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Assessing the Possible Antipoverty Effects of Recent Rises in Age-Specific Minimum Wages in New Zealand

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Abstract

Real minimum wages increased by nearly 33% for adults and 123% for teenagers in New Zealand between 1999 and 2008. Where fewer than 2% of workers were being paid a minimum wage at the outset of this sample period, now more than 8% of adult workers and 60% of teenage workers are receiving hourly earnings close to the minimum wage. These policy changes provide a unique opportunity to estimate the effects of the minimum wage on the characteristics of these workers and their location across the income distribution. We provide some evidence on the likely consequences of these rising minimum wages on the poverty rate in New Zealand. Although minimum wage workers are more likely to live in the poorest households, they are relatively widely dispersed throughout the income distribution. This is particularly true of teenage minimum wage workers. Furthermore, low-income households often do not contain any working members. We estimate that a 10% increase in minimum wages, even without any offsetting reduction in earnings due to a loss in employment or hours of work, would lower the relative poverty rate by less than one-tenth of a percentage point.

Keywords: New Zealand, Minimum Wage, Poverty

JEL-Classification: I380, J380, J880

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1. Introduction

This study takes advantage of substantial and varied changes in New Zealand's minimum wages policy since 2000 to better understand their potential importance for reducing poverty in this country. No attempts are made in this present study to estimate the potential detrimental effects of these wage floors on hours of work and employment propensities among affected workers. Instead, we develop a consistent method for identifying minimum wage workers in our annual cross sectional data, and show how both the incidence of minimum wage work and the characteristics of these individuals have changed with large effective increases in both teenage and adult minimum wages over our sample period. More importantly, we estimate where these minimum wage workers are located in the income distribution and how this has changed over our sample period. We end with a series of policy simulations designed to show the possible consequences of a 10% increase in minimum wages for a specific poverty measure across various household populations.

Section 2 of this paper discusses both the substantive changes to statutory minimum wages in New Zealand since 2000, and the context of these changes relative to both the contemporary political and economic history of this country. Section 3 describes the data used in this study, surveys the literature regarding alternative definitions of minimum wage work and analyzes our empirical findings on the incidence of minimum wage in New Zealand between 1997 and 2008. Sections 4 and 5 examine descriptive statistics and regression results on the associations between effective minimum wages and both the dispersion of minimum workers across the income distribution and the incidence of minimum wage work at various points in this income distribution. Section 6 uses the data from our sample period to estimate, under certain restrictive assumptions, how a 10% increase in minimum wages would affect the percentages of households living below 50% of median income. These policy simulations are conducted for different assumptions about the possible detrimental effects on the earnings of minimum wages from a reduction in hours of work, and for different household populations. Finally, Section 7 draws some conclusions from this study.

2. Recent History of the Minimum Wage in New Zealand

Table 1 shows the legislated changes to nominal minimum wages in New Zealand between September 1990 and April 2008. This sample period spans the last legislated changes to the minimum wage prior to the general election victories of the more conservative National Party in both November 1990 and November 2008.

<Insert Table 1 here>

In September 1990, teenagers were exempt from the minimum wage. Adults aged 20 and over faced a minimum wage of $6.125 (or $245 for a 40-hour workweek). A centralised wage-setting system was still in place at this time, characterised by compulsory unionism and national awards with blanket coverage provisions (largely occupational minima pay rates negotiated by a tripartite group involving trade unions, employer organisations and the government).

Over the subsequent nine years in office, the labour market policies of the National Government can be summarised by two key decisions. The first policy was immediate and highly visible. The Employment Contracts Act (ECA) was implemented in May 1991. It abolished the remnants of the national awards system, compulsory unionism and other labour market protections. The second policy was more gradual, less noticeable and somewhat contradictory. Partly in response to the removal of basic labour market protections under the ECA, the National Government introduced a minimum wage for workers aged 16 to 19 in March 1994. This teenage minimum wage ($3.68) was set at 60% of the adult rate. At the same time the adult minimum wage was allowed to erode, albeit slightly, relative to both inflation and the general wage level during the 1990s. As can be seen in Figures 1 and 2, the three legislated increases in the adult minimum wage in 1995, 1996 and 1997 meant that the effective adult minimum wage was lower in September 1999 than it was in September 1990. Over this nine-year period, the adult minimum wage fell by 1.1% relative to the Consumer Price Index (CPI) and by 8.7% relative to average, ordinary-time hourly earnings from the Quarterly Employment Survey (QES). Thus, the National Government extended minimum wage protection to teenagers, but allowed this basic wage floor to be eroded in real terms and relative to the average wage.

