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Wage inequality and neoliberalism: the Australian experience

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Abstract: This article examines wage inequality in Australia from 1982 to 2012 using income distribution data from the Australian Bureau of Statistics. The analysis shows that wage inequality grew steadily during this period, and that the growth was particularly strong from 1996 onward. Through the use of quantile regression it is possible to decompose the growth in inequality into three components: changes in the wage structure, changes in workforce characteristics, and a residual ('unobservables'). The results of this analysis are conclusive among male full-time employees: despite the conventional wisdom that the changing nature of the workforce contributed to the growth of inequality, I find that the changes in the wage structure accounted for more than three quarters of this growth. In the case of female full-time employees changes in the wage structure accounted for about half of this growth. The article locates these findings within an analysis of neoliberalism in Australia and suggests that deindustrialisation and financialisation appear to be closely related to increased wage inequality.

Keywords: *wage inequality, pay, labour market, enterprise bargaining, neoliberalism, deregulation, quantile regression*

Has the rise of neoliberalism since the 1980s led to greater economic inequality?[1] Writing in 2002, two United States economists observed: "inequality is a bigger problem at the end of the nearly 20-year experiment with unregulated global capitalism than it was before deregulation became the rule."(Weller and Hersh, 2002: A15). A number of cross-national studies conducted during the late 1990s endorsed this view and showed that inequality had grown in nearly all Western countries, particularly those which embraced neoliberalism most fully (Gottschalk and Smeeding, 1997). An extensive literature examining wage inequality had already emerged during the 1990s, particularly in the United States and the United Kingdom (Blau and Kahn, 1996; Freeman, 1996; DiNardo et al.,

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1996; Katz and Krueger, 1992; Gossling et al., 2000; Galbraith, 1998). The onset of the Global Financial Crisis (GFC), and subsequent economic stagnation in Europe, spurred another burst of research (Galbraith, 2012; Jenkins, Brandolini et al., 2013). At a popular level, the *Occupy Movement*, with its focus on the gap between the 1% and the 99%, sharply focused outrage at the social implications of growing economic inequality. And by 2014, a lengthy economic history of inequality had become an international best-seller (Piketty, 2014). After decades of complacency about the inter-connections between 'free' markets and inequality, even the OECD had begun to warn that economic inequality was a bad thing: jeopardising economic 'performance' and fostering political 'instability' (OECD, 2011).

In many cases, the growth in inequality had reversed an historical trend towards greater equality which had been taking place in many countries since the end of the Second World War. The extent of the growth in inequality seemed to reflect the extent of neoliberalism. In the United States and United Kingdom, for example, the growth of inequality was both sudden and large in scale, while in countries like Sweden and Canada, the changes were more modest (MacPhail, 2000).

Timing is one thing, causality is another. In Australia in 1993, Peter Saunders posed the question of whether economic deregulation was the cause of increasing income inequality. At that stage the data was still tentative, but Saunders concluded that a case could be made for the link, and suggested that 'the jury is still out and I am confident that a strong prima facie case has been presented and that a guilty verdict will eventually be forthcoming' (Saunders, 1993: 42). Returning to the same issue more than a decade later, Saunders (2005) argued that the empirical evidence for the link was still inconclusive, but that continued growth in inequality was indisputable. What was still not settled, in his mind, were the determinants of that growth.

In his 1993 study Saunders had used data from a range of countries, including Australia, but his analysis was limited to the 1980s. In his 2005 study, Saunders extended his analysis to cover the period 1986 to 2001. In this article I analyse data covering the last three decades—from 1982 to 2012—a period long enough to discern clear trends and patterns. I restrict myself to wage inequality, rather than the broader field of income inequality, and my results endorse Saunders' original intuition of 1993, that deregulation was indeed the guilty party.

Neoliberalism and the labour market

Saunders had in mind the deregulation associated with 'economic rationalism' during the late 1980s. Since that time our understanding of the political and economic forces behind that process have been much deepened and the term 'neoliberalism' is now more commonly employed. The accounts of neoliberalism to be found in the literature are quite varied but the defining characteristics include: financialisation, trade liberalisation, deindustrialisation, deregulation, privatisation, and the privileging of market principles over activities of the state. For a particularly perceptive analysis of neoliberalism, see Mirowski (2013) and for a succinct account of the Australian experience see Quiggin (2012). For some writers, the underlying logic of neoliberalism has been the re-assertion of the economic and political power of the capitalist class (Duménil and Lévy, 2004; Duménil and Lévy, 2011; Duménil and Lévy, 2012; Harvey, 2005). Neoliberalism has also been seen as heralding a new stage in capital accumulation, in which profitability becomes primarily geared to financial transactions rather than the production of commodities (McMurtry, 1999; Harvey, 2010).[2] Economic historian Robert Brenner (2006) has located neoliberalism within the context of the 'long downturn', beginning in 1973, in which a crisis of profitability, induced by excess capacity, brought about intensified capitalist competition. The response by capitalist firms, assisted by governments, has ushered in the familiar contours of neoliberalism: deregulation, privatization and trade liberalisation in particular.

The wage inequality which has become such a distinctive feature of the last 30 years also became a topic of much inquiry during the 1990s. In the United States, a number of explanations were advanced to account for this: technical change, the growth in international trade, the weakening of the labour movement and the persistence of chronic unemployment. It is worth noting that the technical change argument was largely seen as 'neutral', in so far as it reflected a kind of natural progress in technological development. In some cases, the emphasis was on computers, in other cases, it was more a general emphasis on 'higher level skills', epitomised in the popularity of Robert Reich's (1992) notion of the 'symbolic analyst'. Proponents of this view argued that the 1980s had seen the widespread adoption of new technology, particularly computers, and this had led to strong growth in the more highly skilled occupations, which in turn led to growing wage inequality. This was captured in the phrase 'skill biased technical change' (SBTC) and this perspective gained dominance among mainstream economists because it suited their human capital model of the labour market and because it offered a reasonable fit to the US empirical data (Juhn et al., 1993; Levy and Murnane, 1992). Within this framework, workers are paid according to their marginal productivity and if technology raises this for some groups of workers, vis-a-vis others, then a growing dispersion of wages will result. One of the fiercest critics of this explanation was James Galbraith (1998, 2012) who labelled it 'the skills fallacy'. Instead of technical change, Galbraith emphasised unemployment as the driving force behind the growth of inequality. He argued that the onset of recessionary cycles from the 1970s onwards coincided with increasing levels of wage inequality in the US labour market. This was compounded by poor monetary policy, an over-valued currency, and political resistance to raising the minimum wage (Galbraith, 1998; see also Waltman, 2000; Waltman, 2004). In his later research, Galbraith emphasised financialisation and asset-price inflation as core elements in the more recent expansion of inequality (Galbraith, 2012).

Prior to the 1990s researchers had already begun to highlight the impact of deindustrialisation on the labour market, and the decline in the strength of organised labour during the 1980s. As trade liberalisation unfolded, job losses resulted from import competition and from jobs being sent off-shore. Because many of the blue-collar jobs which were lost were relatively well paid, inequality accelerated (Bluestone and Harrison, 1982). Many of the lost jobs had also been unionised jobs. In research published during the early 1990s Richard Freeman attributed about 20 per cent of the increase in wages dispersion during the 1980s to declines in union density (cited in Borland, 1996: 238) and David Card found similar results in his research (Card, 1996).

Research on the emergence of wage inequality in Australia tracked the American debates. Some researchers accepted the technical change and 'higher level skills' arguments with little difficulty, while others dug deeper, looking for political and institutional underpinnings. In the case of the former, some researchers linked the increase in wages inequality with the growth of more highly skilled occupations. However, unlike the United States, the earnings premiums associated with degree holding (the 'returns to education') had not increased during the 1980s but had either plateaued or declined over time (Gregory, 1993: 74; Norris and McLean, 1999: 29) and this trend continued into the 2000s (Coelli and Wilkins, 2009).[3] Some studies which used more innovative approaches to measuring skills than simple educational attainment—including a more sophisticated coding of occupations—were able to link the growth in wage inequality with changing returns to skill (Pappas, 2001).

Researchers who emphasised the growth in high skilled jobs sometimes argued that pay relativities played only a minor role in the growth of wage inequality (Norris and McLean, 1999; Keating, 2003). An emphasis on static wage relativities was also evident in one of the few studies which explicitly examined the links between trade liberalisation and inequality. Murtough et al. (1998) employed a macro model of the Australian economy (the Monash model) to gauge the effect on wages and employment of reductions in trade barriers in the period between the mid 1980s and mid 1990s. They concluded that there was no evidence for such a link, except in a number of sub-sectors (such as textiles, clothing and footwear). Like Murtough et al. (1998) Gaston (1998) also concluded that trade liberalisation had more of an impact on employment than on wages.

In a seminal study which explored both employment changes and changes in wage relativities, Bob Gregory found that large numbers of male jobs had disappeared from the middle of the wage distribution, and he partly attributed this to the large decline of manufacturing jobs which had taken place in the late 1970s and the 1980s. Many of these jobs had been located in the middle of the wage distribution; hence the 'hollowing out' of the middle (Gregory, 1993: 68). But Gregory also observed that the dispersion in wages was occurring *within* and not *across* occupations. This suggested that the notion of a disappearing middle income group did not automatically equate to a hollowing out in the occupational structure. Rather there were declines in *both* middle and low-paid occupations, but at the same time there was growth in low-paid jobs.[4] Gregory suggested that workers who might ordinarily have been employed in jobs in the middle of the wage distribution—such as manufacturing jobs—would have moved into lower paying jobs, 'bumping off' the lower skilled workers from the wages ladder. This overall explanation for the disappearing middle, which emphasised the decline in manufacturing jobs, clearly fitted the deindustrialisation thesis. Moreover, it did not neatly translate into a polarisation of skill, occupation or education which some of the 'natural' employment growth arguments favoured.

