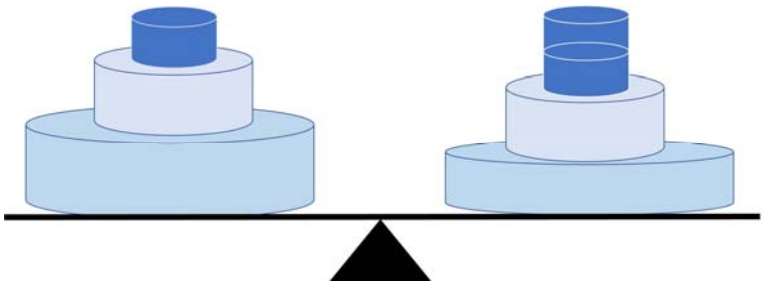
NEW ZEALAND COUNCIL OF TRADE UNIONS
Te Kauae Kaimahi

Shrinking portions to low and middle-income earners:

Inequality in Wages & Self-Employment 1998-2015

Dr Bill Rosenberg, August 2017
NZCTU Economist & Policy Director



Contents

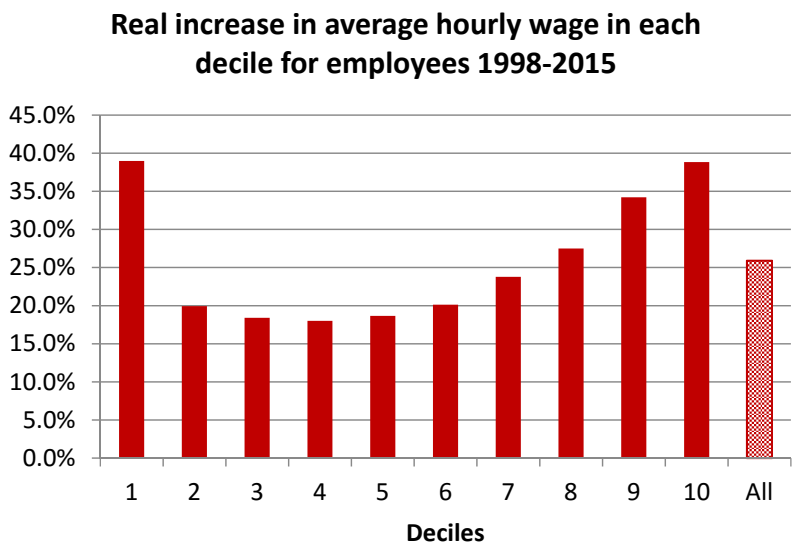
I gratefully acknowledge the helpful comments made by Brian Easton and Nick Henry on drafts of this report. The responsibility for any errors remains my own.

Summary

This study shows rising inequality in the hourly rates of gross earnings (before tax and benefits) among both wage and salary earners and the self-employed over the period 1998-2015, although incomes of the lowest 10 percent (decile) of wage and salary earners benefited greatly from strong rises in the minimum wage since 2000. A majority of people received either low incomes per hour or experienced low growth in those hourly rates, or both.

The data was provided on special request by Statistics New Zealand (SNZ) from the New Zealand Income Survey and comprises jobs sorted into deciles by income per hour, along with hours worked, numbers of people and total income earned in each decile.

For wage and salary earners (employees) this study finds increasing inequality in average hourly wages. The exception is the lowest income decile which is heavily influenced by the minimum wage, whose income has risen on average at about the same rate as the top decile and rose faster during the Labour-led Government in the early 2000s than in previous or subsequent National-led Governments. Other than that, wage rates for the next 50 percent (deciles 2 to 6) of employees rose much more slowly than the wage rates of higher income wage and salary earners: the real average hourly wage of the top 10 percent rose by 39 percent while the low and middle income 50 percent rose by 18-20 percent between 1998 and 2015 in real terms. On the whole, the more highly paid employees were, the faster their hourly wage rates increased, creating growing inequality. There is a 'hollowing out' of the wage scale in the sense that the low and middle income half of employees were getting much lower real increases in pay rates than the top 40 percent – and that higher income group is becoming increasingly unequal.



On the other hand weekly wages showed a weaker growth in inequality over the period. The reason is that employees on lower wages worked increasingly long hours to make up for slower increases in their hourly rate, while those on the highest 40 percent of wages reduced the hours they worked.

The top of the lowest income decile closely tracks the adult hourly minimum wage but the average for the decile averaged 10 percent below the minimum wage implying many workers are being paid below the adult minimum wage. Some of this can be explained by factors such as discriminatory minimum wage rates for young workers and trainees, misreporting of incomes, and the unintended inclusion of some self-employed in SNZ's survey, but there remains a gap that could suggest significant flouting of minimum wage laws.

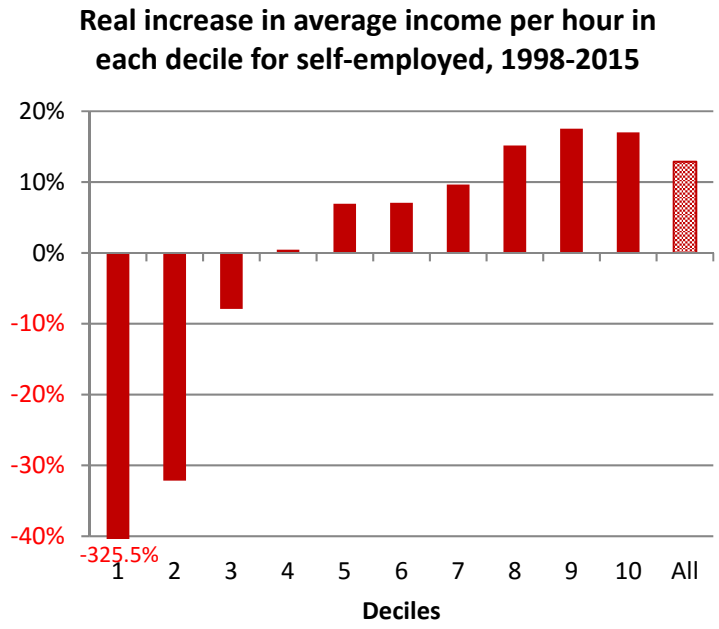
In 2015, an estimated 778,000 or 39 percent of wage and salary earners earned below the Living Wage. Two-thirds of wage and salary earners had wages below the average wage over the period.

To a reasonable approximation, employees paid below the overall average wage received either low wages or experienced low wage growth, or both.

The main differences between the periods of the Labour-led Government (taken to be 2000-2008) and National-led Government (2009-2015) were a slower rate of real wage growth and faster rise in hours worked under National. Wage inequality rose under both Governments though there is a suggestion of a pause towards the end of the Labour-led Government.

Self-employed

Self-employed people earned less than wage and salary earners per hour comparing both average and median hourly incomes for each group. Their incomes also increased more slowly. However their ability to spread their incomes among family members and to take income as capital gain (not reported in Statistics New Zealand's survey) are also important factors. The spread and inequality of earning rates is far greater for self-employed people than employees: the lowest income 10 percent had negative incomes while the highest 10 percent had average hourly earning rates double those of the highest 10 percent of employees on average over the 1998-2015 period. In 2015, an estimated 41 percent of self-employed were earning less than the minimum wage and 51 percent were earning under the Living Wage.



Among self-employed, the higher their earning rates (whether hourly or weekly) the more rapidly they rose over the period. The bottom 30 percent however had falling earning rates in real terms. Their weekly incomes were not moderated as much as employees by the hours they worked, and it is the highest earning self-employed who work the shortest hours (averaging 29 hours per week in 2015). Average hours worked have fallen or remained static for almost all self-employed income groups over the period of study and although on average they still work longer hours than employees, that difference has fallen to 39.3 hours per week for self-employed compared to 36.3 for employees in 2015.

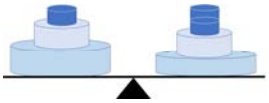
The main differences between the two Governments with respect to self-employed incomes were a rise in income inequality under Labour compared to a fall under National (though inequality was by then at a higher level). There is a suggestion of a slower rate of income growth and slower fall in hours worked under National but this is unlikely to be statistically significant.

In conclusion, the strong rises of the minimum wage over the period have been effective in protecting the wage rates of the lowest income 10 percent of employees, but not those of the next 50 percent or more in deciles 2 to 6. It is surprising that the minimum wage does not support a greater ripple effect up the wage scale. Such hollowing out of the wage distribution is often explained by technology making middle skill jobs redundant and forcing more people into low skilled, low paid employment. However the evidence for this is mixed in New Zealand. There is a rising proportion of jobs in higher skilled occupations, but there is also evidence of the average skill of workers falling in recent years because of strong growth in the employment of lower skilled workers. The poor wage increases beyond the bottom decile could be because of the weak bargaining power of the majority of workers who do not have coverage of a collective employment agreement. Globalisation is increasingly recognised as another contributor to wage inequality which has some explanatory power for New Zealand. The impact of the minimum wage shows that such effects can be significantly and positively countered by regulatory measures.

The data provides little support for the idea that people have low incomes because they don't work hard enough. The highest income earners among employees worked fewer hours per week on average than the next five deciles and their work hours fell over the period. The highest income earners among self-employed people worked the fewest hours on average of all self-employed deciles, and more only than the lowest employee decile whose members on average worked part time.

Because of the ability of the self-employed to disguise or under-report their income in various ways, further research is needed to understand to what extent the low earning rates they report, and the low rate of increase in earnings, is a reality. Tax authorities should be interested too. However, among the self-employed are some with very low incomes, and many of them are likely to have very variable incomes too. Public policy should take an interest in those who are forced into self-employment (often dependent contracting) by their employers, or where small businesses are given special advantages.

The low rates of earning also suggest that very poor labour productivity is widespread among the self-employed, a further concern given it constitutes a sizeable portion of New Zealand's economy.



Chapter 1: Introduction and sources

There is little publicly available data on the distribution of wages and salaries earned by employees in New Zealand, and the income of self-employed people. This is referring to gross or "market" incomes – what the employer pays, or a self-employed person receives as income before taxes and before benefits such as Working for Families. Much of the data is median or mean weekly or annual incomes with indication of neither the hours people have to work to earn it nor its distribution.

The following analysis is also unusual in that it is largely based on hourly earnings rather than weekly or annual income. It uses data on hourly earnings obtained on request from Statistics New Zealand (SNZ). It includes hours worked per week and average earnings per week, broken down into deciles ranked by hourly earnings.

The income a household receives and its distribution are modified by the taxation system, other income from the state and, in a broader sense, freely provided or subsidised public services such as health and education. These are very important in reducing inequality of incomes because in the end it is mainly net incomes plus public services that impact on a household's standard of living. On the other hand, where gross incomes are highly unequal, these systems must do much more to reduce inequality to acceptable levels. This usually requires higher and more progressive taxation, which meets resistance from those on higher incomes.

It is therefore important to understand what makes up net household incomes. Reducing gross income inequality reduces the "heavy lifting" required from the taxation system. Gross incomes also shine a much more direct light on the workings of pay systems and business income. Gross incomes are also frequently quoted when measuring top income inequality (e.g. between the top 1 percent and others), and when comparing shares of income produced in the economy at a national level (compiled in the National Accounts).

Source

The data comes from the New Zealand Income Survey (NZIS) which until 2015 surveyed households in June each year as a supplement to the quarterly Household Labour Force Survey (HLFS). From June 2016 it was replaced by the inelegantly named Labour Market Statistics (Incomes) survey which, while similar in many respects, has some significant differences.

Among those differences was to correct a fault in the earlier survey whereby a small number of self-employed were classified incorrectly as employees. It also identified more self-employment. As a result, I have not included 2016 in most of the analysis that follows. Appendix 2 explains the reasons more fully. In effect, employees in this study include a small proportion of self-employed who identified as paying themselves a wage or salary, and self-employed exclude this group.

The NZIS[1] is a sample survey of individuals in households in the same sample population as the HLFS. In 2015 the HLFS sample had approximately 15,000 households and the NZIS had approximately 30,000 individuals. All respondents to the HLFS are asked to participate in the

[1] For these and further details, see http://www.stats.govt.nz/browse_for_stats/income-and-work/Income/NZIncomeSurvey_HOTPJun15qtr/Data%20Quality.aspx and http://datainfoplus.stats.govt.nz/Item/nz.govt.stats/60252f6c-8057-49d5-9766-db880e27d00f/77

NZIS and 88.3 percent did so (the target was 80 percent). The target population is the usually-resident, non-institutionalised civilian population of New Zealand aged 15 and over, not including the permanent armed forces, overseas diplomats, people temporarily overseas, or overseas visitors who expect to live in New Zealand for less than 12 months. Questions regarding wages and salaries are for the respondent's most recent pay period, while for self-employment income they cover the 12 months before the interview. Information on other forms of income are also collected but are not part of the data analysed here. Respondents are asked for actual and usual gross (pre-tax) wages and salaries for their main jobs and up to two other jobs, by ordinary time, overtime and other income, and for total annual gross income from self-employment. They are also asked for corresponding weeks and hours worked. Sampling errors for the 2014 and 2015 surveys for all people aged 15 years and over for average weekly income was 3 percent and 4 percent respectively for wages and salaries, and 13 percent and 9 percent respectively for self-employment. The higher sampling errors for self-employed incomes should be born in mind in interpreting this analysis.

SNZ was asked to provide data separately on wage and salary earners and the self-employed. In each case the data was provided for every year from 1998 to 2016, by decile determined by hourly earning rates (e.g. hourly wages for employees), and providing also hours worked, total earnings and number of people for each decile. Data was also provided on the number of people within each decile boundary and I used this to as far as possible equalise decile sizes by splitting the decile boundary between adjacent deciles. The alternative was to include all those with hourly incomes at the decile boundary within the decile but this in some cases gave quite unequal “deciles”. The basic data derived from this is tabled in Appendix 1; the original data can be obtained from the author. Note that average hourly wages are calculated by dividing total income by total hours worked. Statistics New Zealand calculates average hourly wages by averaging all hourly wages.

The data is for jobs rather than people: a person could be represented more than once if they have more than one job. However, this is likely to have only a minor impact on overall personal income distribution. Administrative data from SNZ (Linked Employer-Employee Data or LEED) identifies fewer than 4 percent of employees and self-employed had more than one job on average in the year to March 2015, though that had fallen from over 5 percent in the year to March 2000.

Self-employment includes both people who are self-employed without employees and self-employed people who are employers. The data excludes self-employed people who either worked for no pay (such as in a relative’s business), unless they received income from another job, or who received income but worked no hours.

Chapter 2: The wages and salaries of employees

This chapter looks at the wages and salaries (referred to just as 'wages') of people who receive income in that form. These are generally employees, but as noted, there is a small proportion of self-employed who pay themselves wages and before 2016, some were mixed in with employees.

