intervals

Our model uses about 80,000 observations. We have lots of information, on lots of agreements. This could potentially make our results appear spuriously precise. One way to ensure that our results do not rely on a particular quirk in our data – i.e. to ensure the accuracy of our findings – is to 'bootstrap' our results.

Bootstrapping is an approach that uses repeated samples to make statistical inferences.[94] We take independent random observations from our dataset – with replacement – to generate a new dataset on which to run our regression Model (3). We then store the coefficient of our variable of interest, $\Delta(w|sg)$. This process is repeated 2,000 times.[95]

A histogram of the results is shown in Figure 3.14. The median value of 0.83 is similar to our main estimate shown in Table 3.2. The distribution shows that the model is relatively insensitive to repeated sampling of the data, with 90 per cent of $\Delta(w|sg)$ coefficients falling between 0.64 and 1.03. This is similar to the confidence intervals implied by the robust standard errors presented in Table 3.2.

Figure 3.14: Bootstrapping Model (3) results
Number of results

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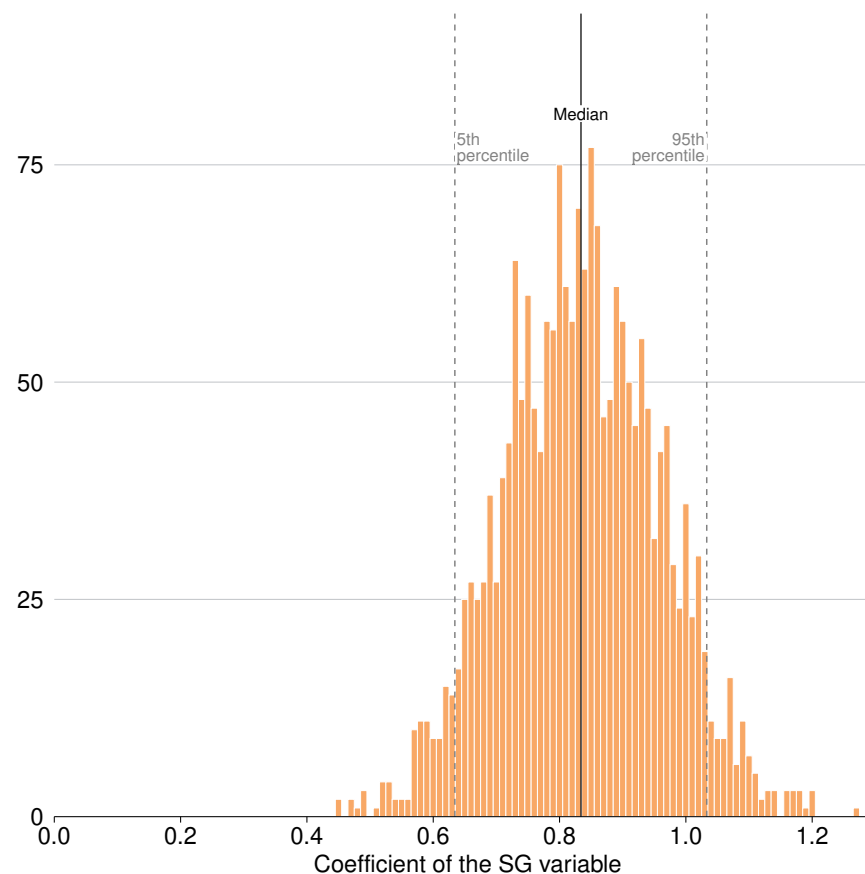
94. Fox (2015).
95. Fox (ibid) suggests 2,000 times is sufficient in almost all cases.

4 What about workers on other pay-setting arrangements?

We estimate that about 80 per cent of the cost of increased super is borne by workers through lower wages over the course of an enterprise agreement (Section 3.4). This is clear evidence of a super-wages trade-off, and the long-term impact is likely to be even higher.

Yet the analysis in the previous chapter only measures the trade-off for workers on collective agreements in the federal industrial relations system – about a third of all employees (Figure 4.1). Do workers on other pay-setting arrangements also bear the cost of higher super through lower wages?

This chapter examines other forms of pay setting – awards, state agreements, and individual arrangements.[96] We find little reason to expect that super would affect wages less for workers on these forms of pay setting.

This is because:

- State agreements are almost all in the public sector, and the degree of pass-through from super to wages is *bigger* for public sector than private sector agreements in the federal IR system.

- When compulsory super rose in the past, the Fair Work Commission stated that the increase in award wages was smaller than it would have been if super hadn't risen. There may be some indirect effect of super on minimum wages as well.

- Pay under individual arrangements is subject to the same labour market forces that affect EBAs, and their wages are more responsive to overall economic conditions, which suggests bigger pass-through.

The degree of pass-through from super to wages depends on how much workers value their super contributions (Section 1.3). Workers subject to other wage-settings arrangements are just as likely to value their superannuation contributions as workers covered by federal agreements.

Figure 4.1: Around a third of employees have their pay set by a federally registered enterprise agreement
Proportion of employees by method of setting pay

Source: ABS (2019d) and Attorney-General's Department (2019c).
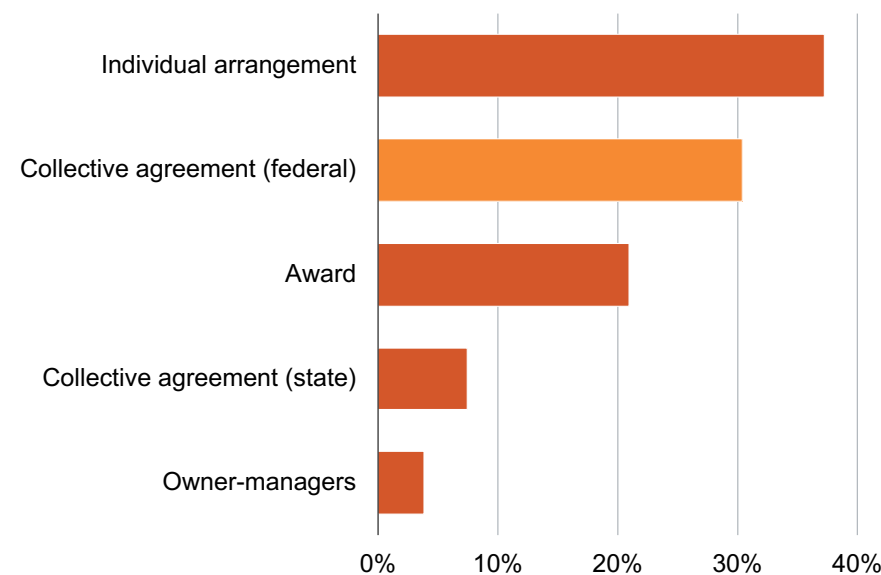
---

96. We do not consider the 3.8 per cent (ABS (2019d)) of employees who work for their own businesses; for them, whether super comes out of wages or profits is immaterial. We also do not consider unregistered collective agreements, because they cover virtually no one: Attorney-General's Department (2019c).

4.1 State agreements

Our analysis in Chapter 3 uses data on collective agreements in the federal industrial relations system. There is also a small number of employees covered by collective agreements in state industrial relations systems – 7.4 per cent of all employees.[97] These are almost all employees of state governments.[98]

Most employees in Australia are in the federal industrial relations system.[99] The federal system covers all employees in Victoria, the ACT, and the Northern Territory, as well as most employees in the other states. The states, other than Victoria, retain their own small industrial relations systems. These cover only state government employees, other than a small residual private sector jurisdiction in Western Australia.[100]

The WAD we used for our analysis of federal agreements in Chapter 3 includes a substantial number of public sector agreements, including all Victorian public sector agreements made since 1997, as well as all agreements covering employees of the Commonwealth, ACT, and Northern Territory governments.

When we estimate our model using only the data for public sector agreements,[101] we find that the wages-super trade-off is *larger* in the public sector than it is when all agreements are included (see Table B.4 in Appendix B).

There are no compelling reasons to expect that the effect of super increases on wages will be significantly different for public sector employees in state IR systems, than for those in the Victorian, ACT, NT, and Commonwealth public sectors for whom we have data.

Some Australian governments have public sector bargaining policies that limit the increase in total remuneration per employee they will agree to as part of enterprise agreement negotiations. For example, it is NSW Government policy to only approve agreements that increase total employee-related costs by 2.5 per cent per annum or less.[102] This implies that any increase in one component of employee remuneration – such as super contributions – must come at the expense of some other component, unless the policy is breached.

There are examples of public sector agreements providing for lower wage increases in years in which super is set to increase. For example, the recent agreement between teachers and the NSW Government provides for a 2.5 per cent wage increase in 2020 – consistent with the government's cap – followed by a 2.28 per cent increase in 2021, when an additional 0.22 per cent is to be paid as super.[103]

---

97. Ibid.
98. There may be some unincorporated private sector employers in Western Australia with collective agreements.
99. Victoria voluntarily referred its industrial relations powers to the Commonwealth in 1997. The Commonwealth's powers expanded again in 2006, with the *WorkChoices* legislation, which meant that corporations were then in the federal system. The remaining states, other than Western Australia, referred their powers over non-government industrial relations in 2009, prior to the commencement of the *Fair Work Act 2009*.
100. The WA industrial relations system covers employees of organisations that are not 'constitutional corporations'; see *New South Wales v Commonwealth* [2006] HCA 52 for a definition of this term. The WA Government estimates that between 22 and 26 per cent of employees in WA are covered by the state industrial relations system, including state government employees. See: Minister for Commerce and Industrial Relations (WA) (2018).

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101. With the necessary exclusion of the 'sector' variable.
102. NSW Treasury (2014). This policy remained current as at December 2019.
103. NSW Teachers Federation (2019).

4.2   Awards

Economic theory suggests that when wages can't fall, there's no scope for the cost of mandated benefits such as super to be passed to workers in the short term (see Section 1.3 on page 10). This is generally the case for workers paid at the minimum wage in the United States, where minimum wages are adjusted infrequently. In Australia, by contrast, minimum wages are adjusted every year, and their adjustment takes super into account.

Australia has a range of legally-binding minimum wages that vary by industry and occupation. These are set out in awards – there are over 100 'modern awards' in the federal IR system.[104] The National Minimum Wage (NMW) applies to any worker not covered by an award or collective agreement.[105] The NMW and award wages are reviewed each year by the Fair Work Commission (FWC) as part of a process called the Annual Wage Review. Slightly more than a fifth of Australian workers – 2.2 million – are paid exactly at a rate set out in an award.[106] A small additional number – about 100,000 – are paid exactly at the NMW.[107]

Award-reliant workers are, by definition, paid the minimum rate they may legally be paid. This means there is no scope for employers to legally reduce their wages.[108] For these employees, the trade-off

between wages and super contributions is determined by the FWC.[109] Higher super contributions are likely to lead to slower growth in minimum wages via two channels: the direct effect via smaller minimum wage increases in the year super goes up; and any indirect effect via super's effect on the pay of higher-income earners, which provides a reference point for subsequent minimum wage decisions by the FWC.