Another group of researchers (King et al., 1992) labelled this pattern the 'law of the shrinking middle' and offered an explicitly institutional analysis. They argued that the decline in manufacturing jobs and the rise in sales work had played a key role in the growth of inequality. They also emphasised a number of key institutional changes which had taken place during the 1980s and early 1990s and which were closely tied to neoliberalism and the struggle between workers and employers. In particular, they emphasised the 'managerial drive for flexibility' which had been facilitated by the Accord between the Australian Council of Trade Unions (ACTU) and the Labor Government.[5] In their analysis, this polarisation in wages was due to three forms of flexibility. 'Wage flexibility' led to declining wages among the more vulnerable sections of the workforce. 'Numerical flexibility' led to a growth in part-time work, outsourcing and the use of contractors and sub-contractors. Finally, 'functional flexibility', associated with the top of the labour market, was responsible for the growth in more highly paid and multi-skilled workers (King et al., 1992: 410).

An institutional basis for wage inequality was also apparent in Jeff Borland's study on the links between falling union density and rising inequality. He found that the Accord had stabilised wages among union employees but that inequality had grown amongst the non-union workforce. In particular, certain groups who were outside the reach of the Accord were able to increase their wages beyond the guidelines set by the Accord. Borland concluded that the decline in union density between 1986 and 1994 accounted for about 30 per cent of the wages dispersion for male employees (Borland, 1996: 245–246).

The emphasis on high skilled jobs growth implied that wage inequality was a 'natural' consequence of modernising the economy and that policy needed to focus on expanding access to skills and training (Pappas, 2001; Keating, 2003). Within this perspective, these policy responses were seen as likely to worsen inequality in the short term, but over the longer term they were expected to moderate it (Keating, 2003: 392). By way of contrast, institutionalist economists who have emphasised the changing wage structure have argued against the 'naturalising' thesis, and pointed towards the political and the institutional factors which have been associated with neoliberalism. While the SBTC argument encompasses both an employment growth and a wages relativity aspect—since increased *relative demand* for higher skills can also increase wages dispersion—the apparent stability in wage relativities in Australia has led the proponents of the SBTC argument to emphasise shifts in workforce composition as the major driving force for inequality. In this article I seek to establish the extent to which changes in the wage structure have caused increased inequality in Australia. In the analysis which follows I contrast changes in workforce composition (also termed worker characteristics or 'endowments') with changes in the wages structure, that is, wage relativities (also termed 'returns on characteristics'). A finding that changes in workforce composition play a minor role in fostering inequality would not rule out the efficacy of the SBTC argument, but such a finding would reinforce the importance of institutional factors associated with a changing wages structure.

The growth in inequality: 1982 to 2012

A number of Australian researchers have examined wage inequality in Australia since the late 1970s. An early study by Norris (1977) found little evidence of growing inequality prior to the 1980s, but studies from the 1990s by Gregory (1993), King et al. (1992) and McGuire (1993) found that the situation had changed during the 1980s. By the late 1990s a trend towards increased wage inequality was well established in research by Borland (1999) and Norris and McLean (1999), and the period after 2000 saw further evidence emerging (Pappas, 2001; Keating, 2003; Wilkins, 2013). My overview of wage inequality is largely consistent with the broad findings in this literature. The differences which emerge are in terms of analysis and interpretation.

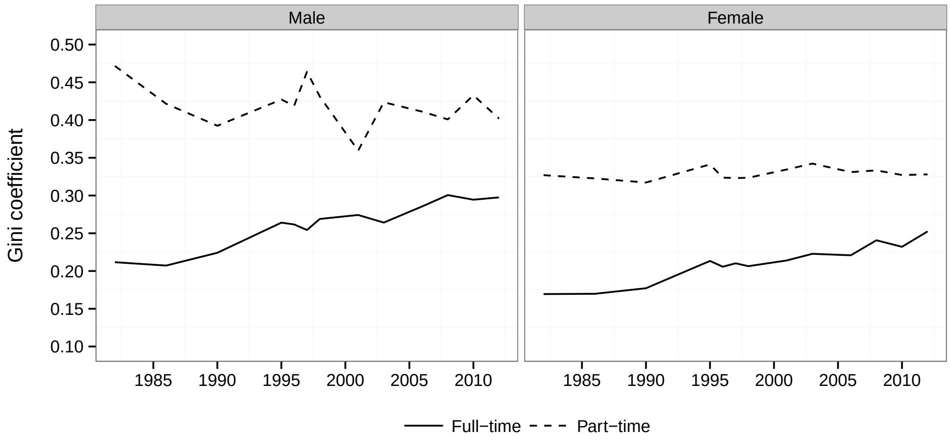
I now outline the broad patterns of inequality, using data from the various Income Distribution Surveys conducted by the Australian Bureau of Statistics (ABS) since the early 1980s. I then introduce the tools for my analysis, quantile regression and the decomposition of wage densities, and then present the findings for the period 1982 to 1996 and 1996 to 2012.[6] I conclude the article with a discussion of the links between neoliberalism and wage inequality.

The ABS household incomes surveys have had a number of different names over time but have been conducted regularly every few years and with enough consistency to allow for the construction of a useful time series dataset. The main titles have been: the Income Distribution Survey (IDS), the Survey of Income and Housing Costs (SIHC) and the Survey of Income and Housing (SIH). In this article I will refer to all of these as the IDS for convenience.[7] The population for my analysis is adult full-time employees—with the exception of one set of graphs which include part-timers—and I use the terms 'employee' and 'worker' interchangeably throughout this article.[8]

It is important to keep in mind that these ABS data are cross-sectional, not longitudinal. We are not following the same group of workers over time, even though the mode of expression in what follows sometimes makes it sound like we are tracking a cohort of workers. Throughout this article the perspective is one based on *locations* within the wage structure, not particular individuals (for the importance of wage structures, as opposed to individuals, see Galbraith, 1998; Watson, 2005).

What trajectory has wage inequality followed over the last three decades? One classic measure of inequality is the Gini coefficient which is shown in Figure 1 for both male and female employees for the period from 1982 to 2012. The Gini coefficient ranges between 0 (complete equality) and 1 (complete inequality, that is, when one person has all the income and everyone else has none). It is clear that wage inequality grew strongly among full-time employees during this period, with inequality greater among men than women and also growing faster. Despite some volatility, the long-term trend amongst the female part-time workforce appears static while among the males no clear-cut trend is apparent. In both case, the levels of inequality are much higher than for the full-time workforce. A study by Borland and Kennedy (1998b) concluded that the changes in wage inequality for part-time employees were similar to those for full-time employees, but a more recent study (Greenville et al., 2013) suggested the growth over time had been relatively stable. Clearly, in the case of male part-time employees, the choice of starting point and end point imply different conclusions about any long-term trends. Another common inequality measure—the Theil index—tells the same story as the Gini.[9]

Figure 1. *Gini coefficients*

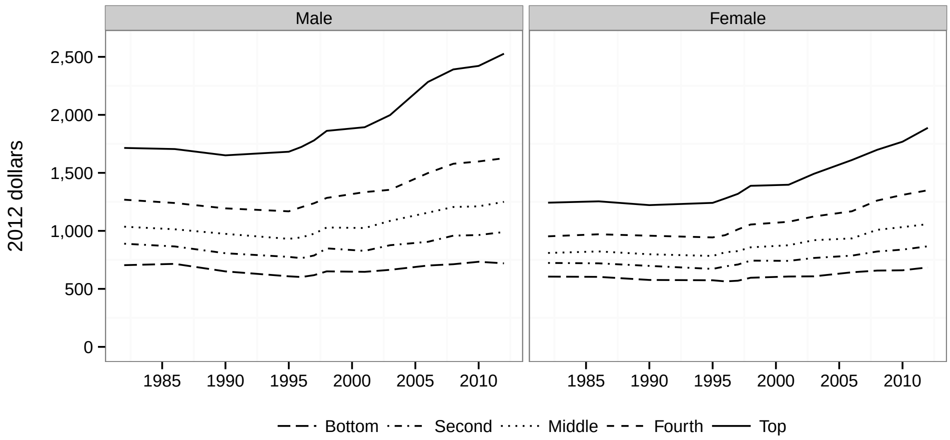


Note: The Gini coefficient for weekly wages for full-time adult employees (solid line) and for the hourly rate of pay for part-time adult employees (dashed line). *Source:* Based on data from ABS IDS 1982 to 2012.

In terms of inequality, Figures 2 and 3 present two examples of the much greater dispersion in real wages (CPI adjusted) from the mid 1990s onwards. In the case of Figure 2, the striking divergence in wages between the top two quintiles and the rest is evident, with the growth in wages in the top quintile among men particularly notable. For most of this 30 year period, the real wages of the bottom remained essentially stagnant. Figure 3 extends this analysis by presenting percentile locations—the tenth, the fiftieth, and the ninetieth—and indexing these three groups to a common starting point. This graph shows, quite starkly, that men on the ninetieth percentile experienced *real* wages growth of more than 47 per cent over these 30 years while men on the tenth percentile saw their real wages grow by just one quarter of one percent. Those on the median saw wages growth of about 20 percent. Among women, the results were equally striking, though not as dismal for those at the bottom. Women in the ninetieth percentile experienced real wages growth of nearly 52 percent, while those on the tenth percentile increased their real wages by about 13 percent. Women on median wages saw a real increase of about 31 percent.