It finds increasing inequality in average hourly wages. In general the higher the wage, the faster it increased with a notable exception: the lowest income decile, which is heavily influenced by the minimum wage. The average wage in the lowest decile rose on average at about the same rate as the top decile though it rose faster during the Labour-led Government (when it rose from 1999 to 2008 by 3.3 percent a year in real terms on average) than in previous or subsequent National-led Governments (in real terms it rose 0.4 percent from 1998 to 1999 and 1.2 percent per year from 2008 to 2015 on average). Other than that, average wages for the next five deciles of employees rose at a rate which was much lower than that of higher income earners. On the whole, higher hourly wages increased faster, creating growing inequality. There is a 'hollowing out' of the wage scale in the sense that half of employees are getting much lower real increases in pay rates than the top 40 percent – and even that higher income group is becoming increasingly unequal.

Though individual employees may move up or down through the income deciles, the fact that a large proportion of the wage range – 60 percent – is either low paid or received poor pay increases or both means that most employees are affected, and many may be in that 60 percent for most or all of their working lives.

Weekly wages showed a weaker growth in inequality. The reason is that employees on lower wages worked increasingly long hours to make up for slower increases in their hourly rate, while those on the highest 40 percent of wages reduced the hours they worked over the period.

The top of the lowest income decile closely tracks the minimum wage but the average for the decile is well below the minimum wage. Some of it can be explained by factors such as discriminatory minimum wage rates for young workers and trainees and the inclusion of some self-employed in the survey, but there remains a gap that could suggest significant flouting of minimum wage laws.

The period 1998-2015

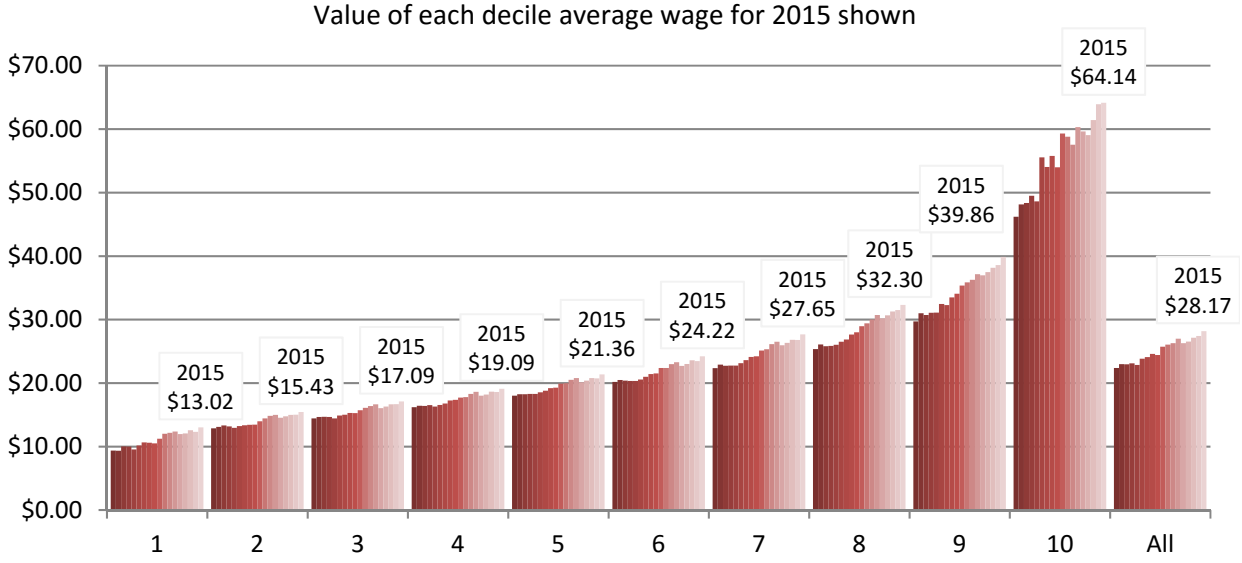
For the full period 1998 to 2015, the dollar values in each decile, their path of increase and the difference between deciles can be seen in real terms (adjusting for CPI inflation) in Figure 1. Table A2 in the Appendix shows the nominal values and these are summarised in Table 1 below.

Table 1. Average hourly wage in each decile for employees, 1998 and 2015, in dollars of the day

	Decile										
June	1	2	3	4	5	6	7	8	9	10	All
1998	6.52	8.95	10.04	11.26	12.53	14.03	15.55	17.63	20.66	32.15	15.57
2015	13.02	15.43	17.09	19.09	21.36	24.22	27.65	32.30	39.86	64.14	28.17

Figure 1: Decile real average hourly wages 1998 to 2015 (June 2015 $)

Value of each decile average wage for 2015 shown



Years shaded from dark to light, 1998 to 2015

Decile 1 contains the lowest one-tenth of hourly wage rates (in 2015 it averaged $13.02 per hour in 2015 dollars). Decile 10 contains the highest one-tenth of hourly wage rates (in 2015 it averaged $64.14 per hour in 2015 dollars). The overall average in 2015 was $28.17 per hour.

In all years, between 60 and 70 percent of employees were paid an hourly wage less than the overall average, reflecting the skewed shape of the distribution of wages towards the highest wages. To a reasonable approximation, two thirds of employees are paid less than the average wage, and this has been consistent over the entire period.

It is obvious from Figure 1 that the average wage in the top decile (Decile 10) has risen much faster than the other deciles (in nominal terms it rose from $32.15 in 1998 to $64.14 in 2015; in 1998 it was $46.20 in June 2015 dollars), but less obvious that the bottom decile has risen at about the same rate (from $6.52 to $13.02 in nominal terms; in 1998 it was $9.37 in June 2015 dollars).

Figure 2. Real increase in average hourly wage in each decile for employees, and for all employees, 1998-2015

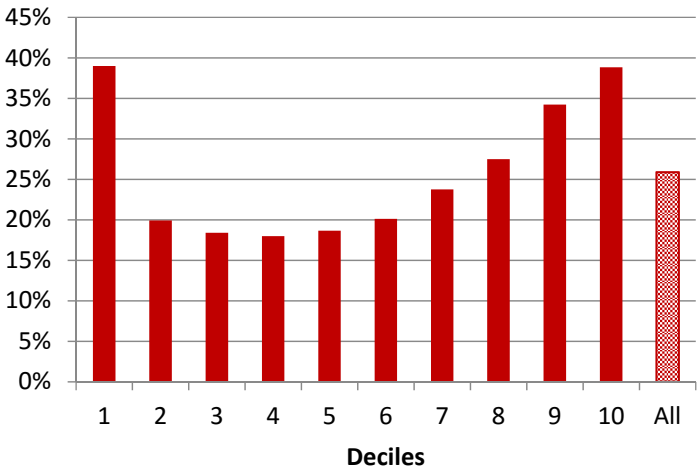


Figure 2 shows the average hourly wage increases in real terms. I'll only look at real increases in what follows unless stated otherwise. The figure shows the increase over the period in each decile. I'll refer to the average hourly wage in Deciles 1 to 10 as 'D1' to 'D10'.

The largest increases were in Decile 1 and Decile 10. Decile 1 is the decile of the minimum wage: the top of the range in all years was at or above the minimum wage. Almost certainly the rapid rise in this decile reflects the rapid rise of the minimum wage between 2000 and 2008 and to a lesser extent since then. The adult hourly minimum wage rose 51.0 percent in real terms over the whole period. The strong rise in the minimum wage has therefore been very effective in saving lowest-earning employees from receiving very small increases in their hourly rate. It is however remarkable how little 'ripple effect' there was to the deciles above the minimum wage. Those workers' bargaining power was too weak to maintain relativity with it. I'll discuss the effects of the minimum wage further below.

The real increases in the average hourly wage in Decile 2 to Decile 6 are all very close. From that point, the increase in average hourly wage rises steeply to Decile 10. While D4 rose only 18 percent in real terms over those years, D10 rose over twice as fast at 39 percent – the same as the minimum wage. The median hourly wage (not shown), which lies between D5 and D6, rose 20 percent – still barely more than half the top decile. So, apart from the minimum wage, the more you earned, the faster your wage rate rose. Half of wage and salary earners – those in Decile 2 to Decile 6 – experienced increases significantly below those rising fastest.

To a reasonable approximation, employees paid below the overall average wage experienced either low wages or low wage growth or both.

The wage scale has been 'hollowed out' in the sense that low to middle income earners have done much less well in real wage increases than those at the top and those right at the bottom protected by the minimum wage.

Wage inequality

Faster rises for the highest incomes meant a rise in income inequality among the majority of employees – the exception being those in the lowest income decile which benefited from the rises in the minimum wage. A simple measure of income inequality is the ratio of the average wage in the top decile (D10) to the average wage in the lowest decile (D1). However, because the minimum wage had such a marked effect, this doesn't show the full effect of rising inequality, so it is useful to look at some other ratios.

Figure 3. Hourly wage inequality: the ratio of the average wage between higher and lower deciles

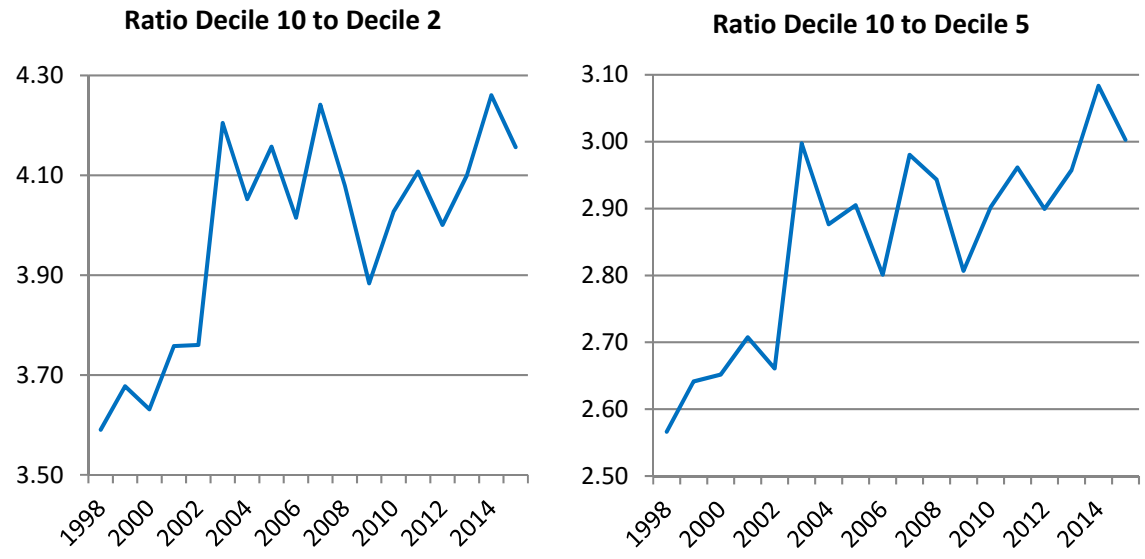


Figure 3 shows two ratios. The upward trend in inequality is very clear in the ratio of D10 to D2, one decile above the bottom. There is a steep rise in the early 2000s, relatively flat until 2007 before a fall and then resuming its climb. I will look at the two main periods below, but in all, the ratio rose from 3.6 in 1998 to 4.2 at the end of the period.

This means that whereas in 1998, people in the second to bottom decile had to work 3 hours and 35 minutes to earn what those in the top decile were paid for one hour ($8.95 compared to $32.15), by 2015 they needed to work 34 minutes longer: 4 hours and 9 minutes ($15.43 compared to $64.14).

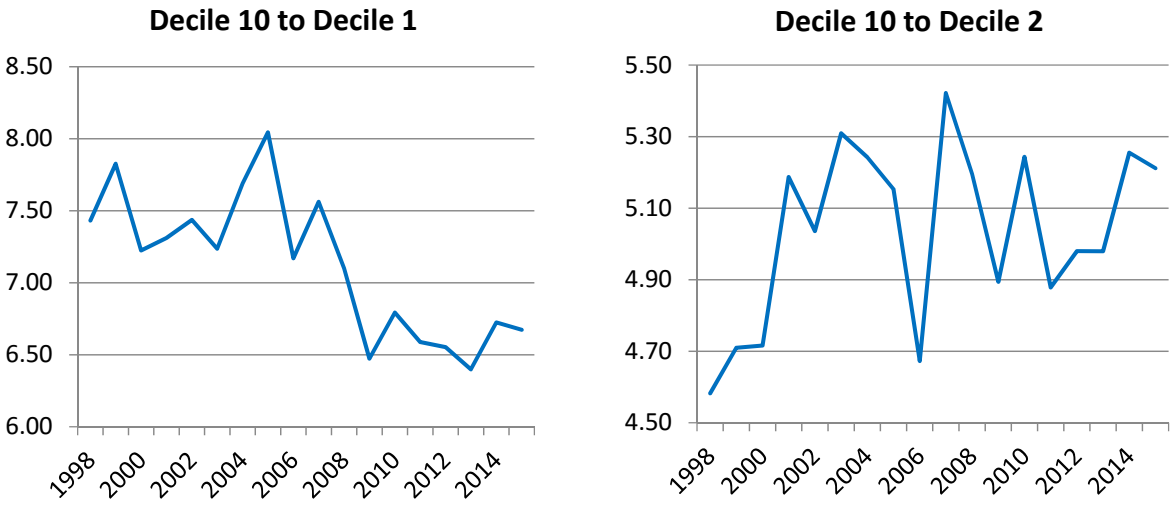
Virtually all the increase in inequality occurred among higher wage rates. Inequality in the top half of the distribution (the D10 to D5 ratio) rose steeply while at the bottom the D5 to D2 ratio (not shown) actually fell a little.

Weekly earnings inequality

Inequality in average hourly wages grew, but people's weekly earnings from wages are determined not only by the wage rate but also by the number of hours they work each week.

In fact, as Figure 4 shows, earnings inequality between the top decile[2] (Decile 10) and the bottom decile (Decile 1) fell over the period, falling until 2009 then levelling out to 2015. This contrasts with the broadly level pattern for the corresponding hourly wage rate.

Figure 4. Earnings inequality: the ratio of the weekly earnings from wages between higher and lower deciles



The reason is that people in the lowest income decile were working longer hours, while those in the highest income decile were working less. That pattern was not unique to those two deciles, as will be seen below.

Inequality rose in the rest of the distribution (putting aside Decile 1) as it did for hourly wage rates, but it was a weaker rise. In general, people with slower rises in their hourly wage rates tried to compensate by working longer. Although the rise was weaker, the absolute levels of

[2] Deciles here are still defined by ranking income per hour.

inequality were greater: the D10/D2 ratio for weekly wages was on average 5.0 while for hourly wages it was 4.0. Again, most of the rise in inequality was among the top half of incomes.