Direct effect of super on minimum wages

The FWC and its predecessor, the Australian Industrial Relations Commission (AIRC), have made it clear that they take increases in compulsory super into account when adjusting minimum wages.[110] The AIRC was specifically required to take super into account.[111] The *Fair Work Act 2009* doesn't mention super as a factor the FWC has to take into account, but the FWC has made it clear that it feels it must take account of super changes, given that the Act does require it to consider changes in 'employment costs' and other factors affected by super.[112]

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104. See: Fair Work Commission (2019b).
105. The ABS classifies NMW employees under the 'individual arrangements' pay-setting category; see ABS (2019e).
106. ABS (2019d).
107. Australian Government (2019, p. 12). There is an estimated 92,600 employees paid exactly at the NMW rate who are not award-reliant.
108. If employers do not comply with minimum wages, this means that the degree of pass-through from higher super to lower wages for their employees is likely to be at least as high than for other award-reliant employees. This is because a non-compliant employer is not constrained by the FWC's decision. A compliant employer will increase wages when the FWC's decision takes effect;

a non-compliant employer may not, and is therefore more able to pass on a super increase to their workers.
109. A very small number of employees are directly covered by state awards. State industrial relations commissions generally increase state award rates of pay at around the same rate as the FWC.
110. The AIRC was responsible for adjusting minimum wages until 2005. The Australian Fair Pay Commission had this responsibility from 2006 to 2009. The Fair Work Commission (initially called 'Fair Work Australia') has been responsible since 2010. Compulsory super contributions did not rise during the AFPC's existence.
111. s.90A of the *Industrial Relations Act 1988*, and later s.90A of the *Workplace Relations Act 1996*.
112. In the 2012-13 Annual Wage Review, Ai Group submitted that various factors in the Act meant super changes 'must be taken into account'. The FWC Panel stated 'we agree with Ai Group's submission', explaining that it felt compelled to take super into account given that the Act requires them to consider 'productivity, employment costs and the regulatory burden' and 'business competitiveness and viability', among other things. See: Paras. 355-357, [2013] FWCFB 4000.

Compulsory super contributions increased by 0.25 percentage points in both 2013 and 2014. The FWC Expert Panel had to consider, as part of its Annual Wage Reviews in those years, whether it should grant a smaller increase in minimum wages than it would have in the absence of a super increase.

The ACTU submitted that it should not, on the grounds that there had been a fall in other non-wage labour costs, such as workers' compensation premiums, and that the increases in compulsory super were small and long-anticipated, giving employers the ability to adjust.[113] Employer groups argued that it would be consistent with the FWC's legislative mandate to take super into account;[114] that it would be consistent with past decisions of the AIRC to do so;[115] and that the FWC should therefore fully offset the rise in compulsory super contributions by awarding a lower wage increase than otherwise.[116]

In its decision, the FWC Expert Panel stated bluntly that it agreed with the employer submission regarding its legislative mandate[117] and rejected the ACTU's view:

> In addition to the public benefit achieved by supporting retirement incomes through the superannuation system, SG contributions also constitute a deferred benefit to employees and a cost to employers. As we have mentioned, our characterisation of SG contributions distinguishes them from other non-wage labour costs. It follows that we do not accept the premise of the ACTU submission.[118]

Increases in compulsory super reduced the pace of wages growth relative to where it otherwise would've been, as the Panel made plain:

The SG rate increase to apply from 1 July 2013 is a moderating factor in considering the adjustment that should be made to minimum wages. As a result, though it would not be appropriate to quantify its effect, the increase in modern award minimum wages and the NMW we have awarded in this Review is lower than it otherwise would have been in the absence of the SG rate increase.[119]

The FWC Expert Panel has been clear about two things: first, that when super has gone up, minimum wages have risen more slowly than they would have otherwise; and second, that it is not willing to quantify the extent of this trade-off. The Panel's decisions are not mechanistic, and take into account a broad range of factors.

The FWC's approach is consistent with the AIRC's before it. The legislation governing the AIRC's deliberations directed it to have regard to the Super Guarantee when adjusting minimum wages.[120] When compulsory super contributions went up, the AIRC stated that it took this into account in its decisions.[121] When compulsory super contributions didn't go up, the AIRC also noted this fact, suggesting that wage increases in those years were higher than they would have been if super had risen.[122]

It is clear that there is some pass-through of higher super into lower wages for award-reliant workers that happens immediately, in the year that compulsory super goes up. The extent of the pass-through is not clear. It is also likely there is some additional indirect, or 'second-round', pass-through from higher super to lower wages.

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113. ACTU (2013, p. 128).
114. Ai Group (2013, p. 49).
115. Ibid (p. 51).
116. Ai Group (ibid, p. 55); ACCI (2013, p. 14).
117. Para. 356, [2013] FWCFB 4000.
118. Para. 358, [2013] FWCFB 4000.
119. Para. 360, [2013] FWCFB 4000.
120. *Industrial Relations Act 1993* (s90A); *Workplace Relations Act 1996* (s90A).
121. October 1995 Third Safety Net Adjustment Section 150A Review decision (1995) 61 IR 236 at 278; April 1998 Safety Net Review (1998) 79 IR 37 at 60 and 70; May 2000 Safety Net Review Wages (2000) 95 IR 64 at 65, 76, 91, and 95; May 2002 Safety Net Review – Wages (2002) 112 IR 411 at 444.
122. April 1999 Safety Net Review – Wages (1999) 87 IR 190 at 191 and 203; 2001 Safety Net Review – Wages (2001) 104 IR 314 at 335.

Indirect effect of super on minimum wages

When it reviews award wages and the NMW, the FWC is required to take into account a range of criteria set out in the 'minimum wages objective' and 'modern awards objective' in the Fair Work Act.[123] These criteria include 'relative living standards and the needs of the low paid'.

A key metric in assessing relative living standards and the needs of the low paid is the ratio of the full-time minimum weekly wage to full-time median weekly earnings. The FWC Expert Panel always refers to this ratio in its decision. In its 2019 decision, the Panel said:

> We pay particular attention to changes in the earnings of NMW and award-reliant workers compared to changes in measures of average and median earnings more generally.

The FWC's decisions are not mechanistic, and take into account a broad range of social and economic criteria; they are not targeting a particular minimum-median wage ratio. But the FWC does take this ratio into account, and over the past decade its decisions have resulted in the ratio remaining remarkably consistent, as shown in Figure 4.2. When the FWC assumed responsibility for minimum wages, the National Minimum Wage sat at 54.4 per cent of the median wage. In 2018, this ratio was 54.1 per cent – virtually unchanged from a decade earlier.

Anything that restrains growth in the median wage is likely to exert downward pressure on growth in minimum wages. In Chapter 3 we demonstrated that increases in compulsory super have reduced wage growth for workers on enterprise agreements. Many of these workers are around the middle of the pay distribution; rising super therefore reduces growth in the median wage. It is therefore reasonable to conclude that rising super contributions have an 'indirect' or 'second round' effect on minimum wages via their effect on the median wage.

123. *Fair Work Act 2009* s284 and s134.

If rising super reduced wages for workers on collective agreements (as demonstrated in Chapter 3) but not for workers on awards and the NMW, we would expect to see minimum wages rising relative to median and average wages. This is not what has occurred. Workers on award wages and the NMW are not insulated from the super-wages trade-off.

Figure 4.2: The Fair Work Commission has kept minimum wages steady as a percentage of the median wage
Full-time minimum wage as a percentage of full-time median earnings
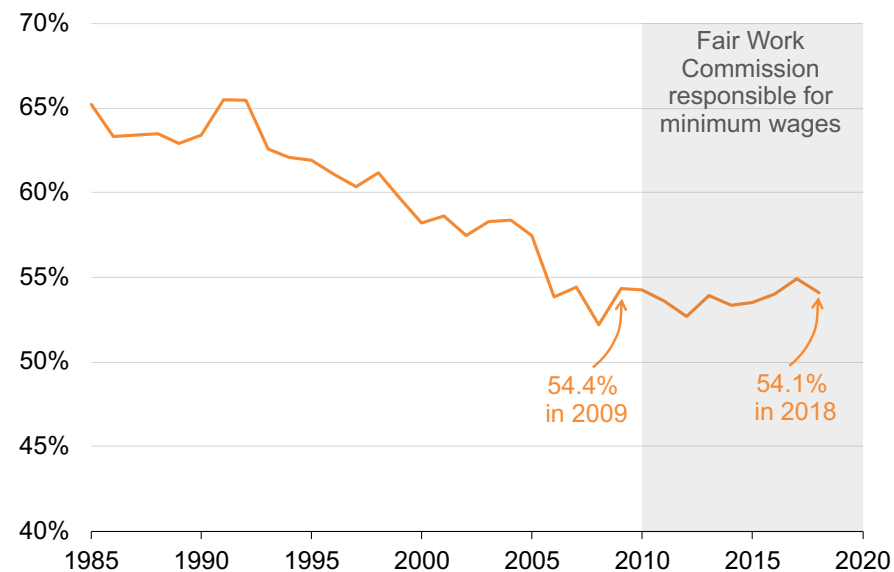
Source: OECD.Stat.

4.3 Individual arrangements

About 37 per cent of employees have their pay set by an individual arrangement.[124] It is unlikely that the extent of pass-through from higher super to lower wages is smaller for this group than for workers on collective agreements. They are subject to the same labour market forces, and their wages are more responsive to changes in economic conditions.

The 'individual arrangement' category is diverse. It covers a broad range of arrangements, ranging from high-paid professionals on common law contracts, to hospitality workers who are paid only a small amount above the award rate.[125] As a result of this diversity, it is difficult to generalise about individual arrangements.

Workers on individual arrangements are disproportionately likely to be managers, professionals, technicians and trade workers, and clerical and administrative workers. The occupational group with the smallest proportion of workers on individual arrangements is community and personal service workers. Individual arrangement workers are less likely to be employed on a casual basis than other employees. There are very few individual arrangement workers in the public sector – just 66,000 across the country.[126]

On average, people on individual arrangements have higher earnings than people on awards or collective agreements. The average weekly earnings for full-time individual arrangement workers is $1,777, compared to $1,630 for awards and collective agreements. The difference in average earnings is bigger if part-time workers are included ($1507 vs $1,138), because individual arrangement workers

are less likely to work part-time.[127] Figure 4.3 shows that workers on individual arrangements are disproportionately represented at the top of the income distribution, but they are still spread throughout the distribution.