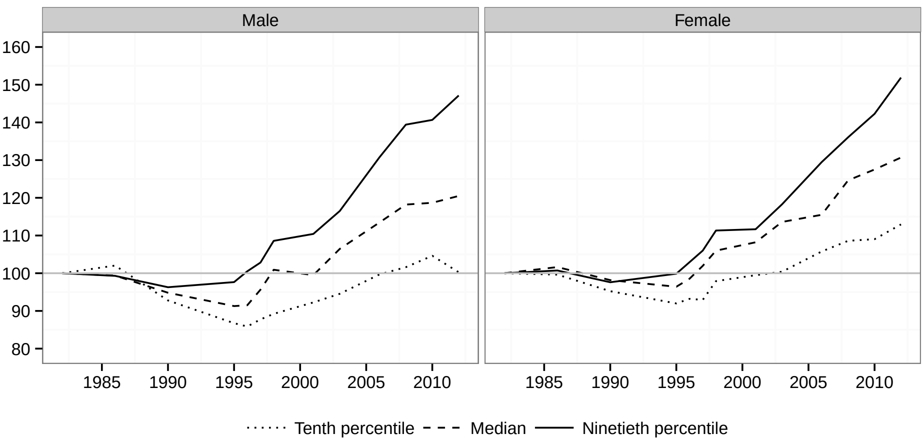
Examining percentile locations like this is particularly informative for understanding the labour market in terms of 'those at the top', 'those in the middle' and 'those at the bottom'. It allows one to examine how both inequality and real wages changed over time. Both Figures 2 and 3 suggest that nearly all employees experienced declining real wages for most of the 1980s and early 1990s. This reflected both a policy of wage restraint (the Prices and Incomes Accord) and a subsequent recessionary period during the early 1990s. For both men and women at the top of the labour market, this decline in real wages ended in 1995 and the period after that saw exceptionally strong wages growth. For those in the middle, the wait was slightly longer. Among women, their real wages had returned to the level of the early 1980s by about 1997 and among men they had revived by 1998. Meanwhile, the wages of workers at the bottom of the labour market stagnated. In the case of men, real wages had fallen so far—by as much as 15 per cent—that it took until 2006 for them to reach the level of the early 1980s. For women, the fall had not been as great—about 8 per cent—and they returned to their earlier level by about 2003.

Figure 2. *Quintile average wages*



Note: Average wages in each quintile of the wages distribution. Weekly wages for full-time adult employees (in 2012 dollars) with average based on the median within each quintile. *Source:* Based on data from ABS IDS 1982 to 2012.

Figure 3. *Real wages and inequality*

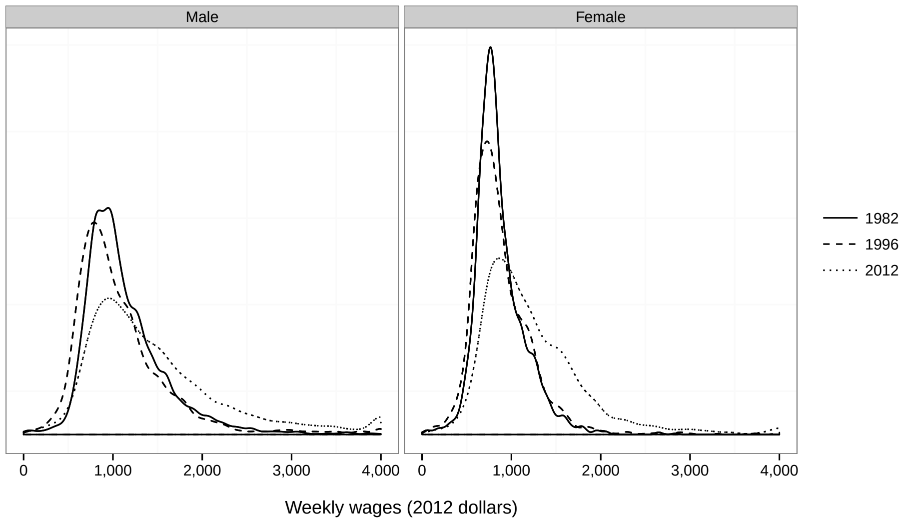


Note: Weekly wages for full-time adult employees. Note that wages are adjusted by the CPI and then indexed to a common starting point of 100 for 1982. *Source:* Based on data from ABS IDS 1982 to 2012.

The changes since 1996 are quite remarkable for such a relatively short period of time and raise questions about data integrity. Roger Wilkins (2013) has argued that changes in the data collection methods, definitions and concepts of the ABS income surveys make their direct comparability over time problematic, and he suggested that the sharp rise in inequality after 2005 lacks credibility. I deal with his concerns in the appendix by reporting the results of using alternative data for the period since 2001. The alternative data—the Household, Income and Labour Dynamics in Australia (HILDA) survey— does indeed suggest that the extent of the rise in inequality is greater in the ABS data (see below page 23 for more details). However, the analysis of the decomposition results—the core part of this article—shows no substantive differences using this alternative data.

Concerns about data comparability over the last decade have greater implications for developments at the top of the labour market, particularly among men. The parlous situation at the bottom of the labour market, on the other hand, appears incontestable. It is worth reflecting for a moment on just how profound is this three-decade trend of static wages at the bottom of the labour market. In reviewing a similar trend among low wage youth in the United States, Juhn et al. (1993: 421) observed that there had been 'no increase in economic opportunity as measured by weekly wage rates in about two and one-half decades'. In other words, from the 1980s onwards the US labour market had not functioned as a source of 'shared prosperity' (Palley, 2012), but rather had become a motor of inequality. It would seem that the same metaphor applies just as much to the Australian labour market.

Figure 4. *Distribution of real weekly wages 1982, 1996 and 2012*



Note: Kernel density graphs for the weekly wages of full-time employees for 1982 (solid), 1996 (dotted) and 2012 (dashed). Wages are truncated at $4000 per week for readability (and have no effect on the remainder of the distribution). The data are converted to constant dollars using the CPI, with 2012 as the base year. Note that the y-axis scale for both males and females is the same, thereby allowing direct comparison. *Source:* Based on data from ABS IDS 1982, 1996 and 2012.

The picture presented so far has been based on summary measures, all of which are sensitive to different parts of the wage distribution (see, for example, Jenkins and Kerm, 2009). Fortunately, it is possible to examine the distribution *as a whole*, and gauge how that has changed over time. In Figure 4 the distribution of wages is shown for the three keys years: 1982, 1996 and 2012. The graphs are kernel densities, a useful device for illustrating inequality and the basis for the decomposition methods used in this article. In these graphs, steeper, narrower curves indicates less inequality while flatter, wider ones indicates more inequality. A direct comparison between male and female full-time employees shows quite starkly the much greater level of inequality among the former, though over time this difference weakened. Looking just at the male weekly wage in the first panel shows that inequality changed slightly between 1982 and 1996. The most distinctive change was that the distribution moved backwards in dollar terms, largely due to the wage restraint of the Accord and the impact of the recession of the early 1990s. This had a more severe impact at the bottom of the labour market—as we saw earlier—and this is evident in the bulge at the far left of the distribution. In the case of women, shown in the second panel, the overall pattern was the same, but less pronounced. The more dramatic changes occurred in the second period, from 1996 to 2012. The shape of the distribution altered radically, becoming far more unequal. There was an upward movement in wages overall—again, something we saw earlier—but for those at the bottom of the distribution the improvement was trivial. Indeed, among men the very lowest paid appeared to still lie behind their location in 1982. The emergence of large pockets of high wage individuals in the upper parts of the distribution was particularly notable in this period.

What emerges clearly from these ABS data is that the 1990s were a watershed for the growth of wage inequality in Australia. Prior to that decade the growth in inequality was subdued, but the recession of the early 1990s gave inequality a boost, and it continued to increase throughout the rest of the decade before accelerating during the 2000s. These changes were largely driven by high wage increases at the top of the labour market alongside stagnation at the bottom. International research suggests that recessions make inequality worse (Jenkins, Brandolini et al., 2013), and that would seem to have been the story in Australia during the early 1990s. During the remainder of that decade the labour market moved relentlessly away from centralised wage fixing to decentralised enterprise-based bargaining, and the period after 1996 was accompanied by increased labour market deregulation under the auspices of the Howard conservative government, with the period between 2005 and 2007 accompanied by almost unfettered 'free market' labour market policies in the form of *Work Choices*. While this chronology helps locate the changing profile of wage inequality within the neoliberal time frame, we also need a deeper analysis of the ways in which the neoliberal project influenced wage outcomes in Australia. Because wage data such as these area necessarily observational in character, causal associations must remain inconclusive (Rosenbaum, 2002). It is possible, however, to move beyond descriptive analogies and by constructing counterfactual decompositions of the wage distribution advance our understanding of this link with neoliberalism.

Analysing wage inequality

Decomposition using quantile regression

Most of the analysis of wage inequality over the last 30 years has made use of linear regression modelling, but in recent years quantile regression has become increasingly important. Roger Koenker, one of the pioneers of the adoption of quantile regression methods over the last two decades, has argued elegantly:

> Much of the early history of social statistics … can be viewed as the a search for the "average man"—that improbable man without qualities who could be comfortable with his feet in the ice chest and his hands in the oven … [But] There have been many prominent stat-

> istical voices who … reveled in the heterogeneity of statistical life … [quantile regression provides] a deeper view into the data … Conditioning covariates may well shift the location, the central tendency, of the distribution of the response variable, but they may also alter its scale or change its entire shape (Koenker, 2005: 293)

It is instructive that much of the analysis of inequality over the last thirty years has been fixated on averages. Several studies have argued that *average* pay relativities for 'skill' or occupation, for example, have not changed in Australia over this period, and thus the driving force for inequality must be be found in the changing characteristics of the workforce, particularly the large increase in more highly 'skilled' workers. Similarly, a number of analyses have confirmed that the returns on university education have not changed over the last thirty years—in stark comparison to the situation in the United States—but again these studies have generally relied on *averages*, that is, the conditional mean results from linear regression models.