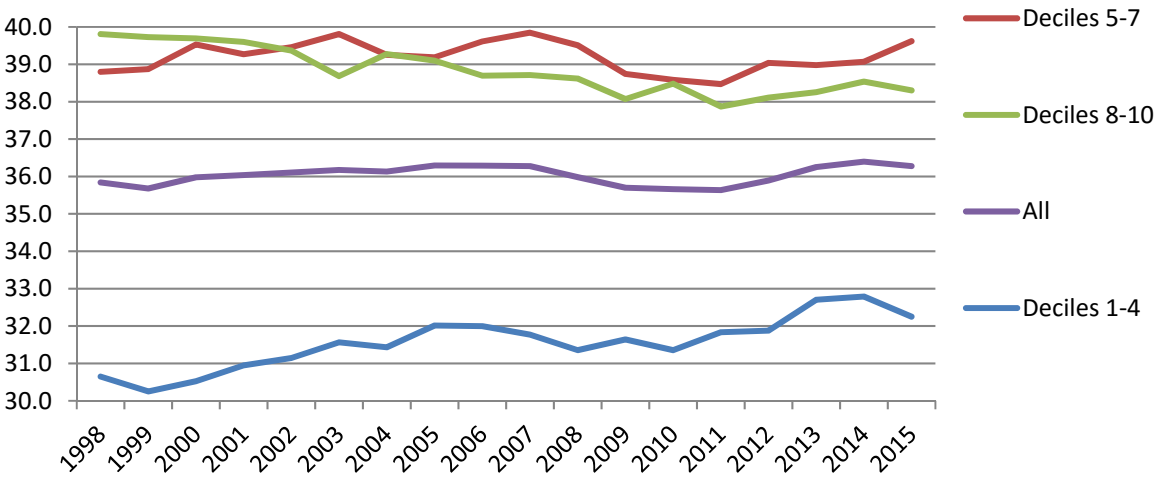
Hours worked

In the two lowest wage rate deciles, people on average worked part time (in the case of the bottom decile) or right on the border between what is officially classed as part time and full time – 30 hours per week – in the second decile. Above that, people on average worked full time, though decile 3 has moved from 30.1 hours per week in 1998 – just above 'part time' – to 34.9 hours per week in 2015.

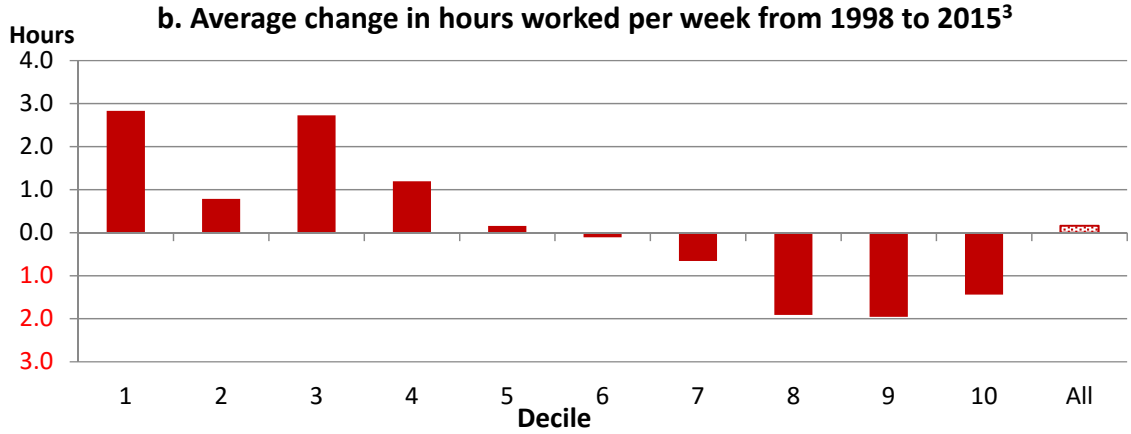
People in the bottom decile increased the hours they worked over the period from 1998 to 2015 on average by 2.7 hours per week, while the hours worked by those in the top decile fell by 1.4 hours per week. Broadly speaking, people in the lowest deciles (1 to 4) worked longer hours, those in the top three deciles (8 to 10) worked shorter hours, and those in the middle were unchanged: see Figure 5[3]. On average over all employees, there was little change.

Figure 5

a. Average weekly hours worked: comparing deciles



b. Average change in hours worked per week from 1998 to 2015[3]



[3] The average changes in weekly hours are calculated from the slope on an OLS linear regression. T-tests on the slope show a statistically significant positive slope for D1, D3 and D4, negative for D8 to D10 and not significantly different from zero for the other deciles and the total population.

The minimum wage

As already mentioned, the lowest decile is closely aligned to the adult minimum hourly wage. Figure 6 shows the relationship between the adult minimum hourly wage, the hourly wage that forms the top boundary of Decile 1, and the average hourly wage in Decile 1. This time these are nominal wages and include 2016.

Figure 6: The Minimum Hourly Wage and Decile 1
Nominal dollars

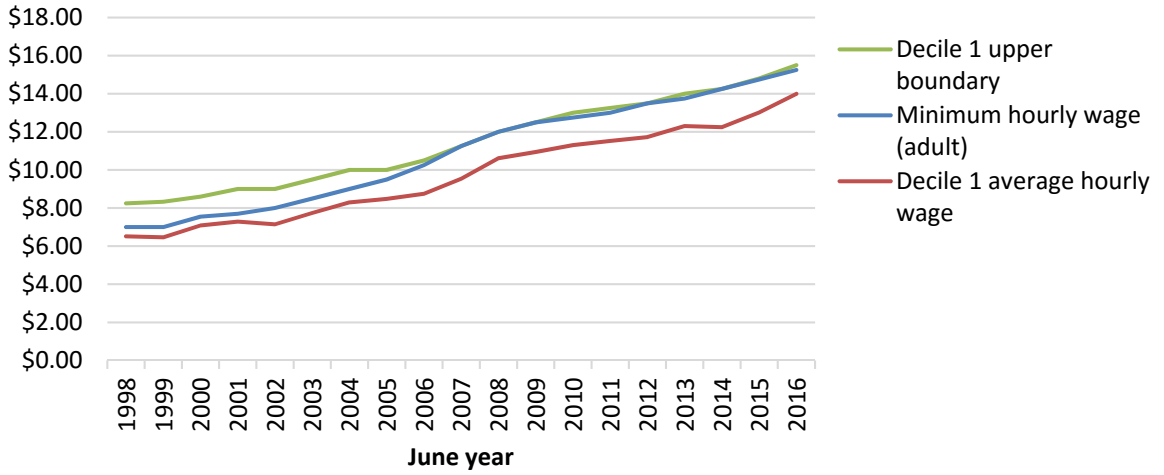
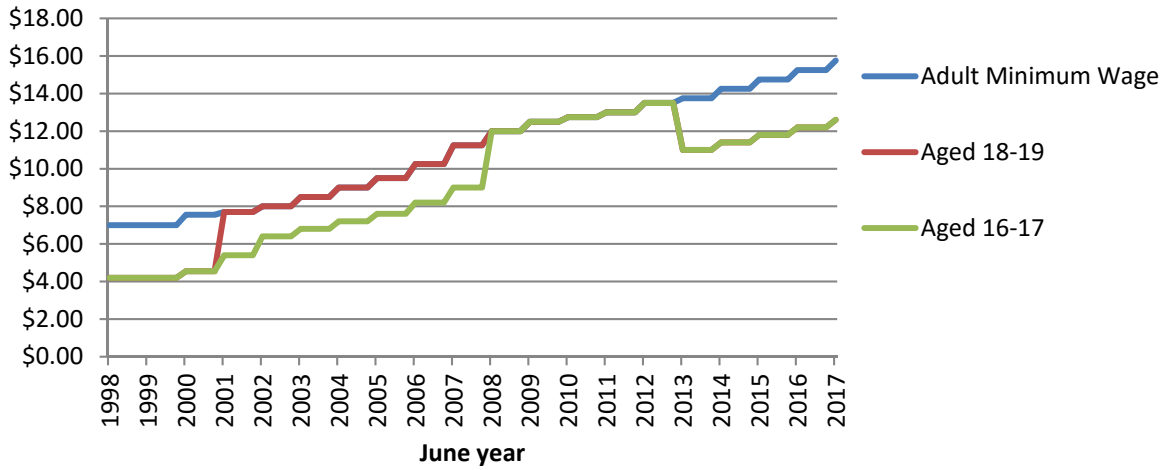


Figure 7: Minimum wage rates
Nominal dollars



In every case, the upper boundary of Decile 1 is equal to or above the adult minimum hourly wage. Since 2006 the two have been within 25 cents of each other and for five out of the 11 years 2006 to 2016 the two have been identical. The average hourly wage within Decile 1 has however been significantly lower than the adult minimum. It has averaged 10 percent lower, ranging from 5 percent (in 2001) to 15 percent (in 2006 and 2007) lower. This means a significant number of employees were paid below the minimum wage.

A more precise measure of the number on and below the minimum wage can be calculated for the five years where the Decile 1 boundary was actually on the minimum wage: see Table 2.

The number below the adult minimum wage is substantial in these years: between 90,000 and 150,000.

There are a number of possible reasons for this apparently large number of employees receiving less than the adult minimum wage.

Table 2. Numbers of employees on and below the adult minimum hourly wage, for years where the Decile 1 boundary was on the minimum wage

	On	Below
2007	45,100	151,700
2008	99,700	90,900
2009	89,000	95,000
2012	86,900	99,800
2014	67,500	128,600

Firstly, for most of the period there was a lower minimum wage for 16 and 17 year olds, and for some of it, also for 18 and 19 year olds (see Figure 7; actual minimum wage rates are provided in Appendix Table A9).

The survey also includes 15 year olds for whom there is no minimum wage but they are unlikely to be a significant influence on the survey. There was no age-discriminatory minimum wage from 2008 to 2013, though employers could pay employees 80 percent of the adult minimum wage if they were trainees undertaking a minimum number of training credits a year. From 1 May 2013 the lower minimum for 16-19 year old workers took the form of a so-called "Starting Out Wage" for six months with an employer, which for 18-19 year olds was tied to receipt of a benefit. Employers may pay such employees 80 percent of the adult minimum wage. However according to employer surveys by the Ministry of Business, Innovation and Employment, these lower minimum wages are infrequently used. For example the 2015-16 survey[4] found only 9 percent of employers who had hired a 16-19 year old in the last 12 months were paying the starting-out wage. Of those employers with staff aged 20 years or over undertaking recognised industry training, only 7 per cent reported paying less than the adult minimum wage. Therefore it is unlikely these lower minimum wages would have had a marked effect on the average in Decile 1, especially from 2008 onwards.

Secondly, as already noted, for all but the 2016 survey, some self-employed, who are not protected by the minimum wage legislation, were mistakenly mixed in with the employees. However the gap between the average wage in the decile and the adult minimum wage was still 8 percent in 2016 after this error had been corrected. This gap is smaller than previous years (it was 12 percent in 2015 and 14 percent in 2014 for example), so it is likely that this error had some effect, but cannot explain all of it.

There could also be misreporting of wage rates: some survey respondents may not know their precise hourly rate or it might have to be calculated from estimates of their weekly income and hours worked. Statistics New Zealand interviewers do however take some care to ascertain the correct rate.

Finally, the gap could reflect flouting of the minimum wage by employers. A more active labour inspectorate in recent years has found numerous breaches of minimum employment standards including payment of the minimum wage. I am not aware of any other assessment

[4] See summary of findings, section 5.2, available at http://www.mbie.govt.nz/info-services/employment-skills/labour-market-reports/national-survey-of-employers/nse-2015-16

of the total impact of this. The persistent gap found here suggests that breaches may be widespread. It calls for further investigation and research.

The Living Wage

The data enables an estimate to be made of the number of employees working at or below the hourly value of the Living Wage set by Living Wage Aotearoa[5]. This was first set in 2012 and takes effect from 1 July in each year. Table 3 shows the numbers of employees on or below the Living Wage in the month before it took effect.

Table 3. Employees on or below the Living Wage

June year	Living Wage	Number of employees on or below Living Wage	Proportion of all employees
2012	$18.40	691,000	38.2%
2013	$18.80	704,000	38.0%
2014	$19.25	746,000	38.5%
2015	$19.80	778,000	39.0%
2016	$20.20	694,000	36.0%

The Living Wage is calculated to provide "the income necessary to provide workers and their families with the basic necessities of life. A Living Wage will enable workers to live with dignity and to participate as active citizens in society." It is based on a two-adult, two-child family where the adults are earning the hourly Living Wage, one working full time and the other half-time.

An estimate is included for 2016 but the change in survey methodology should be borne in mind: the earlier years included some self-employed. In that sense, 2016 may be a more accurate estimate. In that year, over a third or 36.0 percent of employees were paid wages below the Living Wage.

Did different Government policy regimes have different impacts?

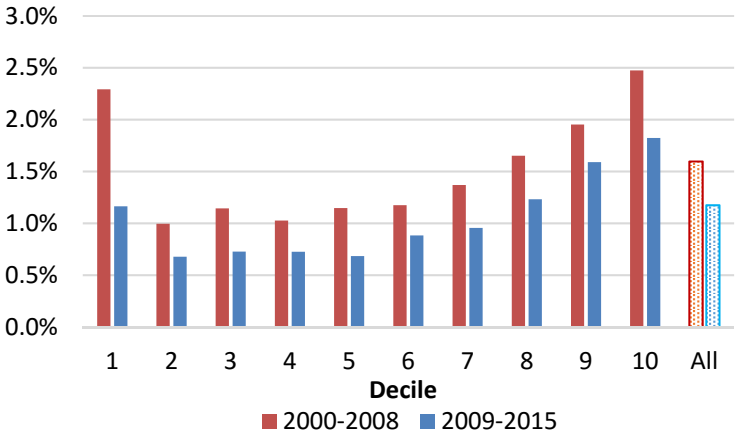
Was the rise in inequality different under the three Governments in power over the 1998 to 2015 period? From 1998 to 1999 a National-led Government was in power; employment relations were under the Employment Contracts Act (ECA) and the minimum wage was not raised. From 1999 to 2008 a Labour-led Government governed the country, replacing the ECA with the Employment Relations Act (ERA) in 2000 and making rapid increases in the minimum wage from 2000, including abolishing the youth minimum wage. The National-led Government elected in 2008 made several significant amendments to the ERA beginning in 2009. These made collective bargaining, industrial action and union activities more difficult and reduced job security. Rises in the minimum wage continued but not as fast as the previous government. Employment and incomes were also affected by the recession beginning in early 2008 which was deepened by the Global Financial Crisis and its aftermath. Real GDP had regained its level at the start of the recession by June 2011.