<Insert Figure 1 here>

<Insert Figure 2 here>

The Labour Party won the general election in November 1999, and continued in power until its election defeat in November 2008. The Labour Government quickly replaced the ECA with the Employment Relations Act (ERA) in October 2000. The ERA promoted collective and good-faith bargaining, re-established the primacy of trade unions in collective contract negotiations and encouraged multi-employer bargaining. However, the ERA did not bring back compulsory unionism, the awards system and other labour market protections. Perhaps as a consequence of the decision not to return to a more formal centralised wage-setting system, the Government initiated a programme to substantially lift minimum wages: implementing annual increases in the minimum wage beginning in 2000 (see Table 1). Over the nine-year period between September 1999 and September 2008, the adult minimum wage increased by 32.9% relative to the CPI and 22.6% relative to average, ordinary-time hourly earnings (see Figures 1 and 2).

The Labour Government implemented even larger changes in the minimum wages faced by teenagers. Recall that the teenage minimum wage was set at 60% of the adult rate by the National Government beginning in March 1994. Labour completely abolished this subminimum wage for 18 and 19 year-olds beginning in March 2001, extending the adult rate to all workers aged 18 and over from this date. This resulted in an immediate and substantial increase in the effective minimum wage for this age group. Between September 1999 and September 2008, the minimum wage for 18 and 19 year-olds increased by 122.8% relative to the CPI and by 104.3% relative to average, ordinary-time hourly earnings.

In contrast the minimum wage for 16 and 17 year-olds was gradually raised to parity with the adult rate from this date. The minimum wage for younger teenagers was lifted to 70% of the adult minimum in March 2001, 80% in March 2002 and finally to 100% in April 2008. It should be noted, however, that 16 and 17 year-olds who are deemed to be 'new entrants' or in qualified training programmes continue to face a minimum wage set at 80% of the adult rate after April 2008. However, this subminimum wage disappears once 16 or 17 year-olds have accumulated 3 months or 200 hours of work experience across all employers subsequent to their 16th birthday or

completion of their training programmes. In the end, there was a similar relative rise in the eventual minimum wage across all teenagers over this period. Only the timing was different. The largest increase occurred for 18 and 19 year-olds in 2001, while the same increase was spread over the 2001-2008 period for 16 and 17 year-olds.

The recent history of minimum wage policy in New Zealand offers an excellent opportunity for researchers to estimate various impacts that such wage floors might have on the labour market. The 'baseline period' between 1990 and 1999 was one of relative stability in the effective minimum wage, except for the introduction of a teenage rate in 1994. The 'experimental period' between 2000 and 2008 saw a steady increase in the minimum wage, with substantial differences in the size and timing of these adjustments across distinct age groups. All of this was done during a period with a relatively decentralised wage-setting system where such wage floors might be expected to have a substantial influence on labour market outcomes.

3. Conceptual Issues and Descriptive Statistics on Minimum Wage Incidence

Data from the annual Income Supplements (IS) to the Household Labour Force Surveys (HLFS) are used in this study to estimate the possible effects of the minimum wage on income inequality. The HLFS is a survey of the resident population conducted in the March, June, September and December quarters of each year. It currently surveys about 16,000 households nationwide. An Income Supplement, which solicits detailed information on sources and amounts of income received by members of each household, was introduced in 1997 and added to each June quarter of the HLFS. The IS data provide the most consistent, nationally-representative information on earnings, as well as personal and household characteristics in New Zealand. The period from 1997 to 2008 covers three years prior to the major minimum wage reforms in 2001, along with the remaining years over which these changes have been more gradually introduced. We begin by asking how these recent policy changes have affected the overall incidence of working for the minimum wage, and how these incidence rates vary across different demographic groups.

One of the first practical issues to consider is how to define a minimum wage worker. One approach would be to base this classification on someone receiving an hourly wage rate that is exactly equal to the statutory minimum wage for that person's

age group at the time of the survey. This is rarely done in practice, because the hourly wage rate is often not reported (and often not even known) by a salaried worker. It must be estimated from earnings and hours worked over a specific period of time (e.g., weekly, fortnightly, monthly or annually). This increases the possibility of measurement error due to the misreporting of either earnings, hours of work or not taking into account deductions or allowances made by the employer.

Previous studies have defined minimum wage workers in a number of ways. Haugen and Mellor (1990) used data from the Current Population Survey (CPS) in the United States for this purpose. The CPS asks individuals to report their hourly wage if this is how they are paid. The authors defined minimum wage workers as those receiving an hourly wage exactly equal to or less than the statutory minimum wage. They found that approximately one-third of these individuals reported receiving a wage rate below the minimum wage. The authors concluded that, even among wage earners, there is reason to suspect some measurement error. This approach of defining minimum wage workers as those earning exactly the minimum wage and below has been replicated in a series of annual reports on the characteristics of US minimum wage workers (e.g., see Bureau of Labor Statistics 2007).