Early attempts to analyse wage inequality which moved beyond a focus on averages included pioneering research by DiNardo et al. (1996), who used semiparametric kernel density estimation methods. Advances in the methodology of quantile regression (Koenker, 2005; Buchinsky, 1998) have seen this approach extended in recent years to the analysis of wage inequality, with a number of useful semiparametric studies by Gardeazabal and Ugidos (2005), Machado and Mata (2005) and Melly (2005). In this article I follow the broad approach of Machado and Mata (2005) who analysed wage inequality in Portugal for the period 1986 to 1995. I implement my wage densities in a different fashion but I follow their mode of presentation. Drawing on Koenker's work Machado and Mata (2005: 447) showed how one could model wages using quantile regression and thereby provide 'a full characterization of the conditional distribution of wages in much the same way as ordinary sample quantiles characterize a marginal distribution'. What is more, the quantile regression coefficients could be interpreted as rates of return of various worker characteristics at different points in the conditional wage distribution. As a result, this approach provides an ideal vehicle for exploring changing wage inequality over time.

Data and approach

The analysis which follows makes use of the same datasets used earlier (the IDS) and the populations are also the same, namely, male and female full-time adult employees. The dependent variable in the quantile regressions is the log of real weekly wages (adjusted using the consumer price index, the CPI). The regressors are age, age squared, educational qualifications, birthplace, marital status, number of dependent children, industry, occupation, and state dummies. These last three sets of dummy variables are coded using deviation coding, which means that the coefficients can be interpreted as deviations from the group mean, rather than with respect to the omitted category.[10] Major changes in occupational coding systems over this period (CCLO to ASCO to ANZSCO)[11] make consistency a formidable challenge, but reducing the categories to a smaller subset partly overcomes this problem. Grappling with changes within major groups (such as professionals) remains problematic. Similarly, industry has been made consistent by collapsing some divisions, though fortunately the conceptual basis of industry classification has changed only moderately over the years. One hybrid required for this analysis was 'human services', a combination of education, health and community services. Another omnibus was 'finance etc', shorthand for finance and insurance, property and business services.

Table 1. *Descriptive statistics, full-time employees*

	Male			Female		
Variable	1982	1996	2012	1982	1996	2012
Age	37.7	38.7	40.9	33.8	37.4	39.6
Uni quals	9.9	18.0	26.1	9.8	21.9	41.8
Diploma quals	14.4	10.7	11.3	30.0	10.4	13.7
Trade quals	27.9	26.3	27.3	4.0	11.7	13.6
No post-school quals	47.8	44.9	35.3	56.2	56.0	30.9
Managers	10.1	12.5	17.8	2.7	6.1	14.1
Professionals	11.5	17.0	20.7	23.2	19.8	32.5
Technicians & trade Workers	34.7	25.8	22.6	11.4	10.8	3.6
Clerical, sales and service workers	18.8	17.6	17.4	57.3	50.3	43.2
Labourers & machinery ops & drivers	24.8	27.2	21.6	5.4	13.1	6.5
Agriculture	2.4	2.4	2.1	0.7	0.7	0.8
Mining	2.9	1.9	3.5	0.4	0.6	1.4
Manufacturing	26.4	23.9	14.7	18.3	12.1	7.2
Utilities	4.6	1.8	2.4	0.5	0.9	1.0
Construction	7.0	8.1	12.0	1.2	1.8	2.1
Wholesale & retail	14.5	17.5	13.4	16.0	15.2	11.7
Transport	8.5	6.4	7.1	2.5	2.5	3.1
Communication	3.7	3.7	2.4	2.4	1.5	2.0
Finance & business services	7.1	12.2	15.8	11.6	17.2	20.4
Government	8.6	7.1	9.1	7.1	8.0	11.0
Education, health & community	11.4	8.0	8.8	34.0	29.1	32.6
Recreation, accomm, other services	2.9	6.9	8.8	5.4	10.5	6.7
Born Aust	72.0	73.0	70.0	73.8	73.8	70.3
Born OS	28.0	27.0	30.0	26.2	26.2	29.7
Married	72.5	71.5	71.3	54.0	63.7	62.8
Not married	27.5	28.5	28.7	46.0	36.3	37.2
No dep child	56.9	59.3	65.1	77.2	73.5	76.4
One dep child	15.0	15.9	15.1	11.2	14.8	12.8
Two dep child	19.0	17.1	14.0	9.2	9.4	8.6
Three dep child	7.1	6.3	4.9	2.1	2.0	1.8
Four or more dep child	1.9	1.5	0.8	0.3	0.4	0.3

Notes: Data weighted by population weights. Source: ABS IDS data 1982, 1996 and 2012. Population: Adult full-time employees.

The changing composition of full-time employees is shown in Table 1. The average age of men and women was much greater in 2012. For men, there had been an increase of two and a half times the proportion with university qualifications since 1982. Among women, the increase had been four-fold. Professional and managerial occupations had increased significantly while the proportions of technicians and trades workers had declined considerably.

Several industry changes were particularly notable. The share held by manufacturing among men dropped from 26 per cent in 1982 to 15 per cent in 2012, with most of that reduction occurring in the latter half of the period. Among women, the decline was from 18 per cent to 7 per cent. By way of contrast, finance, insurance, property and business services more than doubled among men between 1982 and 2012 (from 7 per cent to 16 per cent), with more of that change occurring in the first half of the period. For women the increase was from 12 to 20 per cent, again predominantly in the first half of the period.

Details of the methodology used for the quantile regression models and the decomposition approach are discussed in the appendix. In essence, the core insight is that model coefficients can be interpreted as the effects of the wage structure (prices, or returns on characteristics) while the sample covariates can be interpreted as the effects of the workforce characteristics (quantities, or 'endowments'). Part of the decomposition employs a 'counterfactual by substitution' strategy, in which the substitution of one component in the decomposition by its opposite allows one to assess the effect of each component on the relevant outcomes. For example, in the analysis below I ask how applying the wage structure from 1996 to the workforce characteristics of 1982 changes the shape of the wages density. Variations on this substitution allow one to carry out the relevant decomposition.

Quantile regression (QR) results

Before looking at the decomposition results, I examine plots (Figures 5 and 6) of some of the key regressors for the quantile regression. These are shown as coefficient values (on the y-axis) plotted against the percentile (on the x-axis), with 95% confidence intervals shown as dotted lines offset from the main plotting line. The grey dashed horizontal lines indicate an equivalent linear regression coefficient (which uses the same specification as the quantile regression, QR for short), while a grey solid horizontal line at 0 is shown for reference purposes. When there is a large difference between the quantile regression plots and the dashed horizontal line, it alerts us to the fact that the linear regression modelling is a poor representation of the hetereogeneity in the population. Where the two plots coincide, this suggests that the linear regression results are comparable. Finally, for ease of expression I discuss the coefficients as percentage changes—since the wages are on the natural logarithmic scale—though a more precise figure for categorical variables can be calculated with the formula: $100(e^{\beta} - 1)$.

These plots provide many insights into the factors driving inequality. Whether the end result is more or less inequality clearly hinges on the combination of these factors, their changes over time, and the changing composition of the workforce. The decomposition addresses this complex mix, but to appreciate the net effect of these factors, the coefficient plots are ideal. The link with inequality is as follows. The slope of the quantile regression line shows the effect of particular aspects of the wage structure—such as particular industries—on the wage distribution. Where the regression line is flat, the effect is largely neutral. If it slopes upwards to the right, it is *inequality-inducing*; if it slopes upwards to the left, it is *inequality-suppressing*.[12]