In making comparisons, there is a problem in deciding which Government to attribute June years where Governments changed (1999/2000, 2008/09). There may be a mixture of the previous and new Government's policies (e.g. changes to employment legislation, changes in the minimum wage) in that year. I therefore omit the cross-over years. That means the National-led Government in the 1990s has only two data points, or just one year of increase so I omit it. That leaves periods 2000-2008 (Labour-led) and 2009-2015 (National-led).

[5] http://www.livingwage.org.nz/

Figure 8 shows the average rise per year over each period rather than rises for the whole periods in order to allow comparisons of the different length periods. Both periods have the characteristic "U" shape: a higher rise in the average hourly wage in Decile 1 influenced by the Minimum Wage, then rises in Deciles 2 to 5 or 6 relatively flat at a low level of increase, followed by a rise to the top decile, Decile 10.

Figure 8: Average rise per year in real average hourly wage

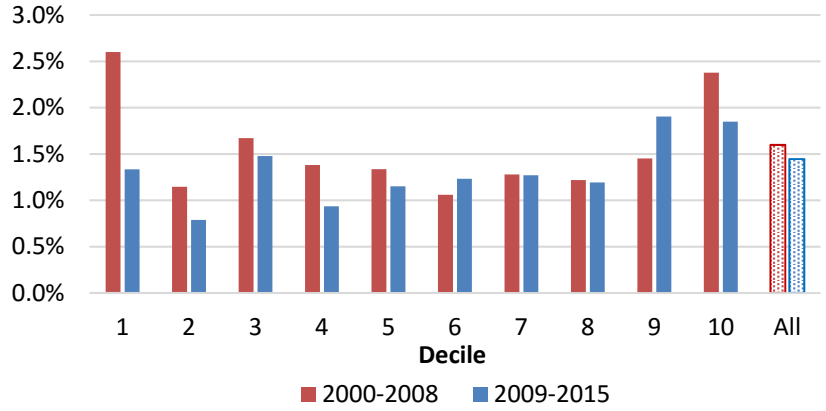


The rises in the second period are in all cases lower than in the first period. This was influenced by the recession, but just how much was due to that is difficult to tell given other changes occurring at the same time. Average real GDP growth per year in the two periods was 3.4 percent and 2.1 percent respectively, but not all of the slowing was necessarily due to the Global Financial Crisis.

On average the hourly wage increases were 0.4 percentage points lower in the years 2009 to 2015 (1.2 percent per year compared to 1.6 percent per year), but the difference ranged from 1.1 percentage points in Decile 1 (1.2 percent per year compared to 2.3 percent – not much more than half, reflecting slower increases in the minimum wage) down to 0.3 percentage points in Deciles 2, 4 and 6. The average rise in Decile 10 was 0.7 percentage points less in 2009-2015 than the previous period.

The mean D10/D2 ratio was 3.98 between 2000 and 2008 and somewhat higher at 4.07 between 2009 and 2015, indicating an increase in inequality on this measure. There was a similar change in the D9/D2 ratio (2.44 to 2.53). However as Figure 3 showed, there was a rising trend throughout the whole 2000-2015 period although there was a dip in both ratios between 2007 and 2009.

Figure 9: Average rise per year in real average weekly earnings



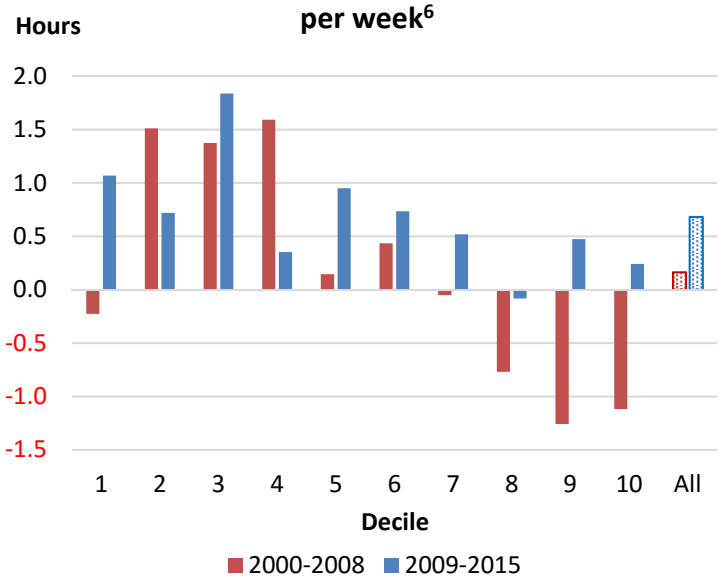
The contrast between the two periods for increases in average weekly earnings, shown in Figure 9, is not as great as for the hourly wage, other than in the lowest wage decile where weekly earnings rose twice as fast per year (2.6 percent compared to 1.3 percent) in the earlier period.

Again, the impact of lower income workers working more hours per week tends to reduce the upward slope of the increases. In the 2009-2015 period however, almost all deciles increased their weekly hours worked over the period, though lower wage workers increased their hours more. See Figure 10[6].

Notably, the lowest decile reduced their hours in the 2000-2008 period but increased them at the second highest rate in the more recent period.

The main difference between the two Governments was the slower rate of real wage growth and faster rise in hours worked under National. Inequality rose under both Governments though there is a suggestion of a pause towards the end of the Labour-led Government.

Figure 10: Average change in hours worked per week[6]



[6] Again the changes in weekly hours are calculated from the slope on an OLS linear regression. This time though, T-tests on the slope show a statistically significant positive slope for only four of the 20 deciles. The changing pattern of hours worked over the years is somewhat erratic and sample sizes are very small with two periods. However a similar pattern is shown in average percentage increases over the period.

Chapter 3: Incomes of self-employed people

Barring extensive hiding of income, the world of self-employment looks even less healthy than that of wage and salary earners. For most self-employed – the lowest income 60 percent – their incomes are lower than the same decile of employees, rising more slowly over time, and much less certain. Inequalities are extreme.

Self-employment often implies much less security and much more variability of income. There is no right to a minimum wage, and at times losses can be made. On the other hand it has the potential, for some, of much higher incomes. It also allows more options for spreading income between members of a household, and de facto making use of business income, products (such as on-farm consumption of produce) and assets for personal benefit. There are often incentives to do these in avoiding tax. For example income could be attributed to a spouse to reduce the tax rate paid on the operation's income even if hours worked by the couple are not proportional to their respective incomes. Farmers, landlords and other businesses with a potential for high capital gain can also minimise their taxable income in various ways such as by heavy expenditure on improving their assets or paying off debt and take their income in future capital gains. Property investors can declare a loss from their property business and use it to offset other income.

Self-employment income notionally arises from two sources: income recognising the labour the owner contributes to the business, and returns on any capital invested in the business. It is often difficult or impossible to distinguish the two in practice, and they are not distinguished in these statistics. There may in fact be no return on capital. It is remarkable that for many self-employed people, if the income for their labour was at the same wage rate as employees in the same occupation or industry, the return to any assets (capital) they use in their businesses would be a substantial loss.

Their businesses can take a wide variety of forms, from farmers, lawyers, accountants, retailers, tradespeople and taxi drivers with business assets, formal accounts and possibly employees, through to Uber drivers and people producing items or services for sale in their own home as time permits with no assets other than the use of the house, and its usual household tools, utensils and vehicles. Income can be received very unevenly through the year, though the survey asks respondents to provide annual accounts (so income may not have been earned in June).

These factors need to be born in mind when analysing the data used here which treats income as an hourly rate and weekly earnings. For some we are just seeing the results of incomes manipulated for tax purposes. On the other hand many self-employed people would agree with the findings that many are earning a very low hourly rate. The very unequal distribution of hourly rates and earnings also accords with the wide range of forms of self-employment. The higher sampling error rates for self-employment data (noted in Chapter 1) should also be borne in mind.

To the extent that the reported incomes are genuine and not reduced for the purposes of tax avoidance, both the labour incomes the self-employed receive and their 'investment returns' pose a problem for economic theories that assume self-interested, rational and indeed optimal behaviour by humans engaged in economic behaviour. Those espousing such theories would ask why a person would accept a wage less than he or she could receive doing the same or similar work as an employee: why would they not just become an employee? They would ask

why a person would tolerate a return on an asset far below what they could receive from investing the market value of the asset elsewhere – even in a bank account in some cases.

There are some possible explanations which could co-exist. One is that the self-employed tolerate low incomes in the belief that they will get a much higher return at some point in the future to compensate for their sacrifices. The evidence here suggests that many do not. Another is that some are doing the work for additional income (or even just for social reasons) and the amount they earn is not a critical factor in continuing to do the work. Some may tolerate the low income simply because they like the freedom of "being their own boss". But some may be doing it because they have been forced into that position by their employers and have become in effect employees without employee rights, sometimes called dependent contractors.

Comparing employees with self-employed

This chapter follows a similar structure to the previous one, but first directly compares some aspects of self-employment with employees.

Figure 11. Comparison of nominal hourly earnings of employees and self-employed

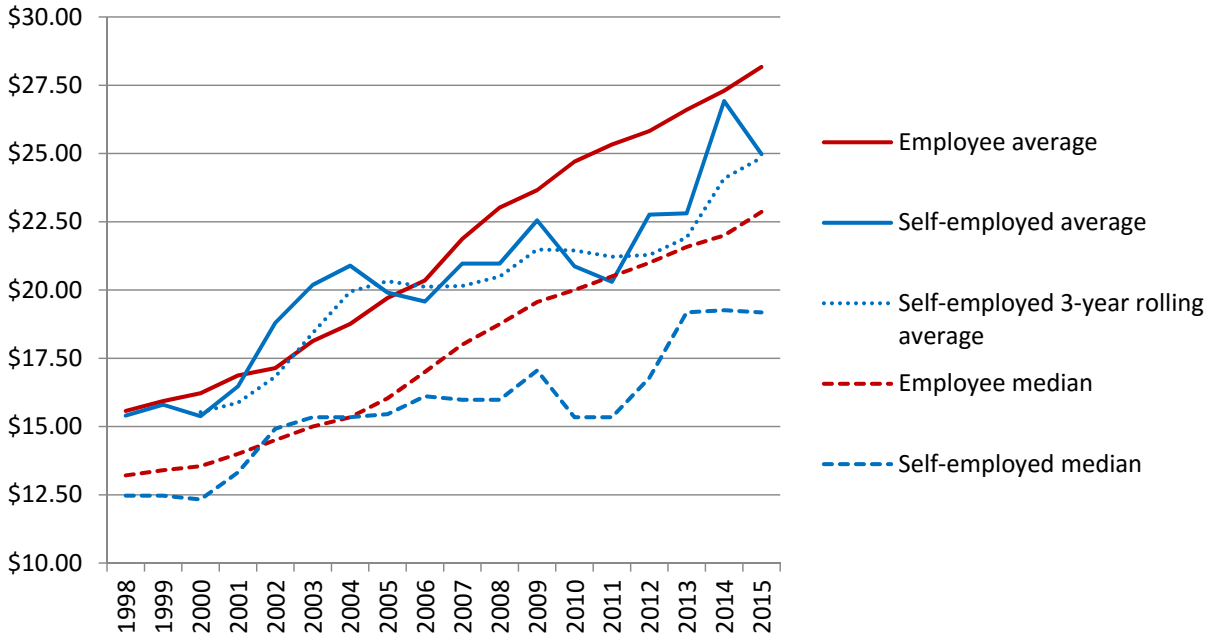
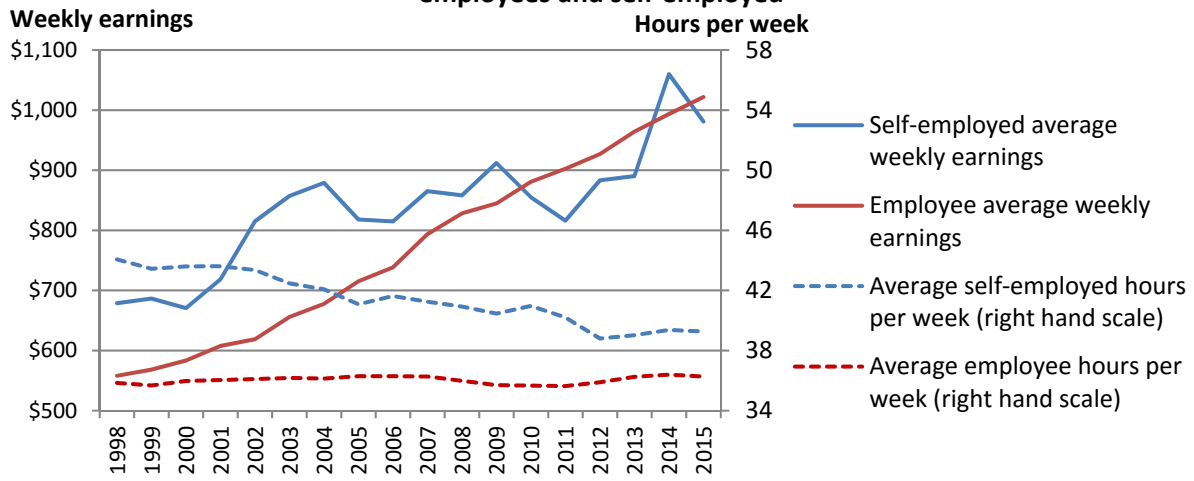


Figure 11 compares the paths of average hourly wages and median hourly wages for employees and self-employed people over the period in dollars of the day. Until about 2005 both hourly incomes were reasonably similar for the two groups. Remember though that self-employed incomes should in general include an element of return on capital so even over this period, the return to self-employed labour was on average (mean and median) lower than for employees. From 2005 onward the hourly incomes of the two groups parted company. There was a closing of the gap from 2011 but employees remain appreciably ahead. The variability in self-employed hourly incomes should not be over-interpreted because some of it may be due to survey sampling error, but a smoothed series using 3-year rolling geometric means still shows considerable variability and emphasises the parting of the ways in more recent years.