Other authors have adopted alternative ways of defining minimum wage workers. Dolado et al. (1996) summarise a large number of studies on the impact of minimum wages in Europe. Without being very specific, they claim that minimum wage workers are generally defined as being "... paid at or close to the minimum wage" (p.325). Presumably this allows for some range of values on either side of the legal minimum wage. Bernstein and Schmitt (2000) define minimum wage workers as those receiving hourly earnings exactly equal to the minimum wage and up to one dollar above this amount. This suggests that the authors consider workers reporting an hourly wage below the legal minimum as either an invalid wage observation, or at least an invalid observation of a true 'minimum wage worker' (e.g., possibly due to exemptions from the federal minimum wage). Finally, Hyslop and Stillman (2007) divide the low end of the wage distribution into three distinct groups: those receiving an hourly wage rate less than the current minimum wage, exactly equal to the current minimum wage, and above next year's minimum wage.

Thus, the literature provides a wide array of potential definitions for minimum wage workers. One consistent theme that runs across these studies is that some 'margin of error' around the statutory minimum wage is needed to capture all

minimum wage workers. Some authors seem to differ on which side of the minimum wage this margin of error should exist. Once we acknowledge that measurement error can occur in computing hourly earnings, however, there would seem to be little justification for it to be one-sided. Furthermore, we believe that some computed hourly earnings are so low that they most likely reflect substantial measurement error and maybe therefore not be legitimate observations on minimum wage work. These are important considerations if we want to characterise the extent and nature of minimum wage work. For example, the dispersion of minimum wage workers across income deciles could hinge on how minimum wage work is defined.

We believe that measurement error in computing hourly earnings necessitates the creation of 'bands' around the legal minimum wage. These bands should be fixed in real dollar amounts over time, and should not be dependent on future values of the minimum wage.[1] The issue that is impossible to resolve satisfactorily is the appropriate width of the bands.[2] We also need to recognise that our earnings data for this study are taken over a period of a few months following the increases in statutory minimum wages in New Zealand that occurred in either March or April. Some individuals may be reporting earnings information in the June quarter that has yet to be adjusted for the rise in the relevant minimum wage. For this reason, we choose three arbitrary bands around both the prevailing and previous statutory minimum wages. These will be set at 20-cent, 50-cent and 100-cent intervals (measured in constant 2008 dollars) on either side of the previous and current, age-relevant minimum wage. Our main focus will be on the 50-cent band, but the results from the narrower and wider bands will be reported to gauge the robustness of our findings.

Table 2 displays our findings on minimum wage incidence over the 12 years between 1997 and 2008. We have a total of 143,166 valid observations on workers over this period, or nearly 12,000 per year.[3] On average, slightly less than one out of

[1] For the purposes of defining who is a minimum wage worker in the present period it would be problematic if this hinged on future values of the minimum wage. This might be appropriate for other considerations (e.g. who is at risk of employment loss at the next period), but it would make it difficult to get a consistent picture of how the characteristics of minimum wage workers are changing over time with the current minimum wage.

[2] There is an additional issue about whether or not these bands should be symmetric around the minimum wage. This largely depends on the nature of the measurement error that might make true minimum wage workers report hourly earnings below or above this legal minimum. Without being able to identify these various sources of measurement error, we simply choose to centre these bands on the legal minimum wage.

[3] We removed from our sample observations on individuals aged less than 16 and more than 65. In addition, we eliminated individuals reported to be disabled or retired, those not receiving positive

every twenty workers (4.8%) is defined as a minimum wage worker using our 50-cent band. However, across the period from 1997 to 2008, this minimum wage incidence ranged from a little over 1% in 1998 to more than 12% in 2008. If we compare the average incidence rates in the three-year periods 1997-1999 and 2006-2008, the percentage of minimum wage workers increased over six-fold from 1.63% to 10.03%.[4]

<Insert Table 2 here>

The next two columns in Table 2 report minimum wage incidence rates separately for teenage workers (aged 16 to 19) and adult workers (aged 20 or over). With the teenage minimum set at 60% of the adult rate through 2000, very few teenage workers were receiving the minimum wage over the first four years in our sample (ranging between 2% and 3.5%). Note that the teenage minimum wage was approximately 25% of average hourly earnings over this period (Figure 2). This is substantially lower than effective minimum wage for teenagers in other countries, and suggests that the teenage minimum was not 'binding' for the vast majority of workers between the ages of 16 and 19 in this early period. As would be expected, the minimum wage incidence rate for adults was generally even lower than that for teenagers. This was true even in the earlier period when the teenage minimum was set at 60% of the adult rate.