Figure 4.3: A broad range of workers are on individual arrangements, but they're most common among high earners
Distribution of employees by weekly earnings, by pay-setting method
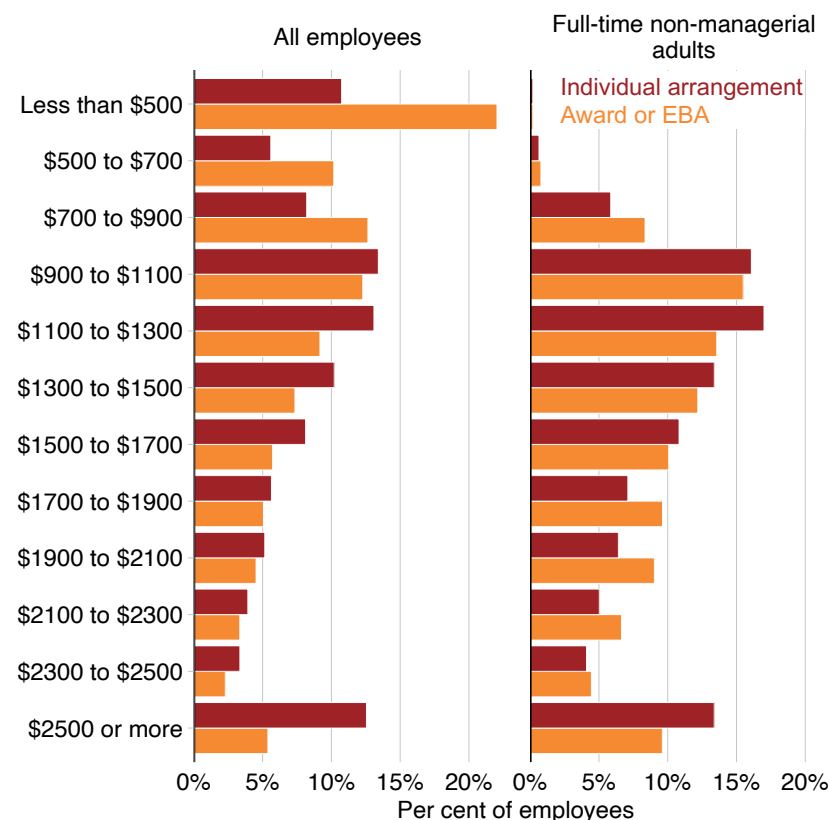
Source: ABS (2019f).

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124. ABS (2019f).
125. For a discussion of the worker characteristics associated with coverage by collective agreements, awards, or individual arrangements, see: Peetz and Yu (2018).
126. ABS (2019f).

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127. Ibid.

There are several reasons to expect workers on individual arrangements will bear the cost of super increases through slower wage growth:

- workers on individual arrangements whose pay is tied to an award will experience at least the same pass-through as those on awards;

- higher-paid workers on individual arrangements may have contracts in 'total remuneration' terms, which will mean any increase in compulsory super comes out of their wages; and

- pay for workers on individual arrangements is more responsive to economic conditions, so it is likely that it is also more responsive to regulatory changes that affect firms' costs.

About a third of individual arrangement workers earn less than $1,000 per week.[128] The wages of these relatively low-paid workers are likely to be influenced, directly or indirectly, by awards. Recent research by the RBA found that about 8 per cent of all wage changes for individual arrangement jobs are directly influenced by changes in award rates;[129] the share of jobs affected by FWC decisions is likely to be higher than this. For these workers, any pass-through from higher super to lower growth in award wages will affect them. The degree of pass-through for these workers may be even higher than for award workers, because employers have more scope to cut pay growth for workers paid above the award rate. For example, if a worker is paid $1 per hour above the relevant award rate, the employer has some scope to reduce that

differential to the award, while remaining compliant with their legal obligations and without cutting nominal wages.

Some highly-paid workers on individual arrangements have 'total remuneration' packages. Total remuneration packages specify the amount that an employee will be paid – inclusive of super. Any increase in one component of remuneration, such as compulsory super, will therefore come at the cost of other components of remuneration, such as wages. Slightly more than a third of workers on individual arrangements are managers or professionals,[130] occupational groups in which total remuneration packages are common.

Pay growth for workers on individual arrangements is more variable than for workers on awards or collective agreements. Individual arrangements are more responsive to changes in economic conditions.[131] This is clear in Figure 4.4. In the period of rapid economic growth and high inflation before the Global Financial Crisis, wages grew very rapidly for workers on individual arrangements – peaking at an average of nearly 5 per cent. Pay growth then slowed sharply, before rebounding as the economy recovered in the wake of the crisis. In the recent period of sluggish economic growth, wages have grown more slowly for workers on individual arrangements than for workers on other pay-setting methods, bottoming out at 1.5 per cent in 2016.

If wages are more responsive to changes in economic conditions for workers on individual arrangements, as is clearly the case, then it is reasonable to expect that the wages of those workers will also be most responsive to changes in labour costs, such as increases in compulsory super. Firms are more able to immediately pass through any changes in labour costs to individual arrangement workers than workers on other pay-setting methods.[132]

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128. Ibid.
129. Bishop and Cassidy (2019). The authors explain that their estimates from the Wage Price Index microdata weight each job by its contribution to the WPI. Given that award-influenced jobs are disproportionately low-paid, their wage-weighted share of wage changes is lower than their share of jobs. Wright and Buchanan (2013) found that about 20 per cent of private sector employees on individual arrangements or collective agreements had their pay influenced by an award.

130. ABS (2019f).
131. Bishop and Cassidy (2019).
132. EBAs are typically negotiated only every 2-to-4 years, whereas awards are adjusted once a year.

Figure 4.4: Wages are more responsive to economic conditions for workers on individual arrangements

Average annual wages growth by method of setting pay
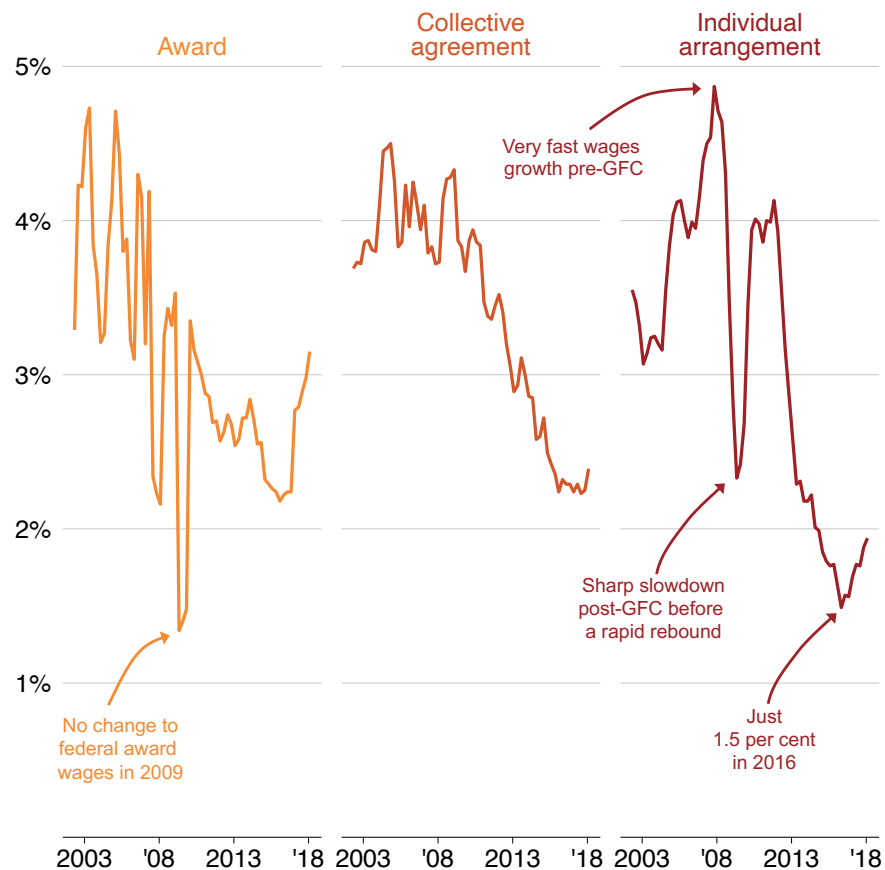
Note: The WPI data measures wage changes for individual jobs, rather than individual workers.

Source: Unpublished ABS WPI data reported in Bishop and Cassidy (2019).

5   Will this time be different?

Some advocates of higher compulsory super contributions, such as Bill Kelty[133] and Paul Keating,[134] have acknowledged that super came out of wages in the 1990s, but assert that further increases in super from current levels will not come out of wages.

Various reasons have been advanced to support the argument that future super increases will not come at the expense of wages. These include:

- In the past there was an explicit agreement in place to trade off higher super for reduced wages growth, but that agreement is no longer in place;

- Sluggish real wages growth in recent years in the absence of SG increases demonstrates the lack of connection between super and wages;

- Low wages growth does not provide scope for wages to be reduced in response to SG rises;

- Wages are 'sticky' and wages growth cannot fall below a certain level – above zero – which will prevent pass-through; and

- Labour markets are well-described by models of 'monopsony', in which traditional assumptions about the effect of policies such as minimum wages do not hold.

This chapter shows why these factors do not provide compelling reasons to believe that the future will be different from the past. The

history of the trade-off between wages and super is likely to be a reliable guide to the future.

5.1   We don't have an Accord now, but we didn't have an Accord during most SG increases

When compulsory super was introduced via awards, it was part of an explicit trade-off for lower wages growth, agreed with unions via the Prices and Incomes Accord.

There is no similar explicit agreement in place now, and some people argue that any pass-through from higher super to lower wages observed in the data (Chapter 3) may have been due to the institutional arrangements in place in the past.[135]

This is unconvincing. The institutional arrangements that delivered wage restraint were effectively dismantled around the time the SG was introduced. During the 1980s, most workers were paid according to awards; wage growth for most workers was determined by the Australian Industrial Relations Commission's decisions in National Wage Cases. Wage restraint was agreed to at a high level between the ACTU and the federal government – this agreement was able to be translated into policy via the National Wage Cases.

In the early 1990s, wage determination became much less centralised, with the adoption of enterprise bargaining. In 1993, the *Industrial Relations Reform Act* put enterprise bargaining at the centre of the system, with awards to play a diminished role as a safety net, rather than determining the pay of most workers. The move towards enterprise bargaining, with wages negotiated between individual

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133. The former ACTU secretary was recently reported as having said that 'the idea that pausing the Super Guarantee led to wage rises was laughable': Mather (2019).

134. For example, see: Keating (2019).

135. Stanford (2019, p. 21).

employers and unions, meant that top-down agreements on the pace of wages growth were no longer institutionally feasible.

In any case, the Accord ceased entirely in March 1996 when the ALP government lost power; all subsequent SG increases occurred in an institutional environment without a formal agreement to trade-off super for wages. Broadly speaking, the industrial relations arrangements in place since the early 1990s and covered by the WAD used in Chapter 2 – bargaining at enterprise level underpinned by an award safety net – were the same as the arrangements that will be in place for the scheduled increases in the 2020s.