Figure 12. Comparison of average weekly earnings and hours worked of employees and self-employed



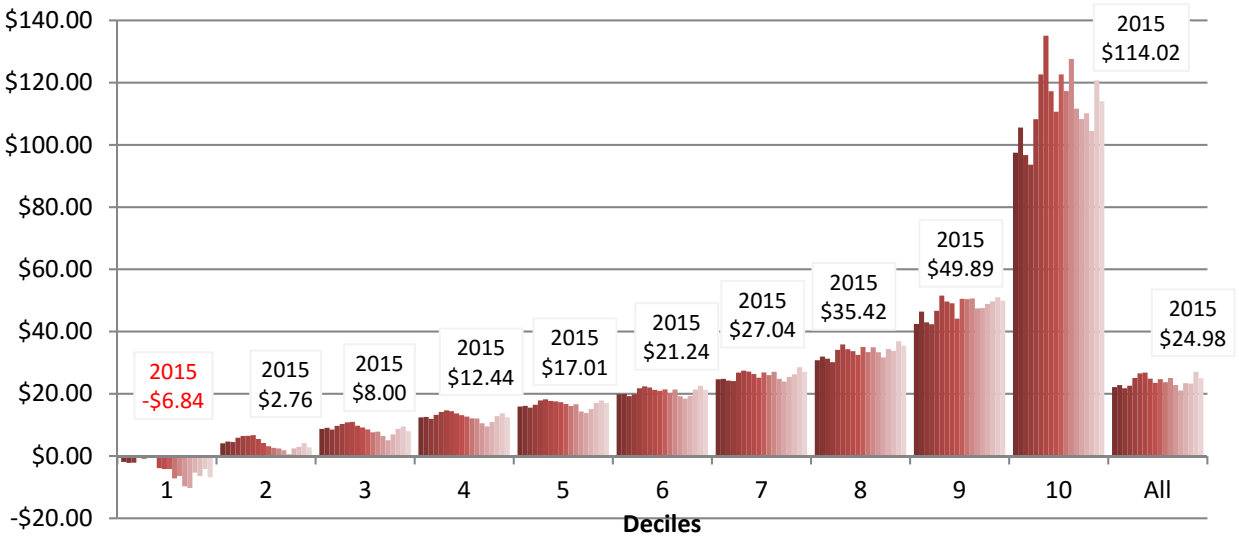
The average weekly earnings of self-employed people however was significantly greater than employees' until 2010 when they roughly came in line, as Figure 12 shows. This convergence was largely because the average hours worked by self-employed people fell over the period from 44 hours per week to 39 hours per week. Employees averaged 36 hours per week throughout the period (although as we know, there were big variations at different wage levels). So self-employed hours fell from 23 percent more than employees to 8 percent more. I go into more detail below.

The period 1998-2015

The dollar per hour values in each decile, their path of increase and the difference between deciles can be seen in real terms in Figure 13. It shows very large inequality in hourly rates of earnings. Table A6 in the Appendix shows the nominal values and these are summarised in Table 4.

Figure 13. Decile real incomes per hour of self-employed 1998 to 2015 (June 2015 $)

Value of wage for 2015 shown



Years shaded from dark to light, 1998 to 2015

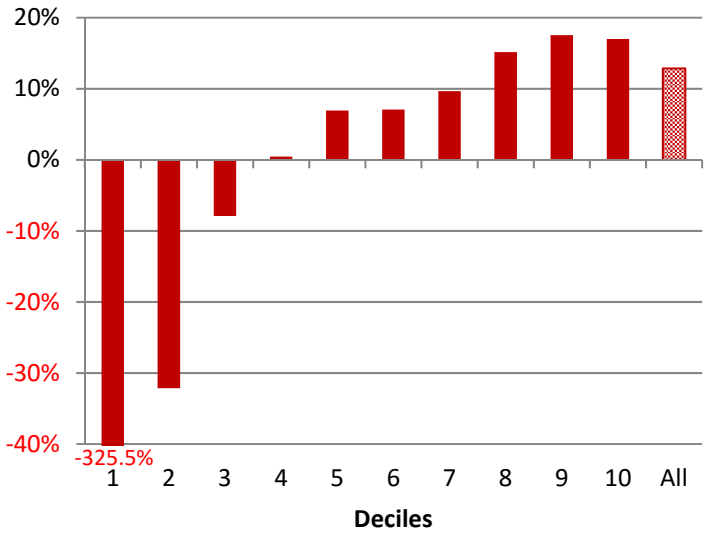
The lowest income decile, Decile 1 was negative in every year but 2003: it averaged -$6.84 per hour in 2015 and for most years since 2006 its top value was $0.00. The highest decile, Decile 10 averaged $114.02 per hour in 2015. The overall average in 2015 was $24.98 per hour, but the spread was much greater than for employees ranging from negative values through to an average in the top decile not far from twice that for employees ($64.14).

While the top decile for employees stands out clearly above the others and rose considerably faster than all but the bottom decile, for the self-employed the difference is spectacular. The average income per hour in Decile 10 is never less than 2.1 times the next highest decile, and reached 2.7 times Decile 9 in 2004. At the other end of the scale, the lowest three deciles have largely been below the minimum wage over the period, and consistently so since 2006.

In real terms, the average hourly earnings in the lowest income three deciles fell over the period while the top two deciles rose 17.5 percent and 17.0 percent respectively.

Figure 14 shows the real increases in average earnings per hour in each decile over the period. Note that the average income per hour in the first decile reduced from a loss of -$1.31 per hour in 1998 (in June 2015 dollars) to -$6.84 in 2015 – arithmetically an *increase* of 325 percent in real terms. This has been displayed as negative (going off the scale) because it represents a reduction in income – though in dollar terms, a difference between very small (negative) incomes.

Figure 14: Real increase in average income per hour in each decile for self-employed, 1998-2015



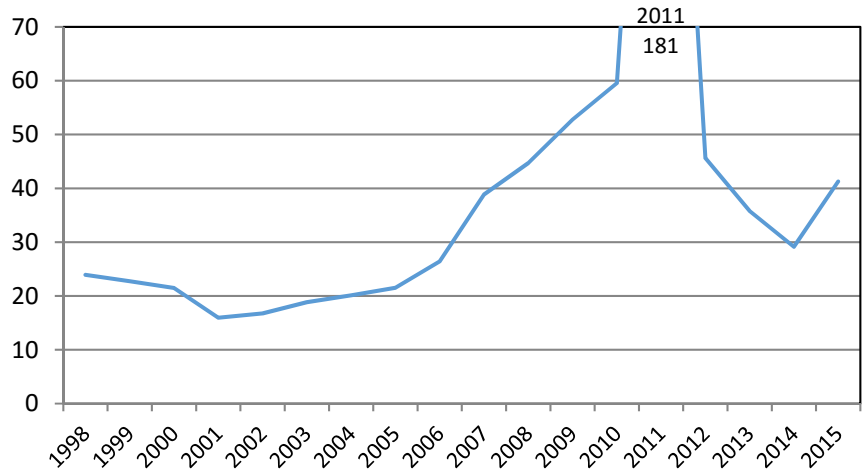
As already noted, the largest increases were in Deciles 9 and 10. Incomes fell in Deciles 1 to 3, while Decile 4 barely changed. Rises increased from Decile 5 to Decile 9. However even the top deciles rose more slowly than every one of the employee hourly wage deciles, the slowest rise in which was 18 percent over the period. The top self-employed deciles rose 17.5 percent (Decile 9) and 17.0 percent (Decile 10). In fact Decile 10 peaked in 2004 with an income per hour of $135.06 in June 2015 dollars compared to $114.02 in 2015.

Income inequality

There is clearly high inequality among the self-employed. Again I look at the ratio of the average hourly income in the top decile to that in lower deciles. However because the bottom decile has a negative hourly income, a ratio to it makes little sense so again I consider the ratio to average hourly income in Decile 2.

There was a sharp fall in income in Decile 2 in 2011 which as Figure 15 shows creates a blip in the D10/D2 ratio that year to 181. Other than that, the ratio has a rising trend: in the 2000s it rose from the low 20s to over 50. Since 2011 it has averaged in the 40s. Its level is even more remarkable than its rise: it averages 32 over the period, excluding 2011. For employees' wages, the ratio averaged 4. Unlike employees, inequality increased throughout the deciles, rather than only in the top half of the distribution.

Figure 15. Ratio of average self-employed income per hour in Decile 10 to Decile 2



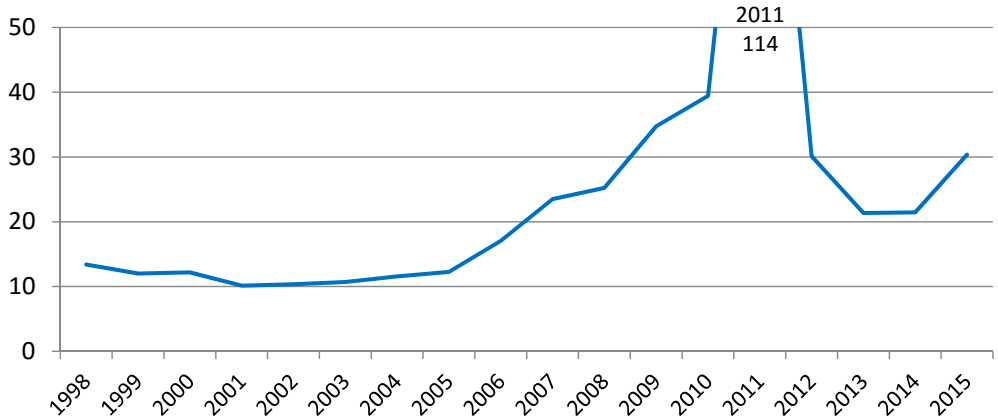
Weekly earnings inequality

In contrast to employees, weekly earnings inequality was less than for hourly earnings, but still very high, the D10/D2 ratio averaging 19.7 over the period compared to 5.0 for employees. Inequality rose as Figure 16 illustrates.

Hours worked

The contrast between employees and self-employed is partly due to the much higher inequality in hourly rates among the self-employed, and partly due to the self-employed reducing their average hours worked over the whole income earnings range whereas low paid employees worked longer hours. This could be a combination of individual self-employed people reducing their hours and new self-employed joining the labour force in part-time work such as Uber.

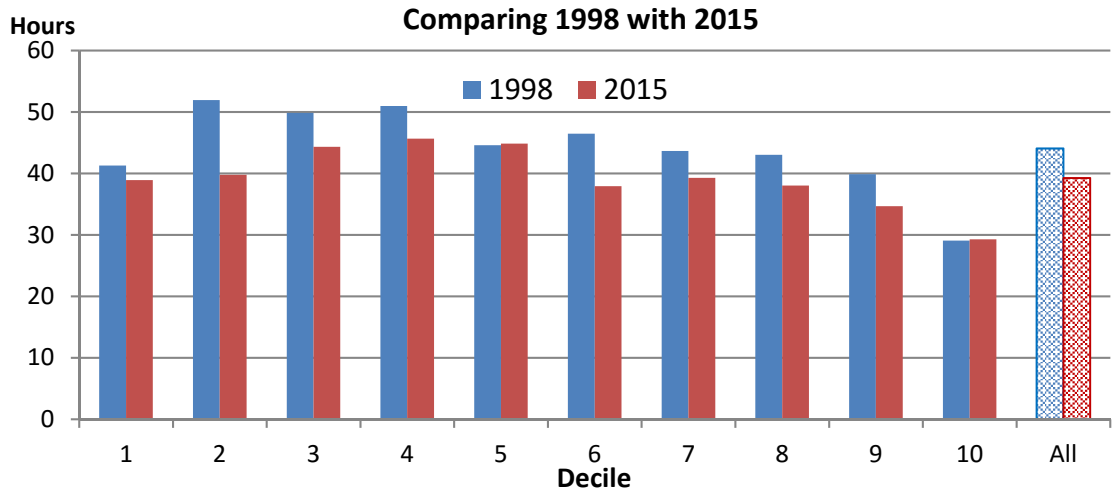
Figure 16. Ratio of average weekly earnings in Decile 10 to Decile 2



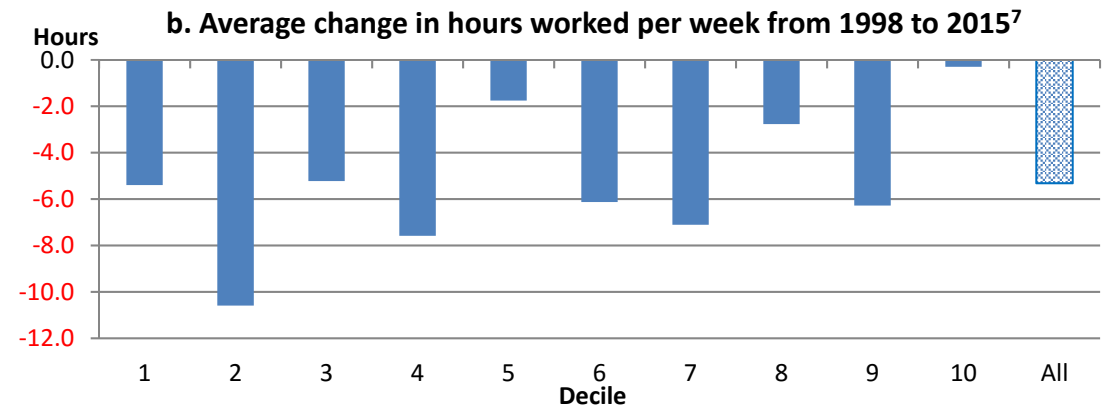
While all Deciles except Deciles 5 and 10 reduced their hours worked over the period, there were distinct differences in hours worked per week. The top decile worked an average of only 29.3 hours per week in 2015. On average self-employed people worked 39.3 hours per week, with the longest hours worked in Deciles 2 to 4 where they worked between 44.3 and 45.7 hours per week on average in 2015. The hours decline from Decile 4 to Decile 10: See Figure 17[7].

Figure 17

a. Average hours worked by self-employed people in each decile



b. Average change in hours worked per week from 1998 to 2015[7]



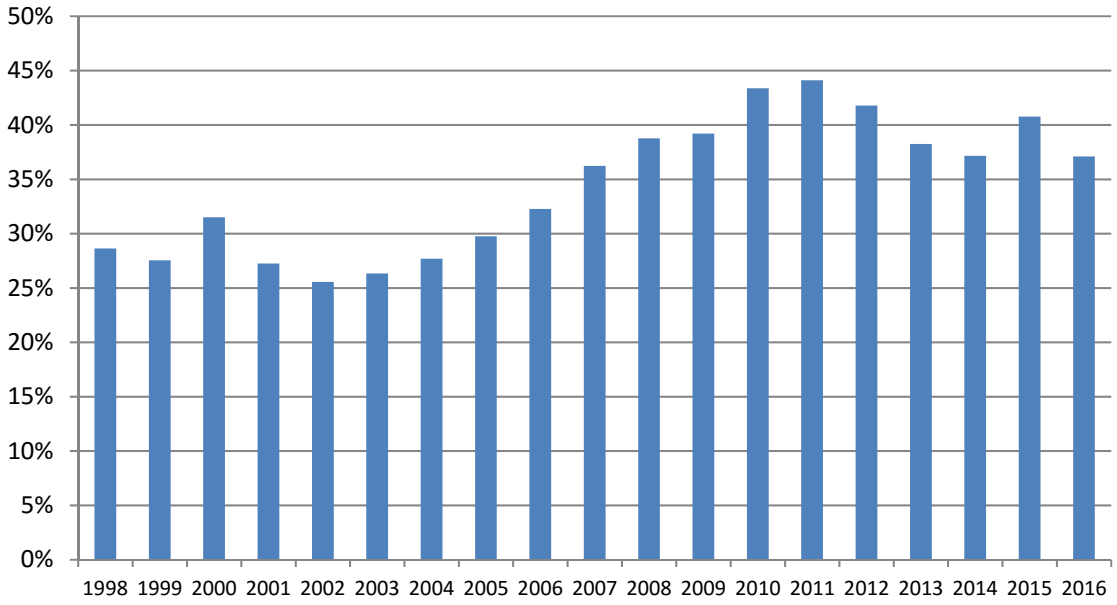
Income adequacy: relation to the Minimum Wage and the Living Wage

While the self-employed are not subject to minimum labour standards legislation, including the minimum wage, it is interesting to compare their hourly incomes to the hourly minimum wage. It gives some idea of the adequacy of self-employed income and the impact at the lower end of the income scale of the lack of minimum labour standards available to employees.