In 2001, the minimum wage was lifted to 100% of the adult rate for 18 and 19 year-olds and 70% of the adult rate for 16 and 17 year-olds. The impact on the minimum wage incidence rate for teenage workers was immediate and substantial. It increased more than six-fold from 3.46% in June 2000 to 21% in June 2001. In comparison, there was very little change in the adult incidence rate between these surveys. Further increases through to full parity in June 2008 meant that more than 60% of teenage workers could be classified as minimum wage workers by the end of our sample period.[5]

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earnings or working positive hours, the self-employed and those with reporting to usually work more than 60 hours per week.

[4] We find similar increases in minimum wage incidence between the periods 1997-1999 and 2006-2008 if we use a narrower 20-cent band (0.99% to 6.82%) and a wider 100-cent band (3.13% to 14.82%).

[5] Minimum wage incidence rates for teenage workers in 2008 were 50.23% and 70.65% using the alternative 20-cent and 100-cent bands, respectively.

The increase in minimum wage incidence among adults was less dramatic, but still substantial. Recall that the adult minimum wage increased relative to the average hourly earnings by nearly 23% relative between 1999 and 2008. The percentage of adult workers receiving the minimum wage increased from an average of slightly more than 1.6% between 1997 and 2001 to over 8% in the last two years of our sample period (2007 and 2008).

Three important conclusions can be derived from the descriptive statistics in the first three columns of Table 2. Firstly, the minimum wages in the late 1990s were binding for only a very small percentage of workers. This was particularly true of teenagers who are normally the focus of studies on the effects of the minimum wage in other countries. Their minimum wage incidence rate is only slightly higher than that of adult workers during the later 1990s. Secondly, raising the teenage and adult minimum wages resulted in substantial increases in the incidence of the minimum wage among both teenage and adult workers. Finally, both the magnitude and the timing of the increases in minimum wage incidence rates varied substantially between teenagers and adults. Much larger jumps in incidence rates for teenagers occurred between 2000 and 2001 when the minimum wage for 18 and 19 year-olds was raised to parity with the adult rate, and again between 2006 and 2008 when the minimum wage for 16 and 17 year-olds was also raised to parity with the adult rate. The adult incidence rate increased gradually beginning in 2001, but experienced the biggest rises between 2005 and 2008[6].

The remaining columns in Table 2 show how minimum wage incidence changed across the sample period for specific demographic groups.[7] Female workers, those with no formal educational qualifications and workers from ethnic minority groups were relatively more likely to receive a minimum wage. By the end of our sample period, more than one out of every seven working women was being paid the minimum wage. The same was true for nearly one-in-five workers recorded as unqualified, Maori or Pacific Island.

The incidence of minimum wage work has historically been relatively higher in part-time employment (defined here as usually working less than 30 hours per week). Incidence rates rose with the increases in the minimum wage after 1999 in

[6] The onset of recession due to the global financial crises is likely to have influenced the incidence near the end of the sample period.

[7] The choice of the relevant demographic characteristics for these descriptive statistics was motivated in earlier work done by Pacheco (2007).

both part-time and full-time work, but at a faster rate in part-time jobs. For example, where minimum wage incidence was three-times higher in part-time compared to full-time employment in 1999, it was nearly four-times higher in 2008.

Moreover, several industries are more likely to create minimum wage jobs.[8] The final two columns of Table 2 show minimum wage incidence in the combined industries of retail, accommodation, cafes and restaurants relative to all industries. In 1999, workers in this suspected low-wage sector were only slightly more likely to receive the minimum wage (1.79%) compared to all other industries (0.98%). In stark contrast, by 2008 minimum wage incidence had increased nearly 18-fold (31.68%) in the aggregate retail, accommodation, cafe and restaurant industry, but less than eight-fold (7.83%) in all other industries. In other words, this suspected low-wage sector became a much more common source for minimum-wage work after these policy changes.

4. The Income Dispersion of Minimum Wage Workers

We now turn to the effectiveness of minimum wages as an antipoverty tool. One of the basic motivations for the provision of wage floors is that they will boost the earnings of low-wage workers and thereby the income of the families or households in which they are located. There are at least three reasons to question the efficacy of the minimum wage as an antipoverty programme. First, earnings of affected low-wage workers may not increase if higher minimum wages lead to reductions in hours of work or losses in employment. Secondly, low-wage workers may not be located in poor families or households; for example teenagers living in relatively high-income families. Third, poor families or households may not contain workers who could potentially benefit from a higher minimum wage; for example households totally reliant on social welfare benefits.

In the absence of detailed panel data on employment, earnings and income histories covering a large sample of individuals directly affected by periodic increases in the minimum wage, we need to make a number of inferences about the likely effects of the minimum wage on poverty and income inequality.[9] We begin by

[8] The industries containing a disproportionate number of minimum wages during the early years of these minimum wage increases was first reported by Pacheco (2007).