5.2 Recent wage sluggishness does not disprove the super-wages connection

In October 2019, Paul Keating wrote in *Guardian Australia* that:

> The government has repeatedly relied upon the discredited analysis of the Grattan Institute, which claims that if employees take extra income as superannuation they will lose the equivalent in wages.
>
> This, of course, is a demonstrable lie. There has been absolutely no addition to compulsory superannuation contributions over the last five years, yet there has not been a jot of increase in real wages over the same period.
>
> For the Grattan analysis to have been correct, we would have seen real wages rise by at least 2.5 per cent, where, in fact, they have not risen at all.[136]

The claim here is that the absence of real wage increases in a period when the SG has not risen demonstrates there is no connection between super and wages. This does not follow. As demonstrated in Chapter 3, when super goes up, wages growth will be lower *than it otherwise would have been*.

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136. Keating (2019).

Nominal wages growth has been slow in Australia in recent years, as it has in many OECD countries. One closely watched measure, the Wage Price Index, has averaged only 2.1 per cent growth over the past five years.[137] If compulsory super had gone up during this period, we expect that wages growth would have been *even slower*. By the same token, cancelling future increases in the SG would not guarantee strong future wages growth – it would just remove one of the factors that will weigh on wages growth in the coming years.

5.3 Wages are still growing, and growing at around the same pace as the last time SG went up

Another argument is that low wages growth does not provide scope for super to come out of wages. It's true that wages growth is lower today than it was in some years when the SG was increased. But nominal wages are still growing, as shown in Figure 5.1 on the next page.

Average weekly earnings for full-time employees rose 3.1 per cent in the past year;[138] the National Accounts measure of average earnings rose 2.9 per cent;[139] and median hourly earnings rose by a solid 3.8 per cent.[140] The Wage Price Index – which measures average wage rises for a fixed basket of jobs, and therefore doesn't reflect any pay changes due to promotions or compositional change in the labour market – rose by 2.2 per cent.[141]

Annual growth in nominal wages is well above zero. This means there is still ample scope for wages growth to fall to accommodate an increase in compulsory super contributions. Wages growth has

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137. Compound annual growth rate in the Wage Price Index over the five years to the September 2019 quarter; Grattan calculation based on ABS (2019g).
138. Year to Q2 2019: ABS (2019b).
139. Year to Q3 2019: ABS (2019c).
140. Year to Q3 2019: ABS (2019h).
141. Year to Q3 2019: ABS (2019g).

also picked up from its low point, reached in or around 2016 on most measures. Wages growth is outpacing inflation on most measures.

Wages are also growing at a broadly similar pace as they were in 2013 and 2014, when the SG last rose.[142] In our examination of the microdata (Table B.6 in Appendix B) we do not find that the effect of increased super on wages has weakened over time, which suggests that the 2013-14 super increases reduced wages growth, just as earlier increases did. Current wages growth is similar to that in 2013-14, so there is every reason to believe that future SG increases will have similar effects on wages as in the past.

5.4 The share of workers not getting a pay rise has risen only slightly

Wages growth is below average, but wages are still growing (see Figure 5.1). The share of jobs[143] receiving no nominal pay rise year on year has risen only slightly since 2012, just before the last SG increase, as shown in Figure 5.2 on the next page.[144] Around a fifth of workers were stuck with no annual pay rise last time super went up (in 2013-14), but we find that the pass-through from super to wages was still high when super went up at that time (see Appendix B on page 61).

Far fewer workers (or jobs) are receiving very large pay increases today than in the past. Recent work by the Reserve Bank found that in the late 2000s, more than a third of jobs received pay rises of more than

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142. The WPI rose by 2.8 per cent over the year to Q2 2013 and 2.6 per cent in the year to Q2 2014, slightly faster than its current pace.
143. The Wage Price Index measures changes in pay for *jobs*, rather than *workers*.
144. Unfortunately, a consistent time series on the distribution of wages growth in Australia is not publicly available, and the ABS does not allow researchers to access the WPI microdata. Information from the RBA's liaison program suggests that the share of workers receiving no pay rise year on year rose from about 6 per cent in the 2002-2013 period, to about 11 per cent in 2013-14, before falling to around 8 per cent in 2014-15. See: Jacobs and Rush (2015).

Figure 5.1: Wages growth has slowed, but wages are still growing
Annual wages growth, per cent
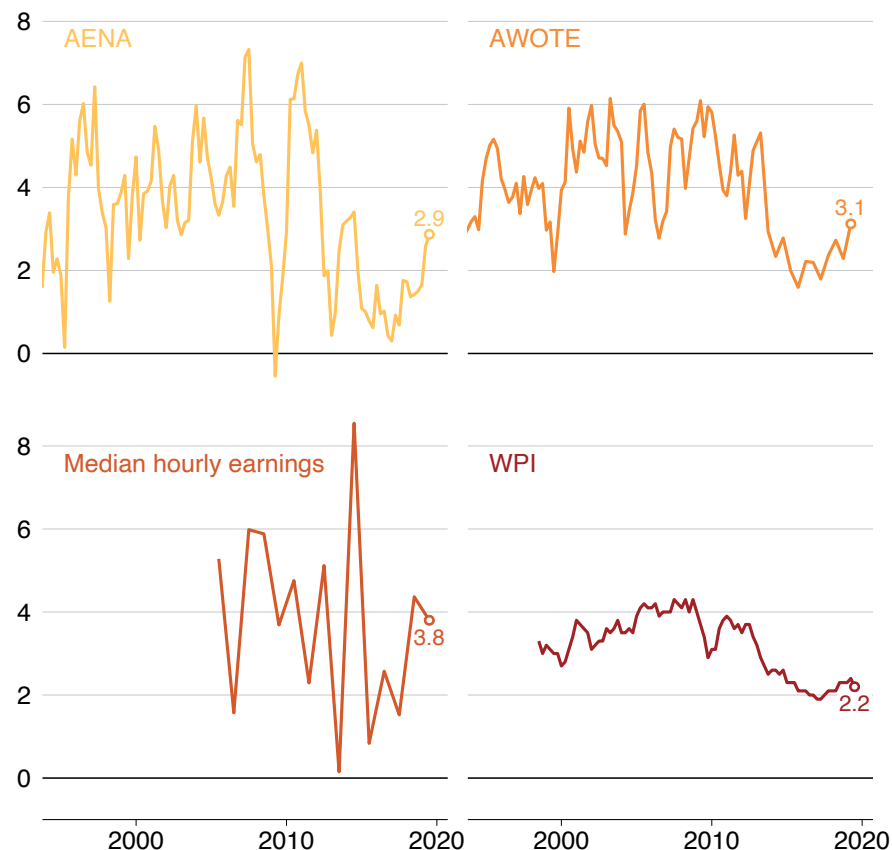
Notes: 'AENA (wages and salaries)' stands for 'average earnings in the National Accounts'; 'AWOTE' is 'average weekly ordinary time earnings' of full-time adults; and 'WPI' is the 'Wage Price Index'.

Sources: ABS (2019b), ABS (2019c), ABS (2019h) and ABS (2019g).

4 per cent; now, less than 10 per cent receive pay rises of this size.[145] This is consistent with the data on wage rises in collective agreements (see Figure 3.4 on page 26). The 'right-tail' of the wage distribution – jobs that once received large pay increases – has disappeared, with most jobs now receiving pay rises in the range of 0 to 4 per cent per year. But the share that receive *no* pay rise, or a very low pay rise, has risen only slightly.

Most workers are still receiving pay rises, even if these increases are lower than in the past. For most workers, therefore, there is scope for their wages to grow more slowly in response to an SG increase. For workers whose wages are not growing, this likely means that pass-through from higher super to lower wages is delayed, rather than avoided.

Many of the workers getting no pay rise in a given year are on expired enterprise agreements. When these agreements are re-negotiated and replaced, those workers will again receive pay rises – and the evidence presented in Chapter 3 suggests these pay rises will factor in any SG increase that is scheduled to occur during the life of the agreement.

5.5   Will wage stickiness prevent pass-through?

It is clear that wages growth remains well above zero, both on average and for most individual workers. But it is possible that there is some 'stickiness' in wages growth that limits the willingness or ability of firms to reduce pay growth below a certain – positive – level. It has been suggested that wages are sticky at around the level of inflation, because workers are unwilling to bear real wage cuts.

There is some evidence for this proposition.[146] But, for most workers, real wages are still growing. Inflation is around 1.8 per cent, and

Figure 5.2: Most workers are still getting pay rises
Distribution of annual nominal pay rises, per cent, 2012 and 2018
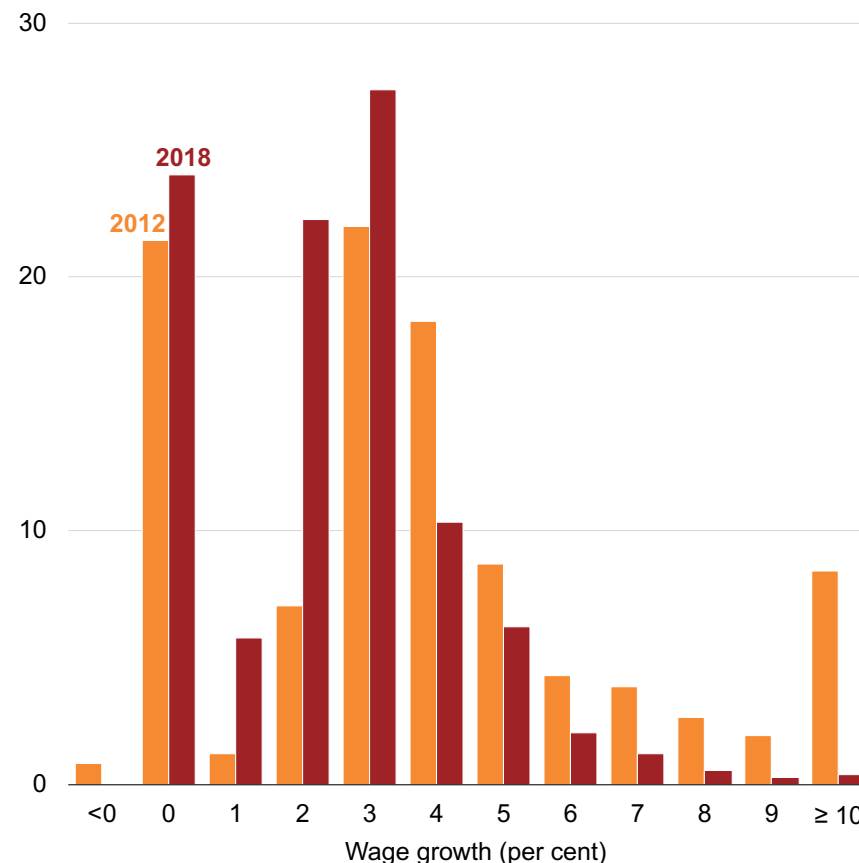
Source: Unpublished ABS Wage Price Index data reported by Debelle (2019).

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145. Debelle (2019).
146. Ibid.

has been below 2 per cent for an extended period.[147] Most workers continue to receive pay rises of 2 per cent or more. There is therefore scope to reduce pay growth for most workers without imposing real wage cuts.