[7] Again the changes in weekly hours are calculated from the slope on an OLS linear regression. T-tests on the slope show a statistically significant positive slope all but Deciles 5, 8 and 10.

As Figure 19 shows, the proportion of self-employed below the minimum wage has risen from under 30 percent in the late 1990s and early 2000s to over 40 percent in recent years.

Figure 19. Proportion of self-employed receiving less income per hour than the minimum wage



A comparison to the Living Wage gives a further measure of the adequacy of self-employed income. Approximately half of self-employed people receive less than the Living Wage.

Table 4. Self-employed on or below the Living Wage

June year	Living Wage	Number of self-employed on or below Living Wage	Proportion of all self-employed
2012	$18.40	196,000	53.8%
2013	$18.80	158,000	49.2%
2014	$19.25	154,000	50.0%
2015	$19.80	167,000	51.3%
2016	$20.20	228,000	47.5%

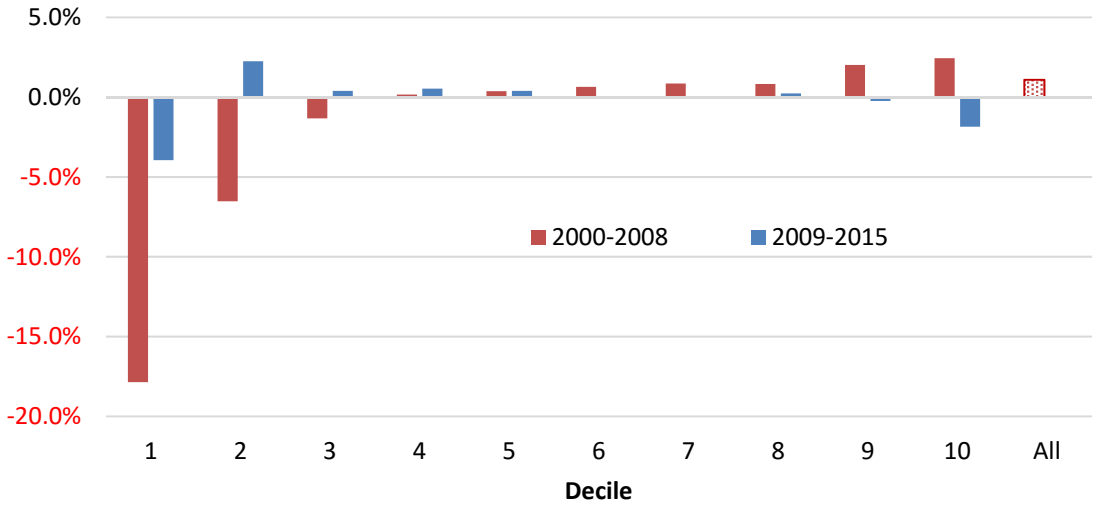
An estimate is included for 2016 but the change in survey methodology that year should be born in mind: in the earlier years some self-employed were counted among wage and salary earners. In that sense, 2016 may be a more accurate estimate.

Did different Government policy regimes have different impacts?

The impact on employee's incomes and wage rates was compared under the Labour-led and National-led Governments from 1999 to 2008 and 2009 to the present, given the changes they made to employment legislation during their terms in office. National is often assumed to be more favourable to the self-employed than Labour, so the comparison is also interesting for self-employed income. Again, I compare periods 2000-2008 (Labour-led) and 2009-2015 (National-led).

While both periods show a worsening of the negative incomes in the lowest decile, the pattern after that is very different as Figure 20 shows. Under Labour, the higher the hourly earning rate, the faster it grew, with the highest average rises in real hourly incomes in Decile 10, increasing inequality among the self-employed. Under National, from Decile 2 onwards, the reverse was the case, reducing inequality. Real hourly incomes fell in Decile 10, and the highest rise was in Decile 2 between 2009 and 2015. On average, hourly incomes rose faster under Labour (1.1 percent per year) than National (unchanged). This contrast would have been influenced by the recession but at the same time, farmers' incomes were on the whole benefiting from strong commodity prices and export quantities.

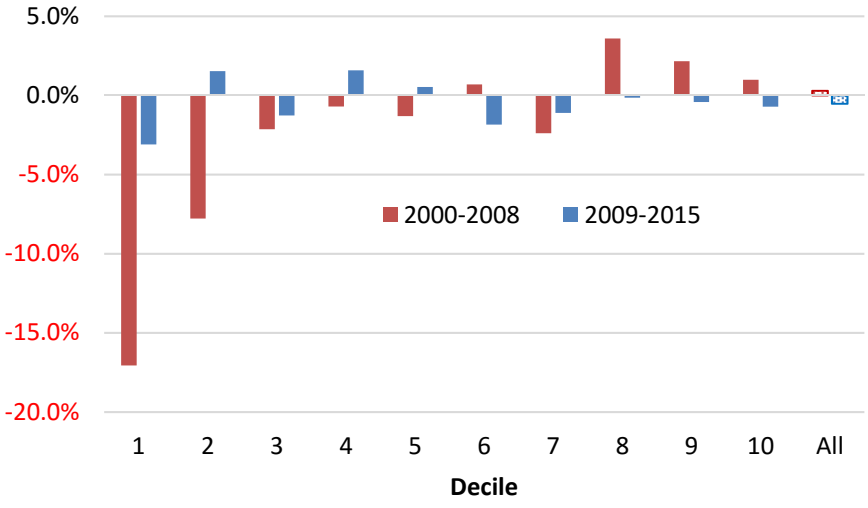
Figure 20. Average rise per year in real average hourly income of self-employed



Though self-employed inequality rose under Labour and fell under National, it was much higher under National. The mean D10/D2 ratio was 23.5 between 2000 and 2008 and 52.6 (or 42.8 if the anomalous 2011 year is ignored) between 2009 and 2015. See Figure 16.

Average weekly earnings, shown in Figure 21, show a similar pattern and the average annual increase still gives a slight but probably statistically insignificant advantage to the Labour period (0.3 percent compared to -0.5 percent).

Figure 21. Average rise per year in real average weekly earnings



As Figure 22 shows, hours worked fell more under Labour, though they rose for Decile 8, and Decile 10's average hours rose under National[8]. Again, the difference is unlikely to be statistically significant.

The main difference between the two Governments was the rise in income inequality under Labour contrasting with a fall (but at a higher inequality level) under National.

Figure 22. Average change in hours worked per week over two periods[8]

[8] Again, the changes in weekly hours are calculated from the slope on a OLS linear regression. T-tests show a statistically significant negative slope for only 2 of the 20 deciles (Deciles 2 and 10 in the earlier period) at a 5 percent significance level. The changing pattern of hours worked over the years is very erratic and sample sizes are very small with two periods. The average rise per year in hours worked per week shows a similar pattern. However, the rise in average hours worked for all deciles together is statistically significant in both periods.

Chapter 4: Discussion

Employees' wages and salaries

The strong rises in the minimum wage over the period have been effective in protecting the hourly wage rates of the lowest income 10 percent of employees but not those of the next 50 percent or more. It is surprising that the minimum wage does not support a greater ripple effect up the wage scale. It is unlikely that there is some hard barrier at the second decile, other than the absence of a regulated wage rate, that prevents absorption of pay increases at a similar rate to the first decile.

Instead there is a "hollowing out" of the wage scale in that, the lowest decile aside, wage rates for the lowest income half of employees have been falling substantially behind the highest income decile (rising at only half the rate), and the same is true to a decreasing degree as the deciles get closer to the top. Low and middle income New Zealanders have been getting a lower share of growth in the economy than the highest income employees. The position does not appear to be as bad as in the US where the average hourly compensation of production and nonsupervisory workers in the private sector barely rose from 1973 to 2015 (only 11 percent in those 42 years in real terms), falling far behind productivity growth.[9] Nonetheless, on average, real wages have fallen behind productivity growth here too, and the trend opens up increasing gaps in incomes. The gap is reduced somewhat by lower wage workers working longer hours (and higher wage workers working fewer hours), but that is not a sustainable solution to inequality, either economically or socially.

The "hollowing out" of low and middle skilled employees' wages has been widely commented on internationally. Common explanations include technology, globalisation (offshoring and international supply chains), deunionisation and loss of employee bargaining power[10], and the international integration and growth of the finance sector[11]. While previously globalisation in the form of international trade and supply chains had been dismissed by many economists as being a contributor to growing income inequality, that view is changing[12], particularly since recent findings by Autor, Dorn and Hansen on the long-lasting impact on employment and incomes of trade between the US and China (Autor, Dorn, & Hanson, 2013). Autor and colleagues (Autor, Dorn, Katz, Patterson, & Van Reenen, 2017) have recently added to this list suggesting that market dominance by large firms could be another explanation (which assumes lack of bargaining power by those firms' employees preventing them sharing in the excess profits of the firms). They find US evidence for it.

Another recent contribution to the research literature is a study by International Monetary Fund researchers on the falling share of wages in national income internationally (Dao, Das, Koczan, & Lian, 2017). They find the main contributors are technology and globalisation but note (p.11) "the difficulty of empirically separating trends in global integration and de-unionization". The two interact: in New Zealand's case, deunionisation accompanied dramatic

[9] "The Productivity–Pay Gap", Economic Policy Institute, August 2016, at http://www.epi.org/productivity-pay-gap/, accessed 13 August 2017.

[10] e.g. Blanchard, Jaumotte, & Loungani, 2013; Card, Lemieux, & Riddell, 2003; DiNardo, Fortin, & Lemieux, 1995; Fournier & Koske, 2012; International Labour Office, 2013; International Monetary Fund & International Labour Organization, 2010; Jaumotte & Buitron, 2015; Kumhof & Rancière, 2010; OECD, 2012; Western & Rosenfeld, 2011.

[11] e.g. Furceri & Loungani, 2013; Jahan & McDonald, 2011; Kumhof & Rancière, 2010; Stockhammer, 2009.

[12] e.g. Autor, Dorn, & Hanson, 2013, 2016; Autor, Dorn, Hanson, & Song, 2013; Elsby, Hobijn, & Şahin, 2013; Feiveson, 2012; Freeman, 2007; International Labour Office, 2013; Koske, Fournier, & Wanner, 2012; Loungani, Wang, Feiveson, & Jalles, 2011; OECD, 2012.

opening of the economy and the changes in employment law that brought it about were argued as being for this purpose; and international integration reduces workers' bargaining power through the threat of closure and job loss by offshoring and competing imports. As Dao et al. note (p.16), "declining unionization rates may reflect the decline of labor's bargaining power, itself a result of trade integration...It is therefore extremely difficult to quantify the distinct effects of each of these drivers." Accompanying changes in New Zealand also weakened bargaining power such as sharp cuts in benefit levels.

However, the priority among these effects is still hotly contested. Some researchers present evidence that the effect of technology and automation is greatly overstated (e.g. D. Card & DiNardo, 2002; Mishel & Bivens, 2017; Mishel, Schmitt, & Shierholz, 2013; Stockhammer, 2009). In New Zealand the extent and nature of deunionisation (including one of the lowest rates of collective bargaining coverage in the OECD), globalisation and a large and open financial sector make these potent factors.

It is an open question whether technology has yet played a major role. It is clearly playing a disruptive role in employment as illustrated by Uber, threats to the viability of commercial news media, internationalisation of call centres, the shrinking of the printing industry, the impact of online purchasing on retail, and the impact of computerised systems in many services such as banking and government departments. It has also done so over the longer term. Are these significant enough to explain the "hollowing out" we see since 1998?

Technology is theorised to affect employment and wages by two main routes. Firstly, it can replace routine tasks, or enable their offshoring to lower wage countries. While "routinisation" can apply to highly skilled and paid occupations (such as some tasks of accountants and lawyers) it more frequently affects low and middle skilled occupations. If this is affecting New Zealand, we might expect to see middle income jobs disappearing, forcing those affected to take up lower paid jobs. Secondly, technological change can be "skill biased" – that is, make middle and low skilled jobs redundant while creating more highly skilled jobs that support and manage the new, more technologically advanced, process. Again, we might expect to see middle income jobs disappearing, movement into lower paid jobs, and an increase in higher skilled positions. In both cases we might expect an increasing proportion of jobs in lower skilled occupations, and increasing competition for these jobs which would push their wages down towards the minimum wage.

The data analysed here does not include information on skills but the case for New Zealand seeing an increased proportion of low skill levels is mixed. In support, Hyslop, Fabling and Maré (2015) find that "average skill of workers declined by 1.8% over the period [2001 to 2012], reflecting strong employment growth for workers with lower than average skill levels". Notably, their measurement of skills was based on an analysis of earnings of workers and so measurement could be impacted by changes in bargaining power. The changes occurred predominantly within firms operating during the whole period. This could have explanations other than technological change, such as disproportionate expansion of employment in low skilled industries. On the other hand, the Ministry of Business, Innovation and Employment regularly forecasts that demand will be strongest for highly skilled workers, mainly managers and professionals (which reflects growth in occupational groups reported by the HLFS between 2004 and 2015) and weak growth in demand for the lowest skilled (e.g. Ministry of Business, Innovation and Employment, 2017, p. 6). Technological change is not the most obvious driver of these trends. Much needs to be done to clarify the picture.

If the hollowing out is not primarily skill related, other explanations are needed such as deunionisation, low collective bargaining coverage, and globalisation through the reality or threat of offshoring of production or competition from imports, which has been common over the last 30 years.