Figure 5. *Male quantile regression coefficents, 1982, 1996 and 2012*

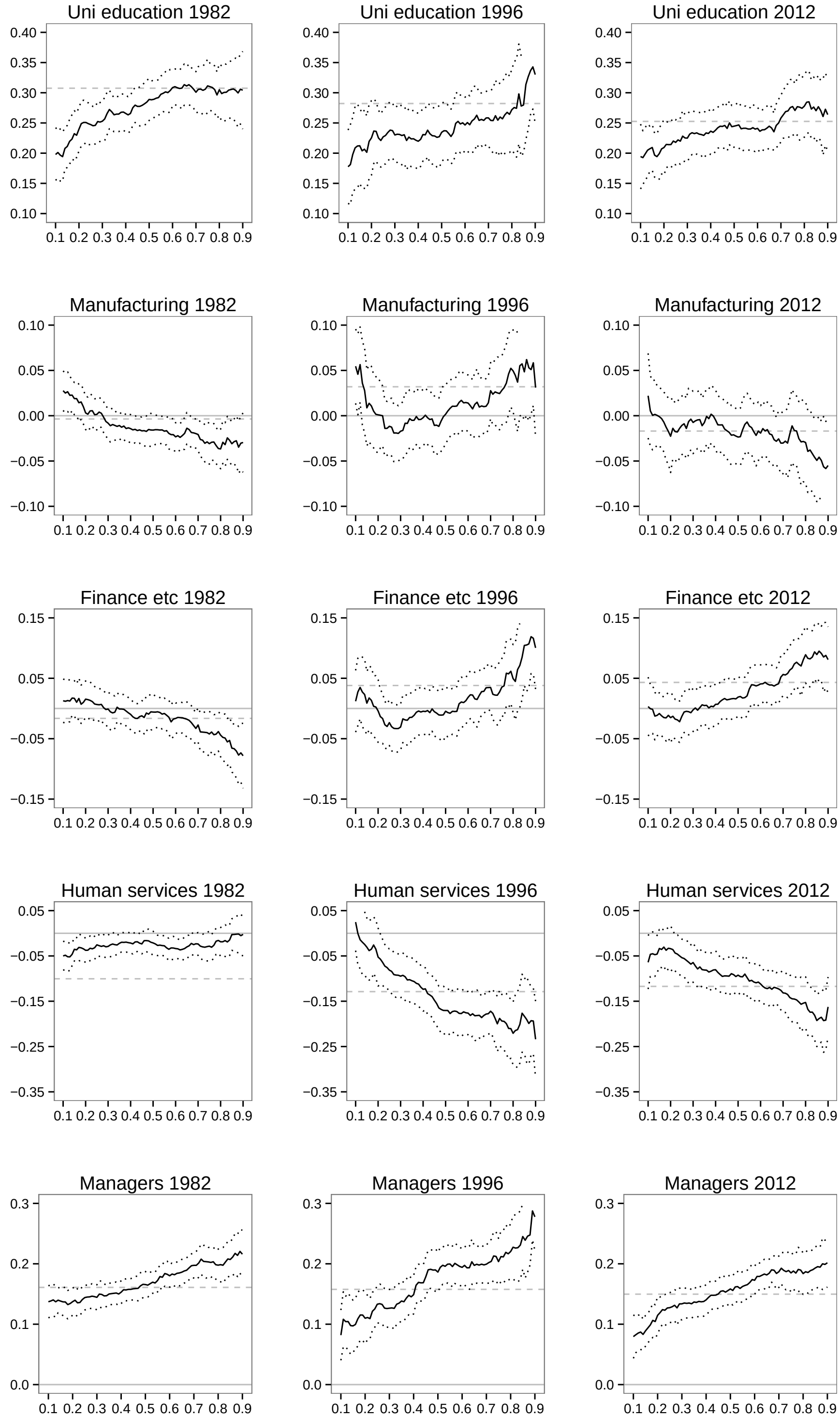
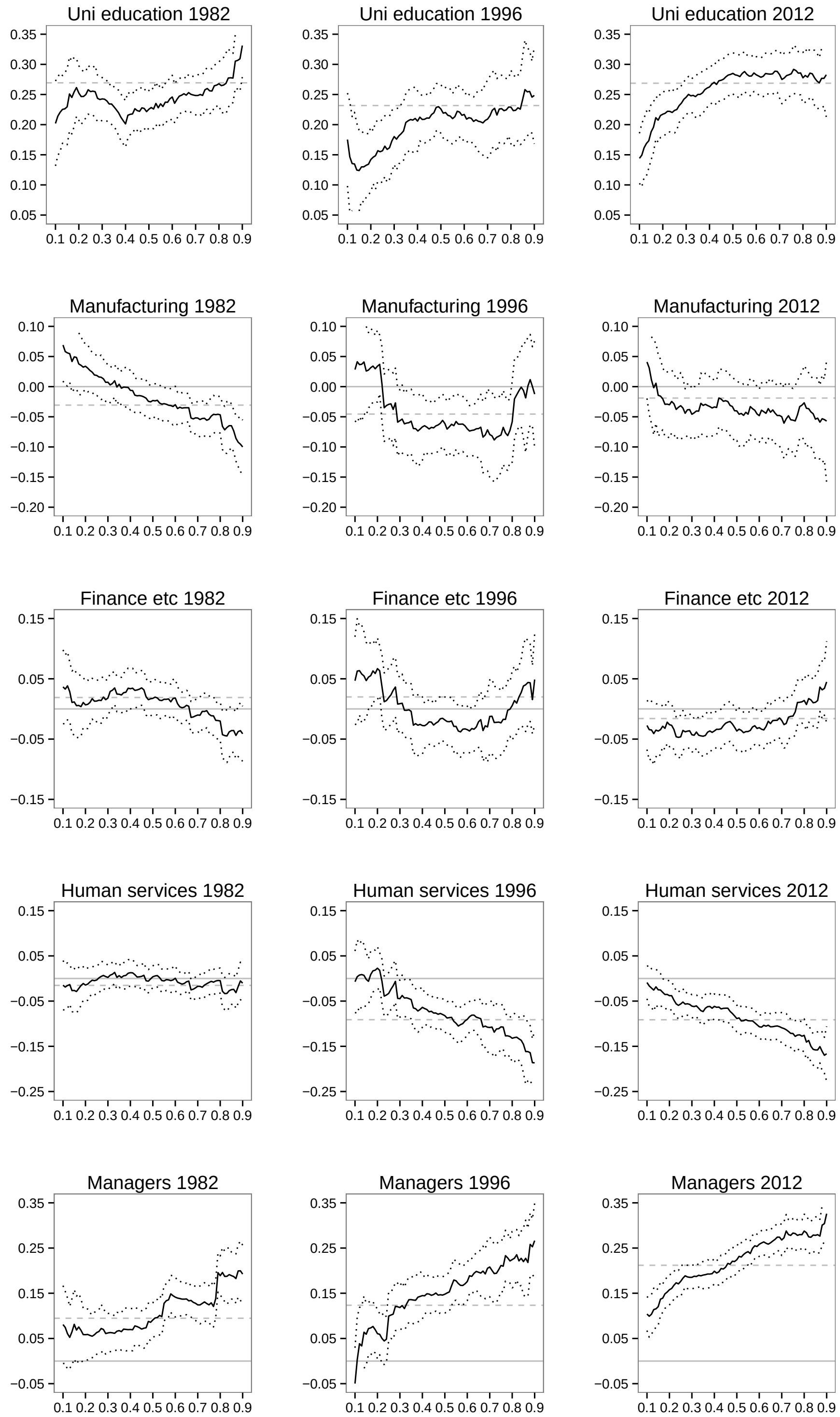


Figure 6. *Female quantile regression coeffi cents, 1982, 1996 and 2012*



To provide some indication of the value of quantile regression, a brief overview of Figures 5 and 6 is warranted. As just noted, in those panels where the overall slope of the QR lines deviates from horizontal we see evidence for the worth of quantile regression. For example, in the case of male employees, university education was inequality-inducing, and this relationship strengthened over the first period (1982 to 1996), particularly at the top of the distribution, before weakening in the second period (1996 to 2012). All three panels suggests that for low wage workers, the gains from university education had changed little over nearly 30 years.

An interesting contrast is between manufacturing and finance etc. In 1982 manufacturing was an inequality-suppressing industry. By 1996 this had reversed as high wage workers in this industry began to earn a premium. By 2012, however, the industry had returned to its 1982 profile. The premium that had emerged in the 1990s was gone by 2012. By 2012 manufacturing for men was a low wage industry across the board. These changes coincided with major plant closures and job losses throughout manufacturing as the Australian economy suffered from an over-valued exchange rate. In the case of finance etc in 1982 this industry was inequality-suppressing, with the low-paid workforce benefiting by working there and higher paid workers at a considerable relative disadvantage. By 2012 this picture had reversed and this industry was decisively inequality-inducing.

In the case of female employees, there are parallels as well as differences. Among the low-paid workforce the premium for university education declined while among middle wage earners it improved. In stark contrast to the men, among female high wage earners the premium actually declined in the period upto 1996. As with their male counterparts, wages for female employees in finance etc also moved from being inequality-suppressing to inequality-inducing but the changes were milder. As with the men, women in the bottom quintiles had lost their modest premium by 2012, but unlike the men, women in the top quintiles did not benefit to the same extent. Human services closely mirrored the male picture. This industry became more inequality-suppressing over time, largely at the expense of the high wage workforce.

Looking at these findings in general terms, it seems likely that some of these changes cancelled each other out. While industries like finance etc and construction became strong promoters of inequality, other industries like mining and human services put the brakes on the growth of inequality. At the same time, the composition of the workforce was changing: particularly the growth in university-educated workers and the decline in the manufacturing workforce. In order to gauge the overall effect on inequality of these countervailing changes in the wage structure, as well as the considerable changes in the composition of the workforce, it is necessary to undertake a decomposition of the wage densities.

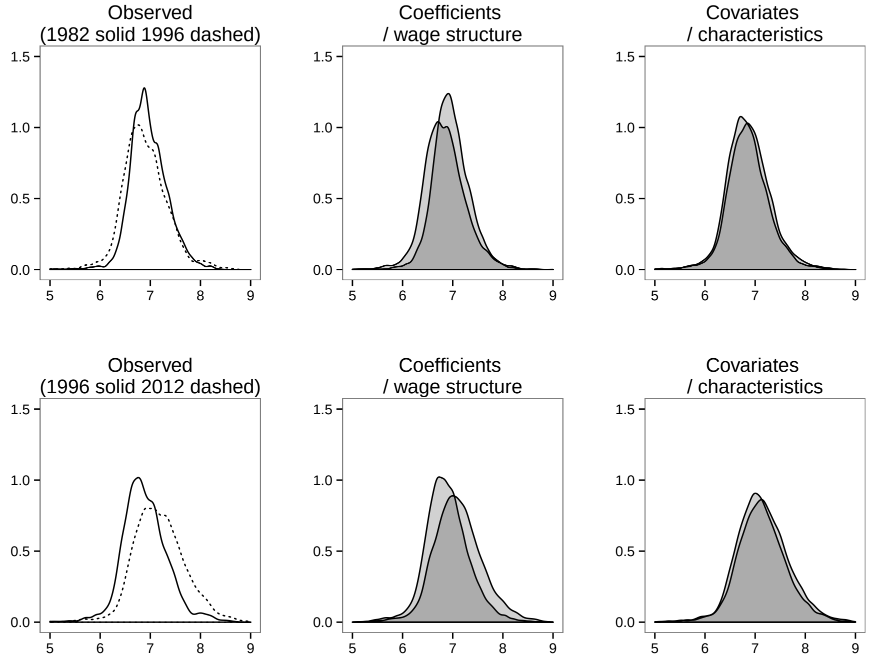
By way of concluding this section, it is salutary to observe the differences between the QR coefficients and the linear regression coefficients and how much they inform this story of inequality. A simple comparison of the linear regression coefficients would suggest much greater stability over time: concealing more often than revealing. And yet linear regression models have been the mainstay of most labour market analysis over the last half century. Koenker is surely right to insist on the value of the 'deeper view' which quantile regression offers.