There is some evidence from the US about what happens to mandated benefits when wages are inflexible.[148] The research finds that, in the short run, workers do end up bearing less of the cost of mandated benefits, in this case health insurance. But employers find a way to shift the burden back to workers over time – including by cutting employment. If low wages growth constrains pass-through in the short run, this is likely to merely delay, rather than prevent, pass-through.

5.6 Advances in labour market theory don't imply that employers pay for super

Another argument is that wages are socially determined and not well described by simple models like the one set out in Box 1 on page 12. There is a lot of good evidence for the proposition that labour markets are not perfectly competitive.[149] Economists increasingly think that labour markets are better described by models in which employers have some power in wage setting and sometimes use this power to pay wages that are less than what workers are 'worth' (their marginal revenue product). These theories are plausible, increasingly prominent in the economics literature, and well-supported empirically.

One of the most prominent models of the labour market is 'dynamic monopsony'. In his widely-cited book about dynamic monopsony, Alan Manning of the London School of Economics summarises the two key propositions of the model as follows:

- *there are important frictions in the labor market;* and

- *employers set wages.*[150]

Dynamic monopsony, and similar models in which wages are partly determined by the relative bargaining power of employees and employers, are entirely consistent with the idea that increases in labour costs – such as compulsory super – will be passed on to workers. The proposition that employers have power over wage-setting does not support claims that SG increases will be borne by employers.

There are reasons to think workers may have less bargaining power now than they did in the 1990s when the SG was introduced. This is in part due to institutional changes, such as declining rates of union membership, but also economic changes, such as globalisation, rising concentration, and the spread of new technology. If workers' bargaining power has fallen, and bargaining power is an important determinant of wages, then we should expect to see today's workers bear a larger, not smaller, share of SG increases.

Theories such as dynamic monopsony have been used to explain repeated empirical findings that minimum wage increases do not have a statistically significant effect on employment.[151] But minimum wages are not analogous to the SG. Changes in the minimum wage amount to compulsory increases in employees' *total remuneration*,[152] whereas the SG requires only that a certain percentage of total remuneration is paid in super.

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147. ABS (2019i).
148. Sommers (2005).
149. For example, see Booth and Katic (2011), Manning (2003), Dube et al (2018) and Cengiz et al (2019).

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150. Manning (2003).
151. There is an extensive literature on this question; for example, see: Cengiz et al (2019).
152. This is the case if there are no discretionary non-wage components of remuneration.

5.7 Higher compulsory super isn't a path to a pay rise

Some have expressed concerns about the failure of wages to keep up with labour productivity growth in Australia and other OECD countries.[153] Some commentators argue that lifting compulsory superannuation is a means to secure workers their share of productivity growth, especially at a time when the labour share of income appears to be falling.

It's possible that employers may be able to afford to pay higher compulsory super contributions without reducing wages growth. But proponents of this view do not explain why employers will choose not to pass on the cost of higher compulsory super, unlike in the past.

None of the plausible explanations for lower wages growth – whether slower growth in productivity, technological change, globalisation, an under-performing economy, or weaker bargaining power among workers – helps explain how employers would foot any more of the bill for higher compulsory super this time around.[154] In fact, if workers' bargaining power has fallen, as several proponents of higher compulsory super argue,[155] then employers should be even *less* likely to pay for higher compulsory super than in the past.

The evidence in this report demonstrates that higher compulsory super won't lead to higher wages for workers – rather the opposite. Further increases in compulsory super are likely to come at the cost of wages, slowing growth in workers' living standards even further.

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153. Views differ on the extent and causes of this phenomenon. See, for example: T. Treasury (2017), Stanford (2018), La Cava (2019), Kirchner (2019) and Cowgill (2013). See OECD (2018) for a discussion of the decoupling of wages growth from productivity in OECD countries.
154. For a detailed discussion of the possible causes of slower wages growth in Australia, see: Bishop and Cassidy (2017) and Cassidy (2019).
155. Stanford (2019, p. 57).

6   Implications for retirement incomes policy

This working paper confirms that workers bear somewhere between 'most' and 'all' of the cost of compulsory superannuation. It shows that higher compulsory super can only boost retirement incomes by making Australians worse off before retirement. The findings reinforce our earlier recommendation that the planned increase in the rate of compulsory super contributions to 12 per cent by July 2025 should be abandoned.[156]

Our previous research showed that for many Australians, the trade-off between higher super and lower wages isn't worth it. Increasing the Super Guarantee as planned would effectively compel most people to save for a higher living standard in retirement than they enjoy in their working lives. Lifting compulsory super would also do little to boost the retirement incomes of many low- and middle-income workers, while hurting them today. Pension payments are benchmarked to wages after super, and so it would also reduce the value of pension payments – hurting pensioners today. And raising compulsory super to 12 per cent would cost the budget $2 billion a year now, and well into the future.

Past Grattan research assumed that 100 per cent of the impact of higher compulsory super would come at the cost of lower wages for workers. Yet our conclusions are unchanged whether workers pay for about 90 per cent, 80 per cent, or even 70 per cent, of the cost of higher compulsory super via lower growth in wages.

6.1   Higher super is not needed

Grattan Institute's 2018 report, *Money in retirement*, showed that most Australians can already look forward to a comfortable retirement. The vast majority of retirees today and in future are likely to be financially comfortable. Our modelling shows that, even after allowing for inflation, the average worker today can expect a retirement income of at least 89 per cent of their pre-retirement income – well above the 70 per cent benchmark used in that report and endorsed by the OECD. The vast majority of workers in their 40s and 50s are also on track for a comfortable retirement (Figure 6.1 on the next page).[157] Many low-income Australians will get a rise in pay when they retire, because the Age Pension and the income they get from compulsory retirement savings will be higher than what they earned before retirement.

Forcing Australians to save more for their retirement is not always beneficial. If people have lower living standards while working they are less able to be able to afford to buy a home, or invest in their children's education, or start a new business. And for vulnerable Australians it leaves them at greater risk of poverty or financial stress. Meanwhile making Australians save more than they need (or are likely to spend) in retirement is a recipe for larger inheritances, which will exacerbate wealth inequality.[158]

Policy makers can justify lowering someone's living standards during their working life only if they're protecting them from even worse outcomes in retirement. Inevitably, policies will not produce the best outcome for every person to whom they apply. But setting retirement incomes policy for the small number of Australians who would

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156. Daley et al (2018).

157. Replacement rate for a median worker aged 30 today. Replacement rates for median workers aged 40 and 50 today are 94 per cent and 93 per cent respectively. All replacement rates have been updated since *Money in retirement* to reflect the passage of the Government's personal income tax cuts. The modelling has also been updated to reflect the 2015-16 ATO Taxation Statistics and an adjustment to how voluntary pre-tax super contributions are captured in the model, as already published in Coates et al (2019, pp. 22–23).

158. Daley et al (2014, p. 1).

otherwise not replace their pre-retirement living standards would mean forcing everyone else to save too much.[159]

Our retirement modelling accords with the actual experiences of retired Australians today. Retirees today are less likely than working-age Australians to suffer financial stress such as being unable to pay a bill on time.[160] Across the income and age distributions, people typically have enough money to sustain the same, or a higher, living standard in retirement as when working (Figure 6.1). Most own their own homes. And most retirees are more likely to be able to afford optional extras such as annual holidays. Australians tend to spend less after they retire, and even less into old age.[161] While their medical costs increase with age, these are largely borne by the taxpayer. Many retirees are net savers, and current retirees often leave a legacy almost as large as their nest egg on the day they retired.[162]

Grattan's findings also accord with past modelling by the Treasury, including that done for the Henry Tax Review, as well as recent retirement modelling by researchers at the ANU.[163] Further, our findings

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159. Henry (2009, p. 1) adopted a similar approach, suggesting that Superannuation Guarantee contributions be 'benchmarked by reference to moderate potential replacement rates for retirees with a full history of contribution at median to average earnings'.
160. Daley et al (2018, Figure 3.1).
161. Daley et al (ibid, Figures 3.5 and 3.6).
162. See Daley et al (ibid, pp. 32–34) for a detailed discussion of retirees' savings behaviour.
163. For example, see: Henry (2009). In particular, in briefing documents released under Freedom of Information laws, Treasury notes: 'Grattan's findings are broadly consistent with internal Treasury analysis. This includes the projection that median wage and salary earners entering the workforce today will have high replacement rates (retirement incomes compared to measures of working life income), including over 90 per cent for median wage and salary earners (based on inflation adjusted incomes).' Treasury (2019, p. 18). Finally, Khemka et al (2020) find that the optimal Super Guarantee is below the current level of 9.5 per cent, although some of their modelling assumptions differ from ours.

Figure 6.1: Both younger and older workers can expect to replace at least 70 per cent of their pre-retirement income when they are retired
Replacement rate, whole of retirement/last five years of working life, CPI deflated, per cent
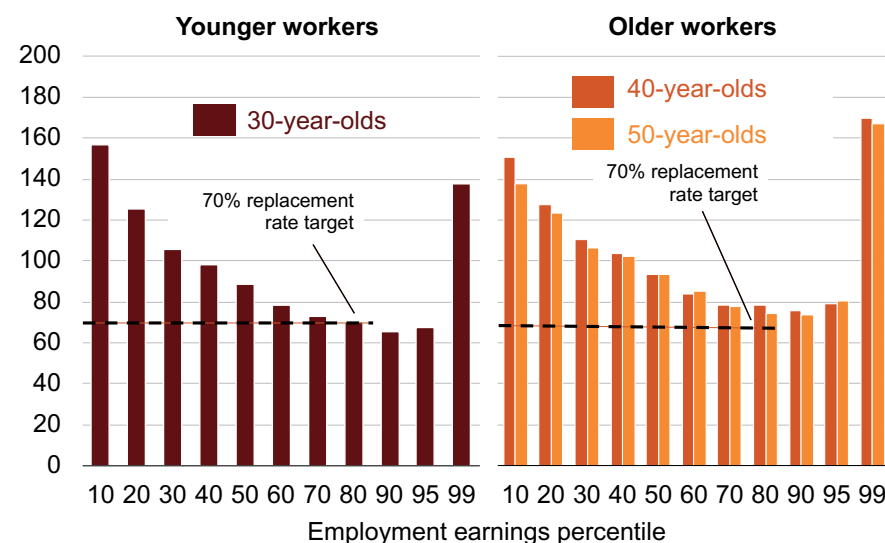
Notes: See Daley et al (2018, Figure 1.2). Based on current retirement income policy settings, including 12 per cent superannuation, and assumes 80 per cent of the cost of higher compulsory super contributions comes via lower wages.