[9] Even with such individual panel data, estimation of the effects of the minimum wage on individual earnings and eventual family or household income would be difficult. We would have to estimate the

looking at possible changes in the location of minimum wage workers across the income distribution over our sample period. This analysis is based implicitly on the assumption that households share income equally among their members. As a result, we use detailed information in the HLFS Income Supplements to associate all income generated by a household to every individual living within that household at the time of the survey.[10] To better justify income as a measure of living standards, household income is 'equivalised' by dividing it by the square root of the number of individuals living within the household at the time of the survey.[11] We then compute the proportion of minimum wage workers in a year who are living within each of these equivalised household income deciles. If they were evenly distributed across the income distribution, then exactly 10% of minimum wage workers would be found in each of the income deciles.

The earliest and latest three-year averages of the income dispersion of minimum wage workers available at the time of this study are used to compare the periods immediately preceding and following New Zealand's minimum wage reforms . These periods cover 1997 to 1999 and 2006 to 2008. One advantage of these three-year averages is that they reduce possible measurement error in estimating income dispersion for minimum wage workers due to small sample sizes, especially during the earlier years when there were relatively few minimum wage workers.

Figure 3 displays the histograms on the distribution of minimum wage workers across equivalised household income deciles for the 1997-1999 and 2006-2008 periods. The lighter bars display the income dispersion of minimum wage workers in the earlier period. Somewhat surprisingly, minimum wage workers were not heavily concentrated in the lowest income deciles. For example, only slightly more than 10% of minimum wage workers were located in deciles one and two during the late 1990s. The largest concentration was in decile three which contained more than 12% of minimum wage workers during this earlier period (18.4%).

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possible effects of the minimum wage in reducing employment and hours of work by eliminating other potential influences on these labour market outcomes. We would also have to estimate the impacts on the earnings and non-labour incomes of other family or household members who might be indirectly affected by such changes in the work and earnings of affected low-wage workers.

[10] It is not possible to identify particular families that might exist within a household in the HLFS.

[11] The family of equivalence scales where household income is divided by the number of individuals in the household raised to the power α is described in Buhmann et al. (1988). The parameter α is scale elasticity in sharing income. If α is one, we have per capita income in the household and no economies of scale. If α is zero, we have household income and maximum economies of scale. The value of α of 0.5 is midway between these two extremes and has been used in a large number of recent studies (e.g., see Atkinson et al. (1995) and Pascual (2005)).

Nevertheless, it would be fair to conclude that minimum wage workers were relatively more likely to be located in lower income deciles. For example, in 1997-1999 39.5% of minimum wage workers were located in households in the bottom three deciles compared to only 16.2% in the top three income deciles. Another way to state this result is that minimum wage workers were 2.44 times more likely during this three-year period to live in households with the lowest 30% of equivalised income compared to households with the highest 30% of equivilised income.

<Insert Figure 3 here>

Our findings suggest that minimum wage workers in New Zealand are more likely to be equally distributed across the income distribution compared to minimum wage workers in other countries. Dolado et. al (1996) found that between 50% and 60% of minimum wage workers in France, the Netherlands, Spain and the United Kingdom were located in the bottom three household income deciles. These figures are much higher than the approximately 40% of minimum wage workers located in the lowest three income deciles in New Zealand between 1997 and 1999. Our results are closer to those reported by Card and Krueger (1995) in the US, where they found that 42.8% of affected workers, i.e. those earning between the former minimum wage of $3.35 and the new minimum wage of $4.25 per hour were located in the lowest three income deciles.[12]

The darker bars in Figure 3 display the income dispersion of minimum wage workers in the later period following substantial increases in teenage and adult wage floors. The overall dispersion of minimum wage workers in the latter period looks fairly similar to the pattern in the earlier period. Relative to the 1997-1999 period, there was a notable increase in the percentages of minimum wage workers in decile two, and declines in minimum wage workers located in deciles three and seven. There was an increase in the proportion of minimum wage workers in the bottom three income deciles between 1997-1999 (39.5%) and 2006-2008 (41.3%). At the same time there was a much smaller increase in the proportion of minimum wage workers in the top three income deciles between 1997-1999 (16.2%) and 2006-2008 (16.6%). The net result was a slight increase in the odds of minimum wage workers

[12] It should be noted that Card and Krueger used income measures for the family, where we use income defined for the household.

living in the bottom three relative to the top three income deciles from 2.44 during 1997-1999 to 2.49 during 2005-2007. Thus, the substantial increases in both teenage and adult minimum wages during our sample period did not appear to have a substantial impact on the income dispersion of minimum wage workers.

It is possible, of course, that many other factors were influencing the location of minimum wage workers across the income distribution over our sample period. In particular, there were changes in the composition of households and a booming macroeconomy that could have influenced where these minimum wage workers were located in the income distribution. We want to isolate the effects of changes in legislated wage floors on the distribution of minimum wage workers across the income deciles while holding these other variables constant.