Decomposition results 1982, 1996 and 2012

The decomposition approach (explained more fully in the appendix) relies on dividing two observed wage densities into separate components. One component is attributable to the model coefficients, that is, the wage structure, a second component is attributable to the sample covariates, that is, the workforce characteristics, and a third component consists of the 'residual'. The latter is often interpreted as the 'return on unobservables' and has been an important part of the interpretation given to increased wage inequality (see, for example, Juhn et al., 1993; Borland, 1999). Figures 7 and 8 show this decomposition in a visual way (with the panel numbering which I refer to below moving left to right in each row). Tables 2 and 4 show the same information as summary measures. In the figures, these components can be visualised as comparisons between the density implied by the QR model, and the density implied by the counterfactual, that is, 'applying' the wage structure from one period to the workforce characteristics of another period. Because the area under a density curve always equals unity, any change in the density over time (for example, the observed changes between 1982 and 1996 in panel 1) will show up as a 'displacement' in the area under the curve. This means that the areas shown as lighter shading in panels 2 and 3 will together equal the area of displacement for these changes in panel 1 (ignoring, for the moment, the residual). Consequently, one can visually compare panel 2 (the coefficients or wage structure) with panel 3 (the covariates or workforce characteristics) and assess the relative importance of each component by examining which panel has a greater area of light shading. The component with the larger area of lighter shading will have contributed more to the change in observed densities. This visual assessment can be augmented by examining the summary measures in Tables 2 and 4, where the proportions contributed by each component should correspond with the shaded areas in the figures. For example, in Table 2 in the second period at the tenth percentile the change was 0.193 and the coefficients contributed 0.147 (or 76%) of this, the covariates contributed 0.044 (or 23%), and the residual contributed 0.002 (or 1%). As will be evident from those tables, the residual is generally very small, and so can safely be ignored in most cases of visual comparison.[13]

The difference in the observed densities of wages for male employees between 1982 and 1996 (Figure 7) shows an increase in inequality, largely driven by a reduction in real wages across the bottom of the labour market, and an increase in real wages at the very top (panel 1). These changes were overwhelmingly driven by changes in the wage structure, which consistently pushed wages backwards for all except the very top of the distribution (panel 2). In the second period, 1996 to 2012, inequality among male employees increased substantially, and again this was driven predominantly by the wage structure (Figure 7, panel 5, that is, middle panel, second row). This time, the changes in the wage structure drove wages forwards, but more at the top of the labour market than in the middle or the bottom. Workforce characteristics (panel 6) played only a minor role (see the second panel of Table 2).

Figure 7. *Conditional wage densities, male employees, 1982, 1996 and 2012*



The lighter shaded areas reflect the part contributed by the component shown by the title. The x-axis shows the log weekly wage and the y-axis shows the densities.

Table 2. *Decomposition of wage densities, male employees, sub-periods 1982 to 1996 and 1996 to 2012*

	Log wages						Proportions		
				Decomposed into:			Decomposed into:		
Percentile			Change	Coef	Cov	Res	Coef	Cov	Res
	1982	*1996*							
10th	6.553	6.400	-0.152	-0.164	0.018	-0.007	1.074	-0.118	0.044
25th	6.720	6.624	-0.096	-0.138	0.025	0.017	1.438	-0.261	-0.176
50th	6.927	6.851	-0.077	-0.106	0.037	-0.008	1.379	-0.478	0.099
75th	7.185	7.154	-0.031	-0.088	0.053	0.004	2.811	-1.689	-0.122
90th	7.441	7.456	0.016	-0.055	0.059	0.011	-3.481	3.764	0.717
	1996	*2012*							
10th	6.400	6.593	0.193	0.175	0.016	0.002	0.908	0.081	0.011
25th	6.624	6.835	0.212	0.201	0.034	-0.024	0.951	0.162	-0.114
50th	6.851	7.140	0.289	0.234	0.054	0.001	0.809	0.187	0.004
75th	7.154	7.496	0.342	0.284	0.058	-0.000	0.831	0.169	-0.000
90th	7.456	7.847	0.391	0.321	0.067	0.003	0.821	0.171	0.008

Notes: Based on evaluating the conditional wage densities shown in Figure 7 at the quantiles shown. Coef = Coefficients; Cov = Covariates; Res = Residuals. The standard errors for these estimates can be found in the appendix (see Table 3.) *Source:* Empirical and counterfactual densities using QR model results for IDS data 1982, 1996 and 2012. *Population:* Male adult full-time employees.

Table 3. *Standard errors for Table 2*

	1982 to 1996				1996 to 2012			
Percentile	Change	Coeff	Cov	Resid	Change	Coeff	Cov	Resid
10th	0.005	0.014	0.008	0.010	0.014	0.014	0.008	0.012
25th	0.005	0.009	0.006	0.007	0.011	0.010	0.007	0.008
50th	0.013	0.009	0.007	0.007	0.016	0.010	0.007	0.010
75th	0.013	0.010	0.008	0.007	0.015	0.011	0.008	0.008
90th	0.020	0.015	0.010	0.011	0.022	0.016	0.010	0.013

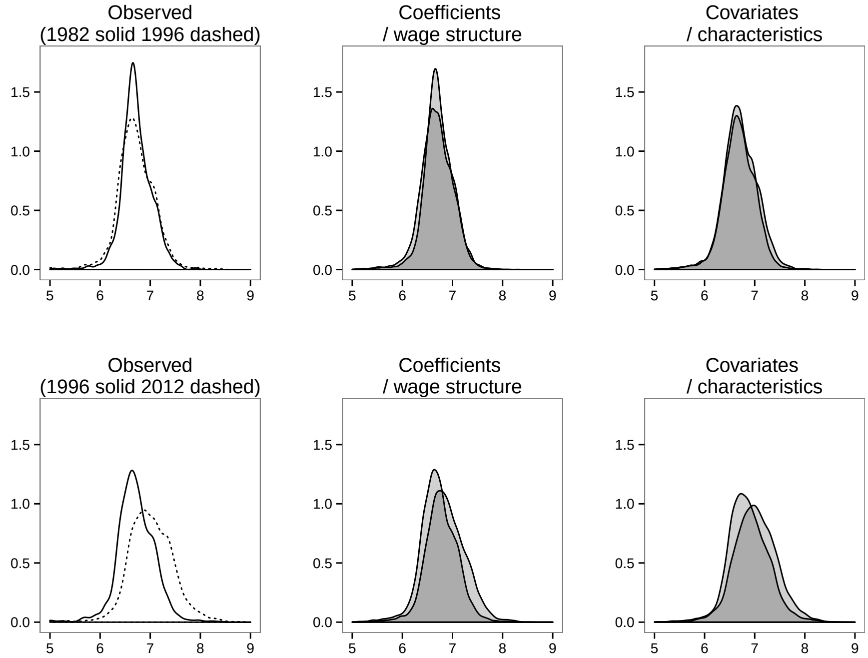
Notes: Note that these are the standard errors for the log wage estimates, not the proportions. They are based on bootstrapping the estimates 1000 times. Source: Empirical and counterfactual densities using QR model results for IDS data 1982, 1996 and 2012. Population: Male adult full-time employees.

Among female employees (Figure 8) the period from 1982 to 1996 is almost static, with an increase in inequality mostly evident in wage reductions at the bottom of the labour market. The changes that did occur were largely driven by the wage structure moving backwards (panel 2) and by some changes in workforce characteristics in the top half of the distribution (panel 3). At the very top of the distribution, characteristics counted much more than changes in the wage structure and in the middle of the distribution they were roughly equivalent (see Table 4).

By way of contrast, the second period, 1996 to 2012, saw a large increase in inequality among female employees, something evident in panel 4 of Figure 8. As with the male employees, this was driven by the wage structure moving forward for all employees (panel 5), though unlike the situation with male employees, workforce characteristics played an important role in this period (panel 6), contributing about half of the changes in density in the middle of the distribution and about 40% at the bottom and the top (see the second panel of Table 4).

In summary, for male employees the changes in the wage structure contributed about three quarters of the growth in inequality in the 30 years following 1982. In the earlier years, the changing wage structure actually drove wages backwards at the bottom of the labour market, while in the latter years, the wage structure drove wages forwards, but disproportionately at the top of the labour market. Among female employees changing characteristics did indeed play an important role in the growth of inequality—contributing about half—but this was quite uneven and did not apply at the bottom or top of the wage distribution. These gender differences were most likely due to increases in women's labour force participation, and greater access to higher education, both of which were consistent with the impact being felt in the middle of the wage distribution. Finally, for both men and women the role of the residual within these decompositions was relatively minor, suggesting that much of the heterogeneity which linear regression fails to accommodate is well catered for in the quantile regression modelling. This makes the invocation of unobservables unnecessary in interpreting the decomposition results. The importance of the wage structure also suggests that the *net* quantile regression effects discussed earlier (and shown in Figures 5 and 6) were indeed the dominant influence on the wages outcomes—particularly for male workers—which did emerge over this period.

Figure 8. *Conditional wage densities, female employees, 1982, 1996 and 2012*



The lighter shaded areas reflect the part contributed by the component shown by the title. The x-axis shows the log weekly wage and the y-axis shows the densities.