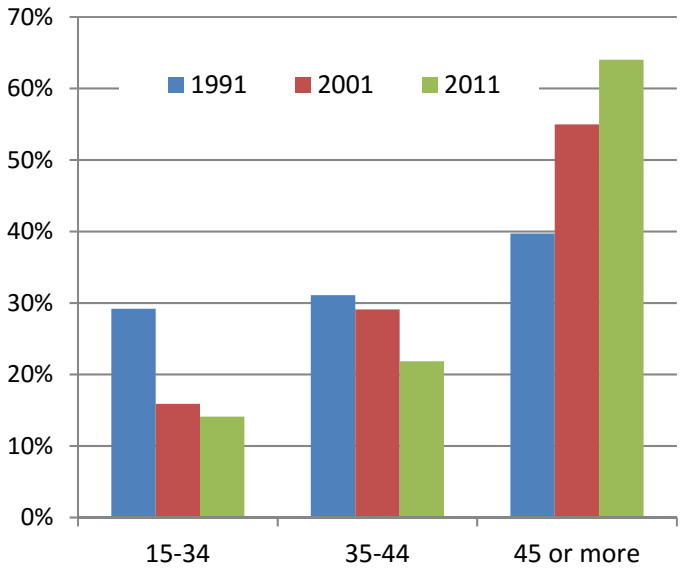
Self-employment

Because of the ability of the self-employed to disguise their (reported) income in various ways, further work is needed to understand how much of the low earning rates they declare reflects reality, but the data presented here suggests that among the self-employed are some – perhaps the majority – with very low rates of earning, low incomes, and for many of them, probably very variable incomes too. While a large number of employees are missing out on income growth, the situation may be even more serious for some self-employed who have low income, precarious employment.

It is possible that the data is just a snapshot and that there is a continuous stream of people moving up and down the income ranks, some eventually earning incomes at rates well above either the self-employed average or employees. There are certainly some very high income (and wealthy) self-employed, with many in the professions and farming coming to mind. This may in part be a process of aging with the highest incomes going to the oldest self-employed (who reduce their hours of work accordingly). If that is the case, it appears that fewer young people are coming in to replace the aging wealthy as Figure 23 (from New Zealand Council of Trade Unions Te Kauae Kaimahi, 2013, p. 19) indicates.

But the hope of future high income is surely not achieved for all self-employed, and many of their earning rates and the speed with which they have increased are so low that that does not fully allay concerns.

Figure 23. Changing makeup of self-employed by age group
Source: Statistics NZ



For those among the self-employed for whom self-employment is genuinely a matter of choice, the low incomes are less a matter for public policy. But that is not the case when people are forced into self-employment (often dependent contracting) by employers in order to avoid their responsibilities as employers, as has been the case in the telecommunications, film, courier and road freight industries for example, or public policy gives small business, often owned by the self-employed, special advantages. Evidence of poor income for the majority of self-employed also gives reason to question the idealisation of self-employment by some public figures.

The low rates of earning also suggest that very poor labour productivity is widespread among the self-employed, a further concern given it constitutes a sizeable portion of New Zealand's economy.

Chapter 5: Conclusion

This analysis has looked at the distribution of the income of employees and the self-employed, primarily from the point of hourly earnings. This has enabled us to also see the distribution of hours worked and weekly earnings, and changes in those over the period studied. It has shown that there is a majority in both groups which has either very low hourly incomes, poor growth in those incomes, or both. For the self-employed this is subject to the proviso that for some, there may be substantial unreported income.

For employees, we found increasing inequality in average hourly wages. The exception is the lowest income decile which is heavily influenced by the minimum wage, whose income has risen on average at about the same rate as the top decile. Other than that, wage rates for the next 50 percent (deciles 2 to 6) of employees rose at half the rate of the real average hourly wage of the top 10 percent. On the whole, the more highly paid employees were, the faster their hourly wage rates increased, creating growing inequality. There is a 'hollowing out' of the wage scale in the sense that the low and middle-income half of employees are getting much lower real increases in pay rates than the top 40 percent – and even that higher income group is becoming increasingly unequal.

On the other hand, weekly wages showed a weaker growth in inequality over the period. The reason is that employees on lower wages worked increasingly long hours to make up for slower increases in their hourly rate, while those on the highest 40 percent of wages reduced the hours they worked.

While the top of the lowest income decile was close to the adult hourly minimum wage throughout the period, there appear to be many workers are being paid below the adult minimum wage. Some of this can be explained, but there remains a gap that could suggest significant flouting of minimum wage laws.

To a reasonable approximation, the two-thirds of employees paid below the overall average hourly wage received either low wages or experienced low wage growth, or both.

On average, self-employed people earned less per hour than wage and salary earners. Incomes of the self-employed also increased more slowly. However their ability to disguise their income in various ways (including taking it as capital gain) also needs to be considered. The spread and inequality of earning rates is far greater for self-employed people than employees: the highest 10 percent had average hourly earning rates double those of the highest 10 percent of employees on average while in 2015 an estimated 41 percent were earning less than the minimum hourly wage and 51 percent were earning under the Living Wage.

Among self-employed, the higher their earning rates (whether hourly or weekly) the more rapidly their earnings rose over the period. The bottom 30 percent however had falling earning rates in real terms. Their weekly incomes were not moderated as much as employees by the hours they worked, and it is the highest earning self-employed who work the shortest hours. Average hours worked have fallen or remained static for almost all self-employed income groups over the period of study and although on average they still work longer hours than employees, that difference has fallen.

The strong rises of the minimum wage over the period have been effective in protecting the wage rates of the lowest income 10 percent of employees, but not those of the next 50 percent or more in deciles 2 to 6, and of course not self-employed people. It is surprising that the

minimum wage does not support a greater ripple effect up the wage scale. Such hollowing out of the wage distribution is often explained by technology making middle skill jobs redundant and forcing more people into low skilled, low paid employment. However the evidence for this is mixed in New Zealand and needs further research. Another explanation is the weakness of collective bargaining and employee bargaining power in New Zealand.

Because of the ability of the self-employed to disguise or under-report their income in various ways, further research is needed to understand to what extent the low earning rates they report, and the low rate of increase in earnings, is real. Tax authorities should be interested too. However, among the self-employed are some with very low incomes, suggesting low productivity, and many of them are likely to have very variable incomes too. Public policy should take an interest in those who are forced into self-employment (often dependent contracting) by their employers, or where small businesses are given special advantages.

Appendix 1: Data tables

Table A1. Decile boundaries for employees' hourly wage rates, and employee numbers

	Decile									Total Employee numbers
June	1	2	3	4	5	6	7	8	9	All deciles
1998	8.25	9.56	10.55	12.00	13.21	14.89	16.40	19.05	23.21	1,347,400
1999	8.33	9.80	10.70	12.00	13.40	15.00	16.91	19.45	24.00	1,368,800
2000	8.60	10.00	11.00	12.10	13.55	15.00	17.00	19.71	24.61	1,399,800
2001	9.00	10.00	11.40	12.67	14.00	15.65	17.60	20.19	25.66	1,467,300
2002	9.00	10.00	11.50	12.98	14.50	16.00	18.20	21.00	26.26	1,519,100
2003	9.50	10.55	12.00	13.33	15.00	16.56	18.75	21.92	28.65	1,555,500
2004	10.00	11.00	12.33	13.98	15.34	17.31	19.50	22.61	28.77	1,602,900
2005	10.00	11.50	13.00	14.75	16.03	18.22	20.46	24.00	30.29	1,673,200
2006	10.50	12.00	13.56	15.00	17.00	19.00	21.58	25.03	32.13	1,758,700
2007	11.25	12.50	14.08	16.00	18.00	20.00	23.00	26.73	34.52	1,796,800
2008	12.00	13.50	15.00	16.70	18.75	21.00	23.98	28.51	36.44	1,787,600
2009	12.50	14.00	15.50	17.50	19.56	22.00	25.00	29.17	37.29	1,796,600
2010	13.00	14.50	16.00	18.00	20.00	22.68	25.91	30.69	38.57	1,802,600
2011	13.25	14.72	16.30	18.23	20.50	23.40	26.85	31.73	40.76	1,810,400
2012	13.50	15.00	16.78	18.75	21.00	23.97	27.54	32.60	41.24	1,809,100
2013	14.00	15.35	17.26	19.18	21.58	24.82	28.29	33.56	42.62	1,851,900
2014	14.25	15.61	17.50	19.56	22.00	24.93	28.77	34.18	44.06	1,938,300
2015	14.80	16.00	18.00	20.00	22.86	25.78	29.92	35.48	45.55	1,995,800
2016	15.50	17.00	19.00	21.00	23.49	26.37	30.10	35.00	45.07	1,928,000

Table A2. Average hourly wage in each decile for employees

										Decile	
June	1	2	3	4	5	6	7	8	9	10	All
1998	6.52	8.95	10.04	11.26	12.53	14.03	15.55	17.63	20.66	32.15	15.57
1999	6.46	9.07	10.16	11.39	12.63	14.20	15.87	18.08	21.49	33.37	15.93
2000	7.08	9.42	10.38	11.58	12.89	14.41	16.06	18.24	21.72	34.19	16.22
2001	7.29	9.62	10.69	12.05	13.35	14.83	16.61	18.88	22.68	36.13	16.87
2002	7.14	9.70	10.82	12.21	13.71	15.25	17.06	19.52	23.32	36.47	17.14
2003	7.74	10.05	11.32	12.60	14.10	15.64	17.61	20.18	24.70	42.27	18.13
2004	8.30	10.39	11.70	13.07	14.64	16.35	18.39	20.94	25.15	42.10	18.76
2005	8.48	10.75	12.24	13.82	15.39	17.16	19.31	22.14	26.83	44.70	19.71
2006	8.75	11.20	12.71	14.45	16.06	17.93	20.16	23.33	28.39	44.98	20.35
2007	9.54	11.88	13.35	15.06	16.91	19.00	21.35	24.60	30.04	50.41	21.87
2008	10.62	12.74	14.22	15.71	17.66	19.78	22.39	26.00	31.71	51.98	23.02
2009	10.94	13.35	14.74	16.47	18.47	20.70	23.53	27.04	32.66	51.84	23.66
2010	11.31	13.72	15.24	17.04	19.04	21.32	24.26	28.12	34.01	55.24	24.70
2011	11.53	14.00	15.46	17.36	19.41	21.89	25.02	29.11	35.63	57.49	25.33
2012	11.72	14.37	15.87	17.71	19.82	22.39	25.61	29.84	36.46	57.47	25.82
2013	12.31	14.68	16.31	18.27	20.35	23.11	26.27	30.65	37.39	60.20	26.60
2014	12.25	14.94	16.59	18.51	20.64	23.35	26.67	31.36	38.41	63.64	27.30
2015	13.02	15.43	17.09	19.09	21.36	24.22	27.65	32.30	39.86	64.14	28.17
2016	14.00	16.24	17.95	19.81	22.16	24.95	28.24	32.44	39.33	65.23	28.93

Table A3. Average hours worked per week in each decile for employees

	Decile										
June	1	2	3	4	5	6	7	8	9	10	All
1998	25.78	30.44	30.06	36.33	37.08	39.95	39.36	40.21	40.37	38.85	35.84
1999	25.03	29.63	31.02	35.32	37.90	39.06	39.65	40.69	40.55	37.95	35.68
2000	25.44	29.32	31.99	35.34	38.48	39.64	40.48	40.60	40.40	38.08	35.98
2001	26.25	28.03	32.99	36.51	39.11	38.55	40.15	39.63	40.46	38.70	36.04
2002	26.11	28.40	34.23	35.85	39.14	38.91	40.33	40.27	39.81	38.03	36.11
2003	27.84	29.20	33.16	36.06	40.29	38.98	40.16	39.85	39.32	36.88	36.17
2004	25.01	29.31	33.78	37.64	37.94	39.96	39.85	40.11	39.80	37.92	36.13
2005	24.65	30.36	34.90	38.15	38.48	39.61	39.49	40.74	38.93	37.63	36.29
2006	26.07	31.26	34.16	36.50	39.03	39.55	40.26	39.98	39.72	36.38	36.29
2007	25.94	29.05	34.08	38.01	39.39	39.48	40.67	39.42	39.58	37.13	36.28
2008	26.06	29.67	33.36	36.34	39.05	39.28	40.19	39.24	38.83	37.79	35.98
2009	27.31	29.60	33.37	36.28	38.03	38.65	39.55	38.51	38.40	37.30	35.70
2010	26.67	28.49	32.68	37.58	37.71	38.85	39.19	39.47	38.89	37.09	35.66
2011	27.39	30.47	32.85	36.62	37.80	38.74	38.87	38.94	38.48	36.18	35.64
2012	27.81	29.86	33.67	36.16	38.66	39.50	38.95	38.91	38.25	37.17	35.89
2013	28.45	30.64	34.54	37.18	38.30	39.47	39.16	38.62	38.93	37.21	36.25
2014	28.72	30.13	34.70	37.60	38.51	39.32	39.37	39.53	38.91	37.16	36.40
2015	27.59	29.80	34.89	36.73	39.11	39.46	40.29	38.42	39.12	37.36	36.28
2016	27.48	30.56	35.79	37.78	39.80	39.90	40.39	40.06	39.33	39.70	37.08

Table A4. Average earnings per week in each decile for employees

	Decile										
June	1	2	3	4	5	6	7	8	9	10	All
1998	168.01	272.51	301.82	409.09	464.54	560.51	612.01	708.95	834.10	1,248.71	558.02
1999	161.80	268.86	315.36	402.23	478.87	554.48	629.19	735.53	871.37	1,266.31	568.40
2000	180.20	276.05	332.22	409.29	496.11	571.11	650.16	740.53	877.61	1,301.86	583.51
2001	191.26	269.57	352.68	439.92	522.00	571.74	666.94	748.10	917.54	1,398.29	607.80
2002	186.52	275.42	370.46	437.82	536.43	593.52	687.81	786.16	928.30	1,386.92	618.93
2003	215.44	293.63	375.42	454.20	568.18	609.66	707.14	804.01	971.26	1,558.90	655.78
2004	207.58	304.48	395.24	492.08	555.31	653.17	732.81	839.69	1,000.84	1,596.21	677.74
2005	209.10	326.42	427.31	527.24	592.04	679.51	762.56	901.89	1,044.35	1,682.06	715.25
2006	228.22	350.21	434.34	527.55	626.73	709.18	811.79	932.76	1,127.64	1,636.34	738.48
2007	247.52	345.24	455.02	572.31	666.17	750.22	868.40	969.70	1,189.25	1,871.80	793.56
2008	276.66	378.06	474.28	571.09	689.71	776.87	899.92	1,020.03	1,231.29	1,964.32	828.22
2009	298.79	395.17	491.78	597.55	702.51	799.90	930.59	1,041.26	1,254.22	1,933.89	844.57
2010	301.62	390.74	498.02	640.25	717.96	828.32	950.82	1,110.03	1,322.64	2,048.72	880.91
2011	315.74	426.44	507.84	635.62	733.87	847.94	972.28	1,133.52	1,371.30	2,080.33	902.49
2012	326.02	428.96	534.28	640.23	766.36	884.27	997.60	1,161.28	1,394.40	2,136.22	926.96
2013	350.10	449.84	563.51	679.35	779.61	912.16	1,028.84	1,183.71	1,455.64	2,240.05	964.28
2014	351.73	450.05	575.76	696.06	794.84	918.00	1,050.19	1,239.63	1,494.78	2,365.11	993.62
2015	359.13	459.81	596.10	701.39	835.30	955.69	1,114.33	1,241.09	1,559.14	2,396.30	1,021.83
2016	384.60	496.23	642.22	748.60	882.20	995.45	1,140.66	1,299.34	1,547.03	2,589.98	1,072.63