We employ a multinomial logit regression model, where the probability that a minimum wage worker will be located in one of the ten equivalised household income deciles is a function of the age, gender, ethnicity, educational qualifications, household composition, local area unemployment rate and the relevant real minimum wage for that individual. Two dummy variables capture household composition. The first indicates the presence of a dependent child in the household, the second indicates no other adult in the household. To capture the state of the overall economy, we rely on variation in regional unemployment rates. We want to take advantage in this regression model of the time variation in legislated changes to minimum wages for the three distinct age groups. For this reason, we interact the age-relevant minimum wage with the age-specific dummy variables. In this way, we can estimate the separate effects of changes in teenage and adult minimum wages on the probability that a given minimum wage worker will be located in a particular income decile.

The results from the estimation of this multinomial regression model are reported in Table 3. The estimated partial derivatives on the probabilities of a minimum wage worker being located in an equivalised household income decile are reported, along with their estimated standard errors. All marginal effects are computed at the means of the covariates in this sample, and the coefficients are normalised to zero for the fifth income decile.

<Insert Table 3 here>

Having a dependent child in the household and having no other adult in the household both significantly increase the probabilities that minimum wage workers will be located in lower income deciles. The same variables significantly reduce the likelihood that a minimum wage worker will be observed in high-income households. These findings are sensible. Having a dependent child in the household directly deflates equivalised income by adding another household member and may indirectly reduce income by lowering hours of work and earnings to care for a dependent child. As a result, a minimum wage worker living in a household with a dependent child is relatively more likely to come from a lower income decile. Having no other adult in the household directly inflates equivalised income by reducing the number of household members. However, this effect is more than offset by the increase in earnings that would often accompany another adult living in that household. As a result, having a dependent child and having no other adult in the household both increase the probability that a minimum wage worker will be located in a lower income decile.

Regional unemployment rates have minimal impacts on the income dispersion of minimum wage workers. A positive and significant effect is estimated on the probability of being in decile two, and negative and significant effects are estimated on being located in the eighth and tenth deciles. These results suggest that an increase in the unemployment rate would slightly increase the 'target efficiency' of the minimum wage as minimum wage workers are slightly more likely to come from lower income deciles during cyclical downturns.

Finally, real minimum wages are found to have a relatively weak statistical relationships with the income dispersion of minimum wage workers across the three age groups. Again, we are taking advantage of the fact that minimum wages increased by different amounts and at different times across our sample period for 16 and 17 year-olds, 18 and 19 year-olds and those 20 years old and over. Increases in the real minimum wage for younger teens had a statistically significant positive effect on the probability of a minimum wage worker being located in income decile nine. Increases in the real minimum wage for older teens had a statistically significant positive effect on the probability of a minimum wage worker coming from income decile two. All other estimated partial derivatives on teenage minimum wages are insignificant in this regression.

The adult minimum wage had slightly stronger statistical effects on the probability of a minimum wage worker being located in a particular income decile. The estimated partial derivatives were positive and significant for decile two, and negative and significant in deciles five and ten. This suggests that a rise in the adult minimum wage made it more likely that minimum wage workers would be located in decile two, especially relative to the middle and top income deciles.

There is another way of stating the results in Table 3. The observed increase in the proportion of minimum wage workers located in decile two between 1997-1999 and 2006-2008 shown in Figure 3 can be statistically linked to the rise in real minimum wages for those 18 years old and above. The rise in the real minimum wage for 16 and 17 year-olds had no measureable effect on the higher proportion of minimum wage workers in this decile. However, the higher real minimum wage among younger teenagers did slightly increase the probability that a minimum wage worker would be located in decile eight. The increase in the real adult minimum wage also significantly reduced the probabilities of minimum wage being observed in the fifth and tenth income deciles.

Finally, we can summarise these regression results in Table 3 by again using histograms on the dispersion of minimum wage workers across the income deciles. Figure 4 shows what we estimate would have happened to the income dispersion of minimum wage workers in 2006-2008 if minimum wages had been adjusted only for inflation after 1999. To produce the darker set of bars in this figure, we subtracted from the actual proportion of minimum wage workers in a decile in the latter period the estimated impact associated with actual increases in real minimum wages for all three age groups over the sample period. The darker bars in Figure 4 are the estimated percentages of minimum wage workers that would have been located in each of the equivalised household income deciles in 2006-2008 if minimum wages had remained at their real 1997-1999 levels, while everything else had been allowed to change as it did.[13]

<Insert Figure 4 here>

[13] In each decile, we subtract from the observed proportion of minimum wage workers in the 2006-2008 period the products of the estimated partial derivatives on the age-specific minimum wage variables multiplied by the observed changes in these variables between the 1997-1999 and 2006-2008 periods for all three age groups.