Table 4. *Decomposition of wage densities, female employees, sub-periods 1982 to 1996 and 1996 to 2012*

	Log wages						Proportions		
				Decomposed into:			Decomposed into:		
Percentile			Change	Coef	Cov	Res	Coef	Cov	Res
	1982	*1996*							
10th	6.403	6.336	-0.067	-0.078	-0.004	0.016	1.175	0.058	-0.233
25th	6.553	6.498	-0.055	-0.061	0.010	-0.004	1.114	-0.180	0.066
50th	6.693	6.701	0.008	-0.030	0.026	0.013	-3.809	3.224	1.585
75th	6.902	6.947	0.045	-0.004	0.046	0.003	-0.086	1.016	0.070
90th	7.125	7.154	0.029	-0.024	0.077	-0.024	-0.827	2.665	-0.838
	1996	*2012*							
10th	6.336	6.537	0.201	0.183	0.022	-0.005	0.913	0.110	-0.023
25th	6.498	6.731	0.233	0.178	0.068	-0.012	0.763	0.290	-0.054
50th	6.701	7.003	0.303	0.210	0.098	-0.006	0.696	0.325	-0.021
75th	6.947	7.311	0.364	0.238	0.110	0.016	0.654	0.302	0.044
90th	7.154	7.550	0.395	0.283	0.100	0.012	0.715	0.253	0.031

Notes: Based on evaluating the conditional wage densities shown in Figure 8 at the quantiles shown. Coef = Coefficients; Cov = Covariates; Res = Residuals. The standard errors for these estimates can be found in the appendix (see Table 5.) *Source:* Empirical and counterfactual densities using QR model results for IDS data 1982, 1996 and 2012. *Population:* Female adult full-time employees.

Table 5. *Standard errors for Table 4*

	1982 to 1996				1996 to 2012			
Percentile	Change	Coeff	Cov	Resid	Change	Coeff	Cov	Resid
10th	0.015	0.020	0.013	0.010	0.015	0.019	0.011	0.010
25th	0.013	0.012	0.010	0.007	0.016	0.011	0.009	0.009
50th	0.016	0.011	0.009	0.008	0.016	0.011	0.010	0.009
75th	0.016	0.014	0.012	0.008	0.014	0.013	0.011	0.009
90th	0.015	0.015	0.013	0.009	0.017	0.015	0.012	0.010

Notes: Note that these are the standard errors for the log wage estimates, not the proportions. They are based on bootstrapping the estimates 1000 times. Source: Empirical and counterfactual densities using QR model results for IDS data 1982, 1996 and 2012. Population: Female adult full-time employees.

Conclusion

The two most salient features of wage inequality in Australia were stagnation at the bottom of the wage distribution and substantial expansion at the top. Despite substantial changes in the composition of the workforce over the last thirty years, the results in this article show that it has been changes in the wage structure which have contributed most to the growth of inequality among male full-time workers. Among the female full-time workforce, changes in the wage structure and changes in this workforce composition have been of roughly equivalent importance.

As the earlier discussion suggested, the emphasis on managerial flexibility, the deregulation of the labour market, and the decline in trade union influence, were hallmarks of neoliberalism. The persistence of long-term unemployment and under-employment, alongside increased casualisation of work, has also been a striking feature of the last 30 years (Mitchell, 2008; Mitchell, 1999; Langmore and Quiggin, 1994). As argued by Botwinick (1993) these developments ensure downward pressure on wages at the bottom of the labour market. They can thus be used to explain much of the stagnation in the growth of real earnings which has been evident over the last 30 years (Watson, 2002).

Explaining the expansion of wages at the top end of the labour market requires that we supplement this institutional perspective with an understanding of capital flows. A core element of neoliberalism has been financialisation. The deregulation of the financial sector in Australia during the 1980s saw large flows of capital into this sector, and via the massive expansion of credit, into property booms and resource sector booms. The industries which grew strongly as a result of these developments—finance and insurance, property and business services, construction and mining—can be regarded as a neoliberal core. These flows of capital have had their impact in the labour market. The distribution of wages within the sectors which have boomed have all become dramatically more unequal, with one exception, mining.[14]

By way of contrast, the neoliberal backwaters—such as manufacturing and human services—have not seen an expansion in inequality, largely because the workers at the top of the wage distribution have not enjoyed the gains which their colleagues in the neoliberal heartlands have enjoyed. In most cases, they have been dependent on public sector funds or have been located in sectors of low profitability. Human services has been particularly notable. It remains a backwater for neoliberalism because it remains an area of economic life which resists commodification and the opportunities for high profits. Outside of the pharmaceutical industry, the domains of health, education and community services have all struggled to become more fully commodified, and public sector finances have been integral to funding their wage structure. Whether this remains the case in coming years is still to be seen. Part of the neoliberal project is a concerted campaign to make these domains more 'market-driven'.

The comparative literature has long suggested that those labour markets which more fully embraced market principles have also experienced higher levels of wage inequality. In Australia, the wage fixing system traditionally operated in such a way that wage gains made by those with industrial strength flowed on to the benefit of others. With enterprise bargaining such gains became both *magnified* and at the same time *quarantined* to the most profitable sectors of the economy. Thus while the flows of capital created the impetus for the growth of wage inequality in Australia, it was political and institutional changes which provided the mechanism for its realisation.

Appendix

Data

A number of researchers have raised concerns about using the ABS IDS data for analysing inequality over time, though their concerns have mainly concerned the analysis of household income rather than individual wage and salary earnings. Siminski et al. (2003), for example, have warned researchers to exercise caution in using the IDS 1982 data for trend analysis due mainly to 'definitional anomalies' related to income from own incorporated businesses. This makes it likely that the 1982 estimates for wages and salaries is under-estimated in aggregate. While this may have implications for the top end of the distribution, its impact in the bottom and middle is less likely. Saunders (2005: 81) also expressed concern about possible 'understatement of wage incomes among low wage employees' in the IDS data for the period between 1994 and 2001 when compared to the ABS EEH data (Employee Earnings and Hours). However, when Saunders compared the IDS aggregate findings with those from the ANA (Australian National Accounts), he found no discrepancy. There was nevertheless, some sensitivity in the findings for Gini inequality when Saunders re-estimated his analysis and omitted the lowest 2.5 per cent of wage and salary incomes.

In the case of Wilkins (2013) his major criticisms were also mainly directed at the annual income data, rather than the weekly wages data. In terms of the latter, the data problems mainly concerned the treatment of salary sacrificed income in the period between 2003 and 2006 and the inclusion of additional payments (such as bonuses) from 2007–08 onward. The inconsistent collecting of salary sacrificed income led to average discrepancies at the *household* level of \$21 in 2003–04 and \$29 in 2005–06, with the mean value of excluded salary sacrificed income at just \$7 in 2003–04 and \$10 in 2005–06 (Wilkins, 2013: 8). If we roughly halve these estimates to arrive at *individual* salary sacrificed amounts, it is clear that the impact from these inconsistencies on the analysis carried out in this article is likely to be minimal.

Nevertheless, there is certainly evidence that the size of the dispersion on earnings from the early 2000s onwards in greater in the ABS IDS data compared to the HILDA data. While the comparisons between the IDS and HILDA data were very close for female full-time employees, among the male full-time workforce the extent of inequality was greater in the IDS data. This showed up in comparisons using the Gini coefficient, as well as in the trajectory of real wages at the 90th percentile, and to some extent, at the median. The story at the bottom of the labour market, at the 10th percentile, showed a much smaller difference.[15]

Do these data concerns have implications for the decomposition analysis in this article? It would seem the answer is no. When the IDS data for 2012 is replaced by the HILDA data for 2012, the wage distributions for both men and women remain almost identical. Similarly, the decomposition results are almost identical in magnitude and the substantive arguments of this article are strengthened, rather than weakened, by the use of the HILDA data. The decomposition proportions for men in Table 3 are very close, and those for women, in Table 5, are even more strongly in favour of the coefficients. The visual differences between density plots from the IDS and the HILDA data are imperceptible. Carrying out the decomposition for the period from 2001 to 2012, using both HILDA and the IDS, produce similar results, and both point strongly towards the findings reported in this article. These results are not shown here, but are available from the author.[16]

Methodology

It is important to stress that the difference between quantile regression (QR) and linear regression is that one focusses on conditional wage *distributions*, rather than conditional *means*. Consequently, model fitting is usually applied using a vector of quantiles, for example, various deciles or percentiles. As with the Blinder-Oaxaca approach to decompositions of the gender or racial wages gap, the core insight is that model coefficients can be interpreted as the effects of the wage structure (prices, or returns on characteristics) while the sample covariates can be interpreted as the effects of the workforce characteristics (quantities, or 'endowments'). This tradition also makes use of a kind of 'counterfactual by substitution' strategy, in which the substitution of one component in the decomposition by its opposite (for example, 'combining' male characteristics with female returns) allows one to assess the effect of each component on the size of the wages gap (see, for example, Blinder, 1973; Oaxaca, 1973; Watson, 2010). This approach to the construction of the counterfactual is also the basis for the methodology in this article, though the implementation is obviously different.