Table A5. Decile boundaries for self-employed income per hour, and self-employed numbers

	Decile									Total Self-employed numbers
June	1	2	3	4	5	6	7	8	9	All deciles
1998	0.73	4.78	7.35	9.59	12.47	15.34	19.18	24.29	37.91	328,600
1999	0.99	4.95	7.67	9.86	12.47	15.34	19.18	25.57	42.62	364,400
2000	1.01	4.78	7.19	9.59	12.33	14.92	19.18	24.55	38.36	363,400
2001	2.42	5.75	8.44	10.90	13.32	15.98	19.18	25.57	39.95	360,400
2002	3.30	6.30	9.36	11.99	14.92	18.22	22.38	28.77	44.75	361,500
2003	3.36	6.61	9.59	12.47	15.34	19.18	23.09	31.97	47.95	371,800
2004	3.45	7.03	9.59	12.51	15.34	19.18	23.65	30.69	51.14	390,800
2005	2.28	6.03	9.59	12.51	15.45	19.18	23.97	31.50	47.95	393,000
2006	0.80	5.75	9.59	12.49	16.11	19.18	23.97	30.69	46.88	367,200
2007	0.00	5.11	9.38	12.38	15.98	20.19	25.57	35.16	54.34	365,000
2008	0.00	4.57	8.69	12.47	15.98	20.07	25.57	34.87	57.54	379,200
2009	0.00	4.93	9.18	12.79	17.05	21.31	27.40	36.67	57.54	346,800
2010	0.00	4.00	7.99	11.43	15.34	19.18	25.82	35.80	55.14	346,800
2011	-1.83	2.85	6.85	11.37	15.34	20.02	26.19	37.29	60.73	362,800
2012	0.00	4.79	8.63	12.79	16.78	21.10	28.77	38.36	62.33	365,200
2013	0.00	5.90	10.79	14.38	19.18	23.56	28.77	38.36	60.57	321,500
2014	0.96	6.80	11.51	15.34	19.26	25.57	31.97	41.10	63.93	308,400
2015	0.00	5.48	10.27	14.38	19.18	23.97	30.14	41.10	63.93	326,300
2016	0.00	4.48	11.51	16.78	21.31	27.62	34.84	47.95	75.35	479,700

Table A6. Average income per hour in each decile for self-employed

	Decile										
June	1	2	3	4	5	6	7	8	9	10	All
1998	-1.31	2.83	6.05	8.61	11.07	13.80	17.16	21.41	29.54	67.81	15.40
1999	-1.53	3.22	6.29	8.71	11.15	13.80	17.19	22.14	32.18	73.15	15.80
2000	-1.53	3.18	5.99	8.45	11.00	13.61	17.15	22.10	30.36	68.38	15.38
2001	-0.45	4.28	7.06	9.65	12.03	14.49	17.56	22.01	30.92	68.32	16.47
2002	-0.67	4.85	7.74	10.60	13.38	16.33	20.10	25.57	35.01	81.19	18.80
2003	0.11	4.96	8.24	11.16	13.88	17.04	20.87	27.28	39.22	93.34	20.19
2004	-0.03	5.23	8.56	11.22	13.79	17.17	21.13	26.73	38.68	105.25	20.89
2005	-3.13	4.37	7.80	10.98	14.05	17.03	21.10	27.01	39.32	93.92	19.91
2006	-3.53	3.49	7.62	10.95	14.39	17.43	20.96	27.08	36.79	92.18	19.58
2007	-3.59	2.68	7.26	10.76	14.21	18.21	22.81	29.78	42.92	104.23	20.97
2008	-6.34	2.32	6.73	10.70	14.17	17.90	22.96	29.51	44.55	103.68	20.97
2009	-5.80	2.18	7.04	10.85	14.97	19.21	24.39	31.47	45.60	114.93	22.55
2010	-8.95	1.72	5.92	9.62	13.12	17.59	22.71	30.53	43.45	102.20	20.87
2011	-9.89	0.58	4.87	9.17	13.35	17.75	23.05	30.56	45.81	104.39	20.30
2012	-5.21	2.35	6.75	10.61	14.66	18.80	24.71	33.46	47.58	107.16	22.76
2013	-6.35	2.86	8.54	12.57	16.67	20.91	25.72	33.12	48.71	102.39	22.81
2014	-4.14	4.12	9.43	13.64	17.77	22.51	28.43	36.72	50.83	120.20	26.92
2015	-6.84	2.76	8.00	12.44	17.01	21.24	27.04	35.42	49.89	114.02	24.98
2016	-18.79	2.68	8.05	14.25	19.00	24.36	31.26	40.67	58.79	130.02	28.31

Table A7. Average hours worked per week in each decile for self-employed

	Decile										
June	1	2	3	4	5	6	7	8	9	10	All
1998	41.27	51.92	49.85	50.97	44.58	46.47	43.64	43.03	39.87	29.06	44.07
1999	43.41	51.02	48.63	47.97	45.11	44.71	51.34	35.10	40.15	26.95	43.44
2000	42.49	50.55	48.16	50.24	46.95	44.50	52.53	32.80	39.08	28.70	43.60
2001	42.54	46.23	52.81	48.19	46.78	45.02	42.10	40.52	42.56	29.36	43.61
2002	44.32	48.38	48.46	48.80	44.45	45.21	44.57	40.76	38.75	29.88	43.36
2003	47.10	47.15	46.69	43.20	44.48	41.34	47.36	42.31	38.25	26.82	42.47
2004	43.94	47.57	47.85	45.34	45.85	50.60	35.66	39.64	37.03	27.35	42.08
2005	41.58	46.01	47.40	45.50	43.44	39.69	42.93	39.39	38.65	26.23	41.08
2006	41.12	43.14	52.97	47.66	44.34	40.85	42.78	38.77	36.81	27.86	41.63
2007	41.85	43.57	47.70	47.26	46.36	43.51	39.92	41.10	34.88	26.36	41.25
2008	39.96	45.36	45.09	46.89	41.01	44.70	40.43	40.74	39.50	25.61	40.93
2009	41.27	41.49	48.99	42.91	44.49	42.23	41.94	38.90	35.03	27.31	40.46
2010	41.37	45.51	45.27	44.78	42.59	42.11	40.85	39.50	37.54	30.13	40.97
2011	39.28	42.53	47.00	43.83	45.60	41.97	41.21	38.29	35.58	26.74	40.20
2012	37.68	41.74	43.10	42.40	41.48	42.92	43.20	33.95	33.95	27.59	38.80
2013	39.19	42.09	46.38	38.76	50.36	36.95	38.06	37.49	35.80	25.10	39.02
2014	38.85	41.57	45.69	42.19	40.08	42.38	44.65	33.63	34.18	30.58	39.38
2015	38.91	39.76	44.32	45.66	44.84	37.93	39.27	38.03	34.66	29.27	39.26
2016	33.84	31.43	44.17	42.36	37.73	38.73	37.71	37.87	32.57	27.75	36.42

Table A8. Average earnings per week in each decile for self-employed

	Decile										
June	1	2	3	4	5	6	7	8	9	10	All
1998	-53.90	147.08	301.46	439.14	493.59	641.40	748.76	921.15	1,177.48	1,970.72	678.69
1999	-66.30	164.11	306.04	417.97	502.95	616.97	882.63	776.98	1,291.85	1,971.38	686.46
2000	-64.89	160.92	288.64	424.33	516.64	605.47	900.94	724.90	1,186.39	1,962.43	670.58
2001	-19.34	197.84	373.01	464.97	563.01	652.18	739.42	891.66	1,315.87	2,005.72	718.44
2002	-29.52	234.41	374.91	517.28	594.61	738.53	895.96	1,042.19	1,356.69	2,425.64	815.07
2003	5.19	233.73	384.76	482.04	617.30	704.34	988.62	1,154.33	1,500.05	2,502.93	857.33
2004	-1.25	248.98	409.47	508.88	632.42	868.77	753.44	1,059.34	1,432.16	2,878.97	879.12
2005	-129.97	200.87	369.71	499.55	610.15	675.96	905.62	1,063.72	1,519.69	2,463.97	817.93
2006	-145.07	150.54	403.73	521.63	638.14	712.20	896.61	1,049.62	1,353.94	2,568.11	814.95
2007	-150.30	116.90	346.44	508.52	658.64	792.29	910.63	1,223.68	1,497.01	2,747.21	865.10
2008	-253.51	105.22	303.59	501.53	581.25	800.29	928.30	1,202.13	1,759.86	2,654.96	858.36
2009	-239.33	90.34	344.95	465.47	665.77	811.36	1,022.83	1,224.16	1,597.55	3,138.44	912.15
2010	-370.24	78.09	267.79	430.91	558.88	740.57	927.80	1,206.06	1,631.26	3,079.47	855.06
2011	-388.42	24.48	228.97	401.98	608.74	745.17	949.75	1,169.85	1,630.02	2,790.93	816.15
2012	-196.33	98.10	290.82	449.83	608.07	806.74	1,067.73	1,135.94	1,615.62	2,956.20	883.27
2013	-248.96	120.34	396.14	487.16	839.23	772.61	979.05	1,241.53	1,743.81	2,570.05	890.10
2014	-160.83	171.43	430.61	575.30	711.99	953.99	1,269.33	1,234.82	1,737.03	3,675.45	1,059.91
2015	-266.29	109.84	354.67	567.82	762.89	805.53	1,061.80	1,347.26	1,729.24	3,337.17	980.99
2016	-635.73	84.14	355.43	603.71	716.98	943.42	1,179.01	1,540.08	1,915.10	3,607.73	1,030.99

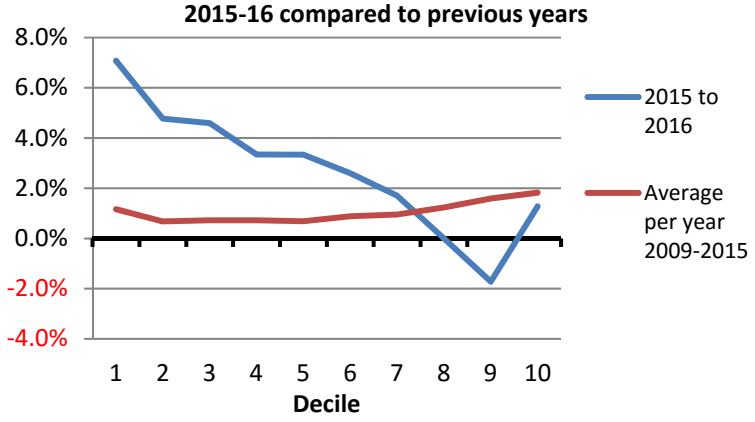
Table A9. Minimum hourly wage rates 1998-2017			
	Adult		Youth rate
At June		18-19 yrs	16-17 yrs
1998	7.00	4.20	4.20
1999	7.00	4.20	4.20
2000	7.55	4.55	4.55
2001	7.70	7.70	5.40
2002	8.00	8.00	6.40
2003	8.50	8.50	6.80
2004	9.00	9.00	7.20
2005	9.50	9.50	7.60
2006	10.25	10.25	8.20
2007	11.25	11.25	9.00
2008	12.00	12.00	12.00
2009	12.50	12.50	12.50
2010	12.75	12.75	12.75
2011	13.00	13.00	13.00
2012	13.50	13.50	13.50
2013	13.75	11.00	11.00
2014	14.25	11.40	11.40
2015	14.75	11.80	11.80
2016	15.25	12.20	12.20
2017	15.75	12.60	12.60

Appendix 2: Comparison to 2016 unreliable

From June 2016 significant changes were made to the household survey from which the data used in this report comes. It affected the measurement of hours worked, incomes earned, numbers of people employed, and their classification as employee versus self-employed. It is difficult to tell how much of the changes between 2016 and earlier years is due to the change in the survey and how much is real, but SNZ warns that comparisons with 2016 need to be treated with caution[13]. SNZ staff have has estimated for example that the change created a level shift upwards in the number employed of 29,000 males and 21,000 females[14] and a roughly corresponding increase in hours worked (Anand-Kumar, Penny, & Gordon, 2017).

One of the changes from June 2016 was to reclassify some self-employed people who had been misclassified as employees in previous years because they had told SNZ that they paid themselves a 'wage or salary'. This appears to have had a marked effect on distribution of earnings. For example, Figure B1 shows the real increase in the average hourly wage for employees in each decile for the year June 2015 to June 2016. It compares it with the average real increase per year in each decile over the previous years 2009 to 2015. The 2016 year shows the annual increases falling from the lowest earnings Decile 1 down to the high earnings Decile 9 (whose hourly earnings decreased), and an increase for Decile 10, still well below the first seven deciles. This pattern is very different from earlier years, which is shown by an average annual increase in the figure. The earlier years generally showed a bigger earnings rise in the first decile, and the annual increases flat or rising to the top decile as the average shows. I cannot think of changes that occurred during the year to June 2016 that would have caused such a difference to earlier years. I conclude that the change in survey had a significant effect on income statistics too.

Figure B1. Real increase in average hourly wage in each hourly earnings decile for employees: 2015-16 compared to previous years



A likely explanation is that the self-employed who had been misclassified were over-represented in the low income deciles. The change in the survey therefore appeared to raise the average hourly earnings for lower decile employees. That means that comparisons to 2016 are not showing true increases in either employee or self-employed earnings. I therefore dropped 2016 from most of the rest of the analysis that follows, but we need to remember that a small proportion of self-employed are counted among employees, and they are missing from the self-employed data. In LEED data, SNZ reports that "about 9 percent of self-employed persons are reported as 'employees'" in their quarterly statistics[15] and this is a plausible guide to the order of magnitude of the misclassification.

[13] E.g. http://stats.govt.nz/browse_for_stats/income-and-work/Income/LabourMarketStatisticsIncome_HOTPJun16qtr/Commentary.aspx

[14] They calculated a 95 percent confidence interval of between 7,000 and 50,000 males and between zero and 42,000 females.

[15] See http://nzdotstat.stats.govt.nz/OECDStat_Metadata/ShowMetadata.ashx?Dataset=TABLECODE7227

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