As might be expected, given the results reported in Table 3, the biggest adjustment to the income dispersion of minimum wage workers occurred in the second income decile. Much of the substantial increase in the proportion of minimum wage workers observed in this decile (from10.3% to 16.4%) can be directly attributed to the legislated increases in real minimum wages. Our results suggest that if real minimum wages had *not* increased over this period; the estimated percentage of minimum wage workers in the second decile would have actually declined from 10.3% to 6.3%. We suggest two reasons for this finding. First, further analysis of the data indicates that households in this second decile have nearly twice as many workers as households in decile one. Secondly, a relatively large proportion of these workers face low wages in the labour market. As real minimum wages increased over our sample period, many of the low-wage workers became categorised as minimum wage workers but this would not have been the case without the legislated increases. Indeed, all of the observed increase in location of minimum wage workers in this second income decile can be attributed to the legislated increases in real minimum wages between 1997-1999 and 2006-2008. The result of all of these adjustments to the income dispersion of minimum wage workers if there had been no real increases in these wage floors can be easily summarised. If minimum wages had remained at their real 1997-1999 levels, the proportion of minimum wage workers in the bottom three deciles would have fallen from 41.3% to 34.6%, but risen in the top three deciles from 16.6% to 20.0%. Thus, without these increases in real minimum wages, the distribution of minimum wage workers would have become slightly more uniform across the income distribution. Legislated increases in real minimum wages are estimated to have resulted in a closer association between minimum wage work and low household income. This can be summarised in the odds ratios. In 1997-1999, minimum wage workers were 2.44 times more likely to live in the bottom three income deciles relative to the top three income deciles; this odds ratio increased to 2.49 by 2006-2008 following the actual increases to the minimum wage. In contrast our analysis suggests that if real minimum wages had *not* increased, this odds ratio would have actually fallen to 1.73. It is not readily apparent in the observed data, but increases in real minimum wages resulted in a greater concentration of minimum wage workers in the poorer households.

5. The Incidence of Minimum Wage Work by Household Income

The analysis in the previous section focussed on changes in the income dispersion of all minimum wage workers over the last 12 years. In this section, we look at the incidence of minimum wage work among all workers within each of the equivalised household income deciles. In Table 3 we observed that minimum wage incidence rates increased substantially over time along with the legislated increases in real minimum wages, and we have seen how this minimum wage incidence among workers varies by demographic characteristics. Continuing with our interest in the possible antipoverty effects of the minimum wage, we now consider how minimum wage incidence varies across the income distribution, and how changes in these incidence rates may have been affected differently by these policies across the equivalised household income deciles.

Figure 5 displays the histograms on the percentages of minimum wage workers in each income decile averaged over the 1997-1999 and 2006-2008 periods. As expected, minimum wage incidence is negatively related to equivalised household income in both periods, and has increased substantially in each income decile along with increases in real minimum wages over our sample period. For example, 5.24% of workers in the bottom income decile were classified as minimum wage workers in 1997-1999. This figure increased more than six-fold to 32.86% in 2006-2008; a similar increase is recorded for the fifth income decile, where the incidence of minimum wage work increased from 1.58% in 1997-1999 to 10.08% in 2006-2008. In the top decile, this incidence rate for minimum wage work increased more than eight-fold from 0.37% in 1997-1999 to 3.22% in 2006-2008. In other words, although the *absolute* percentage changes in minimum wage incidence rates were larger in the lower income deciles between 1997-99 and 2005-07, the *relative* changes in incidence rates were often larger in the higher income deciles over the same period.

<Insert Figure 5 here>

The large increases in minimum wage incidence between 1997-1999 and 2005-2008 could result from legislated increases in these wage floors, changes in the demographic compositions of households and the cyclical upturn in the economy over this sample period. To help isolate the effects of minimum wage policy, maximum

likelihood probit models were estimated for each of the income deciles. The dependent variable is dichotomous and equals one if a worker receives the minimum wage; zero if they earn more than the minimum wage. Unlike the multinomial logit results reported in Table 3, these are separate probit results for each income decile using data from all years in our sample. In this way, the coefficients are allowed to fully interact with the ten income groups. The same covariates as before are included in this analysis, and the full set of regression results are reported in Table 4.

<Insert Table 4 here>

The effects of gender on minimum wage incidence tell an interesting story across the income distribution. Female workers are significantly more likely to receive a minimum wage in all but the bottom income decile. For example, minimum wage incidence is 2.6 percentage points higher for female relative to male workers in the second income decile. This gender effect increases in magnitude, before declining steadily over income deciles four through ten. The absence of statistically significant gender effect in the bottom income decile may be related to work disincentives of social welfare programmes and the fact that women are much more likely to receive the Domestic Purposes Benefit which, unlike the Unemployment Benefit, does not generally have an active job search requirement.