Source: Daley et al (ibid, Figure 1.2), updated for latest Grattan retirement incomes projections published in Coates et al (2019, pp. 22–23) and reflecting passage of the Government's recent personal income tax cuts.

are robust to a range of alternative assumptions including lower investment returns, different draw-down behaviours, and ignoring all voluntary super or non-super savings.[164] Much previous retirement incomes modelling forecast that retirees' spending needs would rise in line with wages as retirees aged. But Daley et al (2018) showed that Australians tend to spend less after they retire, even when they have money to spare. Therefore, retirement incomes should be measured after accounting for inflation, rather than wages.[165]

Crucially, retirement incomes also remain adequate for most Australians even when they take significant career breaks, such as to care for children. For instance, past Grattan research has shown that if a median-income earner takes a five year career break, and works for 32 rather than 37 years – their 'replacement rate' will only fall from 89 per cent to 87 per cent – still well above the 70 per cent benchmark used by Grattan and others. If they take a 10 year break, their replacement rate only falls to 85 per cent.[166] When careers are interrupted, workers save less super for retirement, but will tend to get

larger part-pensions, offsetting much of any potential fall in retirement income from accumulating less compulsory super.[167]

Retirement incomes are adequate for most Australians – but not for retirees who rent. Senior Australians who rent in the private market are much more likely to suffer financial stress and poverty than homeowners. And this problem will get worse: on current trends, home ownership for over-65s will decline, meaning many more retirees will rent privately in future.[168] Yet higher super will reduce working-age incomes, making it harder for younger Australians to afford to buy a home, while leaving low-income renters in even more financial stress than they are currently.

6.2 Lifting the Super Guarantee won't help low- and middle-income workers much in retirement

Increasing compulsory super contributions to 12 per cent would leave Australian workers with less money in their pockets now when they need it most, while giving them more in future when they need it less. But it won't actually translate into materially higher retirement incomes for many low- and middle-income workers (Figure 6.2 on page 56).

As *Money in retirement* showed, higher income from super at retirement is largely offset by reduced pension payments, resulting in little net increase to retirement incomes.

The more superannuation you have, the less Age Pension you will receive in retirement, due to the income and assets means tests for the

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164. For detailed sensitivity analysis of our retirement modelling, see Daley et al (2018, Table 4.3 and Appendix D).

165. Since replacement rates in the Grattan Retirement Income Projector (or GRIP) are calculated by comparing retirement incomes over the entire retirement to the last five years of working, GRIP implicitly allows for wage deflation of working-age incomes, but CPI-deflation of retirement incomes. This approach is consistent with the design of most defined-benefit pension schemes. Coates et al (2019, p. 5).

166. For workers at the 70th percentile, replacement rates fall from 74 per cent for those working 37 years to 71 per cent when working 32 years and 70 per cent when working 27 years. These figures are based on modelling conducted in 2018 before the government introduced income tax changes which will change our numbers slightly. Coates and Emslie (2019, p. 26).

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167. Some high-income earners who take an extended career break may not have incomes in retirement that are more than 70 per cent of the relatively high income they had the day before they retired. This situation – not uncommon for high-income women – embodies the trade-off inherent in retirement incomes. These earners can only maintain their lifestyle from their last few years of working in retirement if they have quite a lot less income for much of their working life.

168. Coates (2019b).

Age Pension. Increasing the Super Guarantee reduces wage growth, and thus reduces Age Pension indexation, which is linked to wages.[169] Higher compulsory super would also hurt pensioners today by reducing their pension payments relative to where they otherwise would've been.

Instead, the main beneficiaries from a higher Super Guarantee would be high-income workers, who receive a much larger tax concession than low-income workers and who will receive a relatively small share of their total income in retirement from Age Pension payments. In total, it's likely that any increase in compulsory super is likely to be regressive: it provides a proportionally greater increase in the retirement incomes of high-income earners, who are ineligible for the Age Pension, than it will for low- and middle-income earners who will be subject to the Age Pension means tests in future.

If workers are being compelled to forego wages for up to 40 years into the future, one would reasonably expect that it would leave them better off overall. Yet taken together, middle-income workers could be worse off over their lifetimes if compulsory super rises to 12 per cent. They would give up post-tax wages of around 1.5 per cent to 2 per cent today, in exchange for a very modest boost to their retirement incomes.

Previous Grattan work has assumed a one-for-one trade-off between higher compulsory super and lower wages, but Figure 6.3 on the next page shows that middle-income earners could be left worse off over their entire lives even if workers only pay for 70 per cent of the cost of compulsory super increases via lower wages.[170]

And if we assume that up to 30 per cent of the costs of extra compulsory super is passed onto employers, it still comes from somewhere. If employers respond to the costs of higher compulsory super by raising prices, therefore raising the cost of living, workers still pay the price. If it is absorbed by corporate profits, that will reduce the growth in super balances, affecting workers' retirement incomes. Otherwise, it could come via higher unemployment as firms choose not to hire workers due to the costs of those higher super contributions.

6.3 Lifting the Super Guarantee is expensive

Raising the Super Guarantee doesn't just reduce workers' take-home pay relative to where it would otherwise be. It also hits the Commonwealth Budget. Instead of workers receiving wages that are then taxed at full marginal rates of personal income tax, the extra compulsory contributions to their super fund are taxed at 15 per cent.[171]

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169. Past Grattan work has estimated that increasing the Super Guarantee to 12 per cent could lower future pension payments by 1.7 per cent if super were fully passed through to wages. For example Daley et al (2018, p. 90) assumed that only 75 per cent of the reduction in wage growth will pass through to Male Total Average Weekly Earnings (MTAWE), and hence to the maximum rate of the Age Pension. So, for each 1 per cent increase in the Superannuation Guarantee, the maximum rate of the Age Pension is 0.75 per cent lower than otherwise. Revised modelling in Figure 6.2 on the following page estimates that higher compulsory super would lower pension payments by 1.44 per cent on the basis that 72 per cent of workers in the MTAWE benchmark receive super contributions of between 7 per cent and 12 per cent of salary and wage income and are therefore likely to be affected, and assumes that 80 per cent of the cost of higher compulsory super is passed on to lower wages for workers.

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170. Past Grattan work also demonstrated that lifetime incomes of middle-income workers could go backwards even if employers covered some of the cost of higher compulsory super contributions in the long-term. If we applying a common but relatively low real discount rate of 2 per cent to allow for the fact that people tend to prefer getting a dollar today rather than getting the same dollar in 40 years' time, many Australian workers would be left worse off even if only a modest portion of the cost of extra compulsory super increases came from wages. See: Emslie and Coates (2019).

171. Or 30 per cent for those earning more than $250,000 and therefore subject to the Division 293 tax.

Figure 6.2: Raising the Super Guarantee to 12 per cent won't help many low- and middle-income workers much

Change in total retirement income if the Super Guarantee increases to 12 per cent compared to staying at 9.5 per cent, $2015-16, CPI-deflated

Legend:
- Super
- Age Pension – less indexation
- Age Pension – assets test
- ● Total change in retirement income

X-axis: Employment earnings percentile
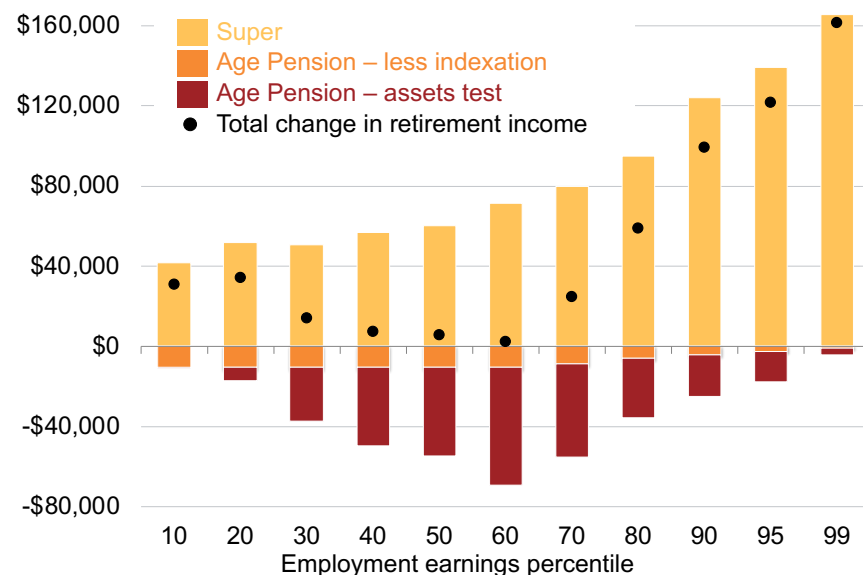
Notes: See Daley et al (Appendix C 2018). Assumes that 80 per cent of the cost of higher compulsory super contributions are passed through to lower wages, in line with the econometric findings in Chapter 3. This approach probably underestimates the long-term pension impact, because pass through to wages is likely to be higher in the long-term. Assumes that 72 per cent of workers in the MTAWE benchmark are covered by higher compulsory super contributions.

Source: Daley et al (Figure 9.2 ibid), updated to reflect more recent data and methodological improvements to the Grattan Retirement Income Projector.

Figure 6.3: Middle-income earners could be left poorer over their lifetimes, even if workers pay for only 70 per cent of super increases via lower wages

Change in lifetime income (CPI-deflated) from increasing compulsory super to 12 per cent

Legend:
- Full super increase comes from wages
- 90% of increase comes from wages
- 80% of increase comes from wages
- 70% of increase comes from wages

X-axis: Employment earnings percentile
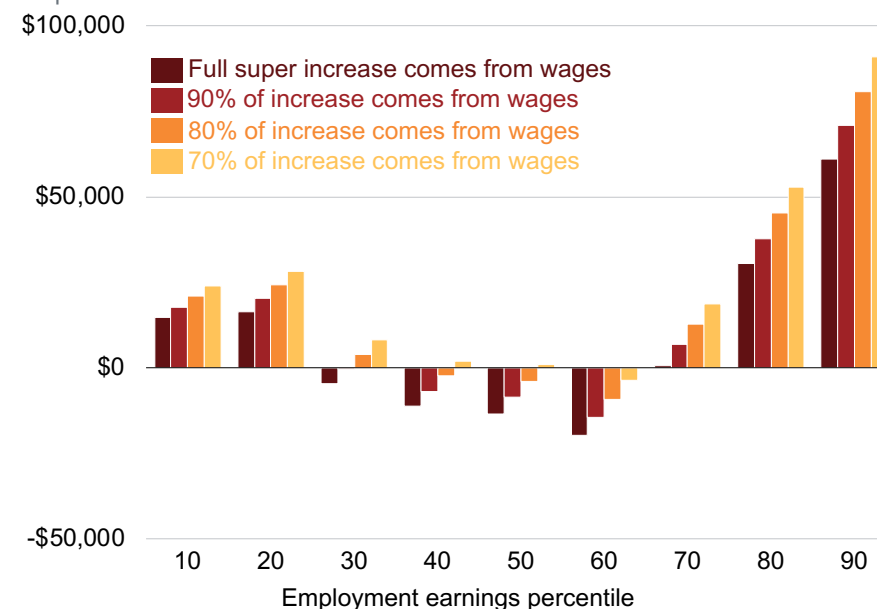
Notes: Results from modelling the retirement income of a person born in 1985, who works from age 30 to 67, and dies at age 92. Retirement savings are drawn down so that a small bequest is left in addition to the home. Modelling revised following the passage of the Government's personal income tax cuts in 2019 and further revisions to the Grattan Retirement Income Projector. Assumes 72 per cent of workers in the MTAWE benchmark are affected by higher compulsory super, based on Grattan analysis of ATO (2019e).