In the following exposition I make use of the terminology and presentation used by Machado and Mata (2005: 447–450) who show that the conditional wage quantiles of the distribution can be modelled by:

$$Q_\theta(w|z) = z'\beta(\theta) \tag{1}$$

where $Q_\theta(w|z)$ for $\theta \in (0,1)$ is the θth quantile of the log wage (w) conditional on a vector of covariates (z) while $\beta(\theta)$ is the vector of QR coefficients. These can be estimated by minimizing in β

$$n^{-1}\sum_{i=1}^{n}\rho_\theta(w_i - z_i\prime\beta)$$

with

$$\rho_\theta(u) = \begin{cases} \theta u & \text{for} \quad u \geq 0 \\ (\theta-1)u & \text{for} \quad u < 0 \end{cases}$$

The marginal density function of the wage distribution is constructed as follows. Let $W(t)$ stand for the QR coefficients for period t and $Z(t)$ stand for the sample covariates for period t. To construct the density 'implied by the model' the same t is used for both terms in the conditional wage function:

$$W^*(t) \equiv Z^*(t)\prime\hat{\beta}^t \tag{2}$$

To construct the counterfactual density, one alternates the period, t. Thus, if $f^*(W(0);Z(0))$ is the density implied by the model in the first period, then $f^*(W(0);Z(1))$ is the counterfactual for that period. Similarly, if $f^*(W(1);Z(1))$ is the density implied by the model in the second period, then $f^*(W(1);Z(0))$ is the counterfactual. For example, one can analyse the change in wage densities between 1982 and 1996 by comparing $f^*(W(1);Z(0))$ with $f^*(W(0);Z(0))$, which basically asks how the wage structure in 1996 applied to the workforce characteristics in 1982 changes the shape of the wages density. At the same time, a comparison of $f^*(W(1);Z(1))$ with $f^*(W(1);Z(0))$ provides an estimate of the contribution of the changes in the workforce to the changes in density. The top row in Figure 7 illustrates these two comparisons.[17]

As well as a visual inspection of the wages density it is also useful to construct various summary measures (see Tables 3 and 5). If $\alpha(\cdot)$ is such a measure (for example, a particular percentile) and $fW(t)$ is the *observed* wage density in period t, then the decomposition for changes in α is:

$$\begin{aligned} \alpha(f(W(1))) - \alpha(f(W(0))) = & \quad \underbrace{\alpha(f^*(W(1);Z(0)) - \alpha(f^*(W(0);Z(0)))}_{\text{coefficients}} \\ & + \quad \underbrace{\alpha(f(W(1);Z(1)) - \alpha(f^*(W(1);Z(0)))}_{\text{covariates}} \\ & + \quad \text{residual} \end{aligned} \tag{3}$$

As equation 3 shows, the $\alpha(f^*(W(1);Z(0))$ terms cancel out, leaving only the 'model implied' densities. This demonstrates that the only difference between the LHS and RHS of this equation is the residual, that is, the part not accounted for by the modelling.

Table 6. *Regression slopes for QR coefficients*

	Male			Female		
Variable	1982	1996	2012	1982	1996	2012
Age (in 10 years)	0.11	0.12	0.06	0.13	-0.11	0.02
Age (quadratic)	-0.01	-0.00	0.00	-0.02	0.02	0.00
Uni quals	0.13	0.11	0.09	0.06	0.13	0.13
Diploma quals	0.04	-0.05	-0.05	0.00	0.11	0.06
Trade quals	-0.08	-0.09	-0.07	0.04	0.18	-0.01
Agriculture	0.18	0.26	0.34	0.27	0.96	0.16
Mining	0.24	0.07	-0.01	0.22	0.32	0.07
Manufacturing	-0.06	0.05	-0.05	-0.16	-0.07	-0.05
Utilities	-0.06	-0.14	-0.11	-0.06	-0.33	-0.00
Construction	-0.05	0.08	0.17	0.14	-0.04	-0.01
Transport	0.07	0.20	-0.01	-0.11	-0.04	0.08
Communications	-0.12	-0.15	0.12	-0.11	-0.23	0.14
Finance etc	-0.10	0.11	0.14	-0.07	-0.05	0.07
Government	-0.11	-0.26	-0.24	-0.04	-0.18	-0.15
Human services	0.03	-0.25	-0.19	-0.01	-0.21	-0.17
Managers	0.11	0.19	0.14	0.18	0.26	0.23
Professionals	-0.08	-0.05	0.03	-0.06	-0.03	-0.04
Tradesworkers	0.01	-0.04	-0.02	0.01	0.10	-0.06
Clerical, sales etc	-0.03	-0.07	-0.11	-0.08	-0.14	-0.05
Not married	0.00	0.02	-0.01	0.10	-0.01	-0.04
One child	-0.00	-0.00	-0.00	0.02	0.05	0.05
Two child	-0.03	0.04	0.08	-0.03	0.10	0.10
Three child	-0.02	0.15	0.12	0.08	0.07	-0.01
Four or more child	0.04	0.27	0.10	-0.21	0.69	0.27
Born overseas	0.03	-0.05	0.00	0.03	0.07	0.02
NSW	0.02	0.08	0.03	0.02	-0.01	0.01
Victoria	0.00	-0.02	0.04	0.02	0.02	0.04
Queensland	0.05	0.01	0.04	-0.00	0.02	0.02
SA	-0.07	-0.08	-0.09	0.01	-0.02	-0.02
WA	-0.03	0.11	0.12	-0.04	0.04	0.03
Tasmania	0.04	-0.08	-0.11	-0.04	-0.02	-0.05

Notes: Based on regressing the quantile regression coefficients against the tau values. Source: QR model results for IDS data 1982, 1996 and 2012. Population: Male and female adult full-time employees.

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Notes

1. This article makes use of confidentialised unit records files (CURFs) provided by the Australia Bureau of Statistics under the ABS/AVCC CURF Agreement.

2. Though Harvey argues that a capitalism without the production of commodities — where all money capital was invested solely in financial 'products'—would produce no surplus value and hence be doomed as a system (Harvey, 2013).

3. Although the return to university degrees among women began to increase slightly in the early 1990s (Borland, 1999: 186–188) and research by Coelli and Wilkins (2009) suggested that changes in the higher education system (particularly among teachers and nurses) had produced misleading results.

4. Whether there had been an actual growth in low-paid jobs was source of controversy during the 1990s. Part of this debate hinged on a methodological artifact: a situation where relative wages changed more than employment numbers. For example, with an absolute increase in high skill jobs alongside an absolute decline in low skill jobs—which most of the evidence suggested had happened—the result could be a decline in the relative wages of the low skilled workers. As a result, more workers would be caught up in the low pay definitional net, since the boundary for being low paid is pegged to median wages, and this cut-off is raised by the increase in high skilled jobs. If the median remains stagnant, as it did in the United States during the 1980s, then the results are not ambiguous. In Australia, however, median wages did increase during this period. How one accounts for inflation over time, and which techniques are used, both seem to influence the conclusions drawn. See, for example, the debate between Belchamber and Gregory concerning the correct way to deflate wages over time: (Belchamber, 1996; Gregory, 1996).

5. The Accord was fashioned in the period leading to the accession to power of the Australian Labor Party in 1983. It was a Prices and Incomes Accord which aimed to restrain wages growth and to increase the profit share of national income in return for employment creation and increases in the social wages, particularly universal health insurance. See Stilwell (1986) for a comprehensive analysis.

6. The analysis in this article was carried out using the R statistical language (R Core Team, 2013). The quantile regressions made use of Roger Koenker's `quantreg` package (Koenker, 2013) and the kernel density plots were produced using the `ggplot2` package (Wickham, 2009).

7. These data, and the data which follow throughout this article, come from the author's calculations using the unit record files of these ABS household income surveys and cover the period from 1982 to 2012. As well as the IDS, other studies of wage inequality use the ABS *Labour Force Survey* (LFS) or the ABS *Employee Earnings and Hours* survey (EEH). In more recent years researchers have begun to use cross-sectional estimates based on the Melbourne Institute's longitudinal *Household, Income and Labour Dynamics in Australia* (HILDA) survey. While the

precise magnitude of the results depend on the data source, the overall conclusions about the extent of inequality do not appear to depend on the choice of data source (for example Borland, 1999: 181).

8. The restriction to full-time workers in this article is necessary because assessing inequality in the part-time workforce is problematic without access to adequate hourly earnings data, which requires good measures of hours worked. Hourly measures can also be misleading for the full-time workforce because it can artificially deflate the earnings of high-paid workers who are paid a salary and work long hours, sometimes taking time in lieu.

9. The Theil index is part of a group of inequality measures, the General Entropy class, and has a number of desirable statistical properties for measuring cross-sectional inequality. Its interpretation, however, is less intuitive than the Gini index. See Burkhauser and Couch (2009: 524–28).

10. This coding scheme, which differs from the more conventional indicator coding approach, provides identical model results. All that differs is the interpretation placed on the coefficients.

11. CCLO is Census Classification and Classified List of Occupations; ASCO is Australian Standard Classification of Occupations; ANZSCO is Australian and New Zealand Standard Classification of Occupations.

12. The full set of QR regressors are shown in appendix Table 6, where slopes for these QR coefficients have been calculated to provide a simple, albeit crude, summary of the overall effect of each regressor. These slopes have been constructed by regressing the QR coefficients against the tau values. Where these slopes are positive, this implies an *inequality-inducing* effect, where they are negative, this implies an *inequality-suppressing* effect.

13. These results can be influenced by the order of the decomposition (see Machado and Mata, 2005: 450), so the analysis reported here was repeated in the reverse order. The results were substantively the same.

14. Mining has provided low wage workers with a substantial premium, well beyond their reach in any other industry. These wages have been one of the factors sustaining the fly-in-fly-out phenomenon across regional and remote Australia. In this respect, mining has been one neoliberal industry where inequality has been constrained, rather than accelerated.

15. The Gini coefficients for male part-time workers using HILDA data for 2010 and 2012 were 0.37 and 0.34, whereas for the ABS data they were 0.43 and 0.42 respectively. For male full-time workers, the differences were much less: 0.28 in HILDA (both years) and 0.30 for the ABS (both years). In the case of female workers, the figures for full-time workforce were 0.23 and 0.24 (HILDA) and 0.23 and 0.25 (ABS) for 2010 and 2012; for part-time workers the figures were 0.30 and 0.26 (HILDA) and 0.33 and 0.33 (ABS).

16. This comparative analysis made use of the unit record data from the HILDA Survey. The HILDA Project was initiated and is funded by the Australian Gov-

ernment Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) and is managed by the Melbourne Institute of Applied Economic and Social Research (MIAESR). The findings and views based on this analysis are those of the author and should not be attributed to either FaHCSIA or the MIAESR.

17. One can also reverse this process to test for the robustness of the decomposition since the results can be sensitive to the order of the decomposition. I discuss this issue further in the results section.

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