Source: Grattan Retirement Income Projector.

We estimate that raising the Super Guarantee to 12 per cent could cost the budget $2 billion a year in additional super tax breaks.[172] These estimates are not substantially affected by assumptions about whether workers or employers cover the cost of higher compulsory super.[173]

Super tax breaks will continue to cost the budget more than they save in pension payments until about 2060, according to Treasury analysis in 2013. The cumulative increase in Commonwealth public debt from a 12 per cent Super Guarantee would exceed 10 per cent of GDP by 2050.[174]

6.4 Governments will have to act soon if they want to cancel planned increases in compulsory super

This paper demonstrates that higher compulsory super will come at the expense of workers' wages. And past Grattan work has shown that trade-off isn't worth it for many Australians.

Governments will need to act soon if they want to cancel planned super increases. New wage agreements are being negotiated now. As our research in Chapter 3 shows, scheduled increases in the SG are taken into account in the wage rises agreed to under enterprise bargaining agreements.

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172. Estimates based on past Treasury costings of the actual budgetary impact of changes in compulsory super, as published in Budget papers. See: Daley et al (2018, pp. 92–93). These estimates have adjusted down to account for the passage of the Government's personal income tax cuts in 2019. Those cuts reduce the gap between marginal rates of personal income tax, and super contributions that are typically taxed at 15 per cent.

173. For example, Grattan analysis of the ATO 2 per cent sample file of personal income tax returns suggests that the average *marginal* tax rate on personal income is 27 per cent, compared to a corporate tax rate of 27.5 per cent for firms with turnover of less than $25 million a year, or 30 per cent for larger firms.

174. Daley et al (2018, pp. 93–94). These cost estimates predated recent policy changes: a higher pension assets test taper rate and tighter super tax breaks. But these changes are unlikely to substantially affect the budgetary costs of raising the Super Guarantee. More recently, Rice Warner (2019, p. 9) estimated that increasing the Super Guarantee to 12 per cent would see the pension savings from higher compulsory super rising to 0.1 per cent of GDP to 2100, whereas the tax breaks from higher super would cost an average of 0.2 per cent of GDP each year over the century.

Appendix A: Model residuals

Each agreement in the Workplace Agreements Dataset has an actual value of annual wage increases ($wage\_inc_i$) that our model estimates using the information provided to it.

The difference between the value of $wage\_inc_i$ *predicted* by the model and the *actual* value is called the residual. It is the part of the data we can't explain with the information provided.

Models have residuals because there will always be behaviour that we can't explain just with the information we have. They are an inevitable part of modelling. But they should be random. While there can be unexplained variation in our data, there shouldn't be any pattern do it. If there is, we may have misspecified our model, such as by leaving our important variables.

Figure A.1 plots our residuals along the y-axis, against the model's 'fitted' values along the x-axis. The density plot on the right shows that the residuals are normally distributed around zero, for both agreements with and without changes to the superannuation guarantee. The linear trend, in black, confirms that there is no relationship between the fitted values and residuals.

However, there is greater *variance* in the residuals as the fitted values grow. This property, called heteroskedasticity, means traditional standard errors may underestimate the variance in the data, and so overstate our confidence in our results.

To address this, we use 'heteroskedasticity-corrected standard errors' to evaluate our models in all tables in this report.[175]

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175. Standard errors are corrected for heteroskedasticity using the HC1 method. This correction method is appropriate for large samples: Mackinnon and White (1985) and Long and Ervin (2000).

Figure A.1: Relationship and distribution of fitted and residual values from Model (3)
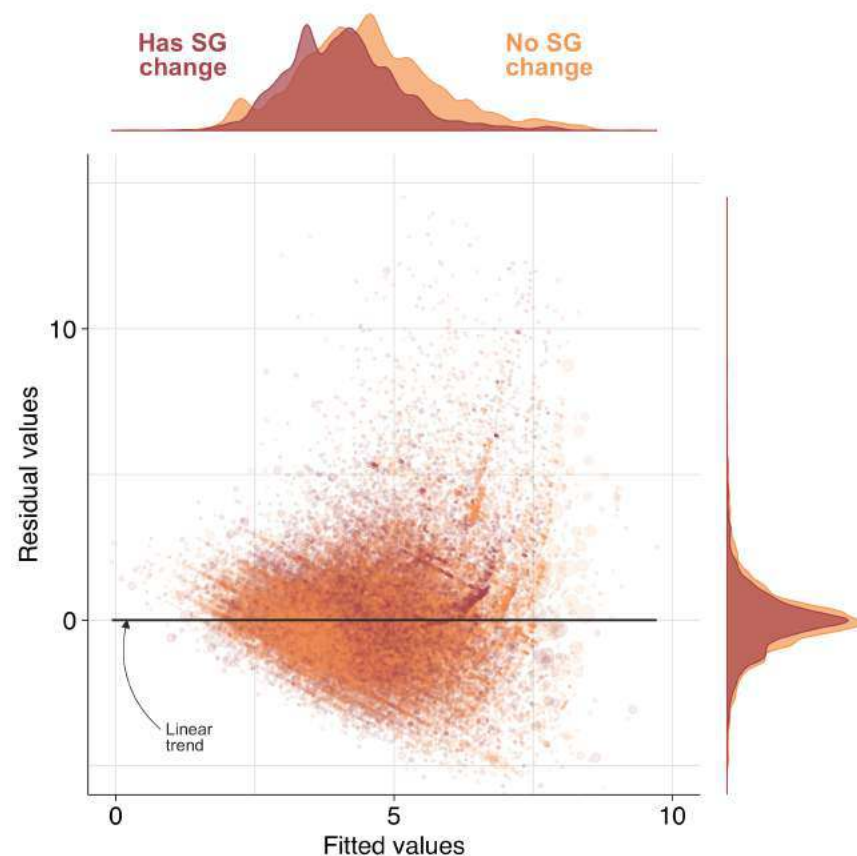
Notes: See Section 3.3.

Source: Grattan analysis.

Appendix B: Sensitivity to alternate model specifications and data subsets

This Appendix explores the robustness of our modelling developed in Chapter 3. Small changes to our preferred model – such as variable selection, use of weights, or data filtering – shouldn't have a substantial effect on our key finding that there is substantial pass through from higher compulsory super to lower growth in wages.

The 'base' model for these tests is Model (3). Changes to the base model and their effects are shown in the following sections.

Using unweighted regression

The goal of our analysis was to work out the average effect of changes to the Superannuation Guarantee on workers' wages growth.

This end justified a weighted-least-squares approach on the number of employees covered by each agreement: we care more about large-scale agreements than small-firm agreements.

The regressions in Table B.1 remove this structure, using unweighted ordinary least squares regression on agreements with 100 or more, and 200 or more, employees, respectively.

Table B.1: Models (r1)-(2)

| | Model (3): | |
	(r1) Unweighted 100+	(r2) Unweighted 200+
$\Delta(w\|sg)$	0.769***	0.931***
	(0.089)	(0.114)
Observations	15,182	8,261
Adjusted R^2	0.339	0.353

The coefficient on $\Delta(w|sg)$ in models (r1) and (r2) suggest that our finding is not totally reliant on the weighted least squares estimation

method. There is some indication that the relationship between the SG and wages becomes stronger with larger agreements.

Using the unadjusted change in the Superannuation Guarantee

Table B.2 shows the effect of replacing the $\Delta(w|sg)$ variable with the unadjusted change in the SG, ΔSG_i, which is the sum of the total percentage point changes to the SG over the life of an agreement.

Table B.2: Model (r3)

| | Model (3): |
	(r3) Percentage point change to SG
ΔSG_i	-0.753***
	(0.110)
Observations	78,072
Adjusted R^2	0.469

Notes: See Table 3.2.

Section 3.2.1 on page 23 explains that using this ΔSG_i is problematic because its expected effect on nominal wages is not linear.

The coefficient on ΔSG_i of -0.753 is lower than that of $\Delta(w|sg)$ in model (3). This is expected: as the SG level increases, the reduction in wages due to a full pass-through falls below 1 and continues to decrease (see Figure 3.3 on page 25).

Using alternative measures of inflation expectations

Inflation is a key variable in wages models.[176] We use the RBA's measure of inflation expectations implied by the difference between the 10-year nominal bond yield and the 10-year inflation indexed bond yield.

Alternative approaches are to use a direct measure of headline inflation, or a direct measure of inflation expectations of businesses. These variables are used in the robustness models in Table B.3.

Table B.3: Models (r4)-(r5)

	Model (3):	
	(r4) Headline CPI	(r5) Business inflation expectations
$\Delta(w|sg)$	0.839***	0.804***
	(0.118)	(0.121)
Observations	78,072	78,072
Adjusted R^2	0.470	0.468

Notes: See Table 3.2.

Differences by sector

There are differences in pay-setting behaviour in public institutions compared to private. Model (3) is run separately on wage data from private institutions and public institutions to examine whether there are structural differences in the pass-through of superannuation to wages based on sector.

Table B.4 shows that while there is a difference – public institutions have tended to have stronger or more immediate pass-through than private institutions – super has a significant effect on wages in both sectors.

Table B.4: Models (r6)-(r7)

	Model (3):	
	(r6) Private only	(r7) Public only
$\Delta(w|sg)$	0.704***	0.821***
	(0.127)	(0.239)
Observations	71,783	6,289
Adjusted R^2	0.426	0.579

Notes: See Table 3.2.

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176. See Bishop and Cassidy (2017) for example.

Excluding the years of potential confusion

For most of the Superannuation Guarantee's history, wage negotiators – employers, employees, and unions – have had information about changes to the SG before they settle on an agreement. Section 3.2.1 on page 23 described two periods where the expected path of the SG and the actual path may have differed: in 1995-96, and 2013-14.

Table B.5 shows the $\Delta(w|sg)$ and model statistics when these years of potential confusion are excluded from our analysis.

Table B.5: Model (r8)

	Model (3): (r8) Remove years of confusion
$\Delta(w|sg)$	0.838***
	(0.128)
Observations	67,793
Adjusted R^2	0.491

Notes: See Table 3.2.

Exploring different time periods

Compulsory SG was introduced in 1992. But many people were receiving some contributions to superannuation from their employer before then.[177]

This analysis requires the timing of changes to the SG to be known. After the SG was introduced in 1992, these changes are clearly documented in legislation.[178]

But most workers had some superannuation contributions before the introduction of the SG in 1992. Kai Swodoba from the Parliamentary Library draws on various ABS datasets to conclude that about 55 per cent of all employees were covered by superannuation in November 1988, and that this figure increased to to 78 per cent in November 1991.[179]

An assumption of zero superannuation coverage before the SG was introduced is flawed. We have assumed SG coverage of half the 1992 rates, as shown in Table 3.1. For a large business, this assumption means their SG contribution increased from 2 per cent to 4 per cent on 1 July 1992.

Similarly, small businesses – with less than $1 million in payroll – had different SG rates than large businesses between 1992 and 1995.[180] For this reason, we have estimated the payroll of firms in the WAD (see Section 3.2.1 on page 23).[181]

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177. ABS (2009).
178. *Superannuation Guarantee (Administration) Act 1992, s 20-21*.
179. Swoboda (2014).
180. Table 3.1 and *Superannuation Guarantee (Administration) Act 1992, s 20-21*.
181. Robust models (r1) and (r2) in Table B.1 also exclude small firms and find similar results.

By restricting the data to 1997 onwards, and by just looking at the past decade, we avoid the issues that surround the introduction of the SG in the early-mid 1990s.

Some firms pay more super than they are required by the SG. These employers won't necessarily be affected by a change to the SG. If, for example, a firm pays 10 per cent superannuation contributions when the SG increased from 6 to 7 per cent, their total labour costs will remain the same.

The Attorney-General's Department started collecting this information about employers in EBAs lodged from 1997 onwards. Restricting the data to only look at 1997 and beyond allows us to exclude this group. The results from Model (3) on the restricted subsets of the data are shown in Table B.6.

Table B.6: Models (r9)-(r10)

	Model (3), excluding EBAs paying above SG:	
	(r9) 1997-2018	(r10) 2008-2018
$\Delta(w\|sg)$	1.086***	0.996*
	(0.158)	(0.589)
Observations	70,287	34,533
Adjusted R^2	0.449	0.562

Notes: See Table 3.2.

Lagged wages

Model (3) uses lagged average wages – $awote\_growth_{t-1}$ – to help explain the wage outcomes in agreements made at time t.

The Attorney-General's Department uses the WAD to calculate the Average Annualised Wage Increases (AAWI) in federal enterprise agreements. This is arguably a more appropriate measure of average wages growth, and is used instead of Average Weekly Ordinary Time Earnings (AWOTE) in Table B.7. Using AAWI decreases the R^2 value of our model to 0.474 and decreases the $\Delta(w|sg)$ coefficient slightly.

Both the lagged AAWI and AWOTE variables may have an endogeneity issue, which could alter our results. They are removed altogether in check (r10).

Table B.7: Models (r11)-(r12)

	Model (3):	
	(r11) Use lagged AAWI	(r12) No lagged wage variable
$\Delta(w\|sg)$	0.705***	0.847***
	(0.131)	(0.120)
Observations	78,072	78,072
Adjusted R^2	0.474	0.466

Notes: See Table 3.2.

Appendix C: Data used in this analysis

C.1 Workplace Agreements Database

The Workplace Agreements Database microdata is collected and kept by the Attorney-General's Department.[182] The original dataset contains 160,000 observations between 1991 and 2018. It was made available to researchers on request in 2016.

The WAD variables used in our analysis are detailed below. The corresponding names and complete details can be found in the Conditions Framework document at Attorney-General's Department (2019b).

C.1.1 Sheet: Basic Info

Agreement Number

'An identifier allocated by Fair Work Australia or predecessors.'

We use this variable to merge information from variables across spreadsheets.

Agreement Type Name

'Differs by the applicable workplace relations legislation at the time, but may distinguish between greenfields and non-greenfields agreements, between single-enterprise and multi-enterprise agreements, and between union and non-union agreements.'

We derive the variables $greenfield$ and $multi\_enterprise$ from the agreement type.

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182. Attorney-General's Department (2019b).

Sector

'Indicates whether the agreement is public or private.'

Australian Public Service (APS) Agreement

'Indicates whether an agreement is a Commonwealth employment agreement.'

Combined with the sector information to derive a $sector$ variable of: APS, non-APS public, and private.

Certification Date

'The date on which an agreement is approved (or lodged, if approval isn't required).'

This date is used to match economic information to each agreement. See Section 3.2.4 on page 29.

Duration (years)

'The duration of an agreement from commencement to expiry/ termination in years.'

We use duration to annualise wages and superannuation rises, and as a dummy variable in our models (see Section 3.3 on page 32).

Unions

'Unions covered. Under the Fair Work Act 2009 this field displays the unions noted in the FWC agreement approval decision as having written to the Commission seeking to be covered by the agreement.

Prior to the Fair Work Act 2009, unions covered are the unions identified as being parties to the agreement.'

Each union mentioned in an agreement is given its own dummy variable in our model.

States

'State/Territories coverage. "Aus" is recorded where the agreement covers all States/Territories.'

Our analysis also uses a value 'Unknown' for agreements that are missing states, and 'Multi' for agreements that covered more than one state.

C.1.2   Sheet: Employee

Employee Statistics – Total Number of Employees

'Number of employees covered by agreement at the time of approval. Provided by parties. Not available when agreement covers fewer than five employees.'

Employee Statistics – Estimated Total Number of Employees

'Where employee numbers are not provided by parties to an agreement, this estimate based on averages is recorded in the WAD instead.'[183]

Our analysis uses total and estimated (where required) numbers of employees as our $employee$ variable.

The WAD does not disclose the number of employees for agreements with five or fewer employees. We exclude these agreements from our analysis.

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183. Note that 'estimated' is correctly spelled in the data documentation, but the variable name in the Excel sheets contain the error of 'esitmated'.

ANZSIC Name

'The industry of the employer, provided at the ANZSIC (Australian New Zealand Standard Industry Classification) sub-divisional level.'

This variable is used as our $industry$ variable. Figure 3.7 on page 28 shows a distribution of employees by broad (top-level) ANZSIC code.

C.1.3   Sheet: Wage Increment

Non-Compounding

'Indicates that the wage increments in the agreement do not compound upon one another.'

Incresement Amount As Percentage Refer ANZSIC 2006

'If the wage increase is a percentage increase, that amount is replicated here. If the wage increase is a dollar increase, that dollar amount is converted to a percentage against the Average Weekly Earnings (published by the Australian Bureau of Statistics) for the relevant industry.'

This is our key wage variable, $wage\_inc$, which is the total wage increase over the life of an agreement. The 'non-compounding' variable is also used to determine the total wage. The total wage rises are then annualised over the duration of the agreement.[184]

Of these, about two-thirds have information about wage increases. Others have 'non-quantifiable wage increases' and are not included in our analysis.[185]

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184. 'Incresement' is likely a spelling error but is consistent between documentation and variable name.
185. Non-quantifiable wage increases are also excluded by the Attorney-General's Department when calculating the headline Average Annual Wage Increase (AAWI) figure: Attorney-General's Department (2016).

C.1.4 Sheet: Detail

'Employers super contribution, percent of income'

'The agreement states that the employer must pay a certain percentage of the employee's salary which is different [can be either lower or higher] than the superannuation guarantee (9% from 1 July 2002, 9.25% for 1 July 2013 to 30 June 2014 and 9.5% since then) as a superannuation contribution. The percentage amount is recorded. Please note that the "555" dummy code will appear here as "5.5" because this field records percentages. Coded from 1997-most current available data.'

This variable is used in robustness model (r4) in Appendix B to exclude agreements that paid above the Superannuation Guarantee on agreements between 1997-2018.[186]

C.2 Economic data sourced for and used in this analysis

The macroeconomic data that was attached to each agreement was broadly outlined in Chapter 3. The precise details of these variables – their collector, years, and catalogue and series numbers – are presented below to allow others to recreate our analysis.

C.2.1 Economic data used in main models

AWOTE growth: $awote\_growth_t$

Items: Quarterly growth in full-time adult ordinary time earnings. Shown in Figure 3.8 on page 30.

Source: ABS.

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186. Note that this variables is entered with explicit quotation marks in the dataset, but not in the data documentation.

Catalogues and series: Three different release dates of Average Weekly Earnings (Catalogue 6302.0) were required to generate data spanning our required range:

- 1992-2007: November 2008 release series A594106L;

- 2008-2012: February 2012 release, series A2772123T;

- 2012-2018: May 2019 release, series A84998729F.

Date range:

- 1992-2007: quarterly;

- 2008-2012: quarterly;

- 2012-2018: biannually. These data were linearly interpolated to fit the quarterly structure.

Transformation: 12-month moving average.

Inflation expectations: inf_exp_t

Items: Average annual inflation rate implied by the difference between the 10-year nominal bond yield and the 10-year inflation indexed bond yield. Shown in Figure 3.9 on page 30.

Source: RBA.

Catalogue: Statistical Tables G3.

Series: Break-even 10-year inflation rate.

Date range: 1991-2018, quarterly.

Transformation: Four-quarter moving average.

Non-farm GDP per capita growth: $gdp\_percap\_growth_t$

Item: GDP per capita growth, per cent. Shown in Figure 3.10 on page 31.

Source: ABS.

Catalogue: 5206.0 – Australian National Accounts: National Income, Expenditure and Product, Sep 2019.

Series: A2304372W, seasonally adjusted.

Date range: 1991-2018, quarterly.

Transformation: 12-month average of the quarterly growth rate.

Unemployment: $unemployment_t$

Items: Unemployment rate, per cent.

Source: ABS.

Catalogue: 6202.0 – Labour Force, Australia, Oct 2019.

Series: A84423050A, seasonally adjusted.

Date range: 1991-2018, monthly.

Transformation: 12-month moving average.

NAIRU: $nairu_t$

Items: Non-accelerating inflation rate of unemployment.

Source: OECD.

Catalogue: Economic Outlook.

Series: AUS.NAIRU.A

Date range: 1991-2018, annually.

Transformation: None.

NAIRU gap: $nairu\_gap_t$

Items: Difference between the unemployment rate and the NAIRU. Shown in Figure 3.11 on page 31.

Derived: $unemployment - nairu$

Underemployment: $underemployment$

Items: Underemployment rate, per cent. Shown in Figure 3.12 on page 32.

Source: ABS.

Catalogue: 6202.0 – Labour Force, Australia, Oct 2019.

Series: A85255701R, seasonally adjusted.

Date range: 1991-2018, monthly.

Transformation: 12-month moving average.

Terms of trade: tot_change_t

Items: Terms of trade index.

Source: ABS.

Catalogue: 5206.0 – Australian National Accounts: National Income, Expenditure and Product, Sep 2019.

Series: A2304200A, seasonally adjusted.

Date range: 1991-2018, quarterly.

Transformation: Annual change, 12-month moving average.

Change in industry GDP share:
$industry\_share\_1year_{it}, industry\_share\_2year_{it}$

Items: Change in the broad industry's GDP share.

Source: ABS.

Catalogue: 5206.0 – Australian National Accounts: National Income, Expenditure and Product, Sep 2019.

Table: 37.

Date range: 1991-2018, annual.

Transformation: One- and two-year change.

Industry AWOTE growth: $industry\_awote\_growth_{it}$

Items: Broad industry's AWOTE growth.

Source: ABS.

Catalogue: 5206.0 – Australian National Accounts: National Income, Expenditure and Product, Sep 2019.

Table: 37.

Date range: 1991-2018, annual.

Transformation: One- and two-year change.

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