As expected, educational qualifications generally have negative and significant effects on minimum wage incidence. Yet, it is worth noting that these partial derivatives generally decline in magnitude at higher income deciles. The implication is that acquiring educational qualifications will have relatively larger impacts in reducing minimum wage incidence among workers living in lower-income households.

Regional unemployment rates do not have consistently significant effects on minimum wage incidence across the income distribution. The partial derivatives were positive and significant in only income deciles one and seven. For example, a one percentage-point increase in the local unemployment rate is estimated to increase minimum wage incidence by 0.9 percentage points in the bottom income decile. This suggests that the overall decline in the aggregate unemployment rate with the rapidly expanding New Zealand economy over much of our sample period had little impact on minimum wage incidence. It may be that the regional unemployment rates do not

adequately capture more general, economy-wide expansion in New Zealand's economic performance over our sample period.

Our analysis consistently shows positive and significant effects on minimum wage incidence for increases in real teenage and adult minimum wages across the entire income distribution. The estimated partial derivatives are significantly different from zero at better than a 1% level in all regressions for age-specific minimum wages. The estimated effects decline steadily in magnitude in moving from lower to higher income deciles. For example, we estimate that a 10% increase in the adult real minimum wage raises the proportion of adult minimum wage workers by 9.34 percentage points in the lowest income decile. This same 10% increase in the adult minimum wage would raises minimum wage incidence rates by 1.55 percentage points in the fifth income decile and by 0.25 percentage points in the top income decile. Thus, the effects of increases in real adult minimum wages on incidence rates are more than 37-times larger in the bottom relative to the top household income decile.

Teenage minimum wages have similar positive and significant effects on their minimum wage incidence across the income distribution. For example, a 10% increase in the minimum wages for 16 or 17 year-olds would increase their minimum wage incidence by 6.21 percentage points in income decile one, but only by 0.36 percentage points in decile 10. Similar declines in these estimated effects are found across the income deciles for 18 or 19 year-olds.

It's also worth noting that adult minimum wages appear to have larger effects on incidence rates relative to teenage minimum wages at lower income deciles. The estimated partial derivatives for adults are larger in magnitude than those for teenagers in income deciles one through three. The opposite is true in the upper income deciles. Although some of these differences are not statistically significant, this suggests that adult minimum wages may be more important in explaining incidence rates among lower income households, while teenage rates may be more important for this purpose at higher income levels. This verifies the perception that increases in minimum wages are more likely to lead to minimum wage work among adults in poorer households and among teenagers in wealthier households.

Figure 6 shows what might have happened to minimum wage incidence across the income distribution in 2006-2008 if minimum wages had been adjusted only for inflation after 1999. To produce the darkest set of bars in this figure, we subtracted

from the actual 2006-2008 incidence rates in a given decile the estimated impact associated with the real increases in the minimum wage over the sample period. This estimated effect is the product in each income decile of the observed growth rates in average real minimum wages between 1997-1999 and 2006-2008, and the estimated partial derivatives on these variables from the regression results in a given income decile. The darkest bars in Figure 6 are the estimated percentages of minimum wage workers in a decile if statutory minimum wages had been kept at their real 1997-1999 levels and everything else had been allowed to change as it did.

<Insert Figure 6 here>

Removing the effects of increases in real minimum wages between 1997-1999 and 2006-2008 on incidence rates has substantial effects on these estimated figures across the income deciles. For example, earlier we showed that minimum wage incidence increased in decile one from 5.24% to 32.86% between these periods; however, without the substantial increases in real teenage and adult minimum wages over the period, we estimate that the minimum wage incidence in this decile would have increased to only 8.25%. Thus, the legislated increases in minimum wages account for nearly 90% of the observed increase in the incidence of minimum wage work among workers in the bottom-income decile. The relative importance of these legislated changes to minimum wages in explaining the rises in incidence rates declines as we move to higher income deciles. At income decile five, real increases in teenage and adult minimum wages explain just over 50% of the observed increase in minimum wage incidence between 1997-1999 and 2006-2008. By income decile ten, real increases in the teenage and adult minimum wages explain slightly less than 25% of the observed increase in minimum wage incidence between these periods.

Across income deciles, minimum wage incidence among workers increased from 1.68% in 1997-1999 to 9.83% in 2006-2008. We estimate that without the actual increases in real teenage and adult minimum wages over this period, this increase would have been a much more modest 4.74%. Thus, increases in real minimum wages account for more than 62% of this increase in minimum wage incidence between these periods. This raises the issue of why minimum wage incidence would have increased in the absence of real increases in wage floors. There are a number of potential explanations. First, this might have resulted from

demographic changes in the composition of the workforce. Secondly, it may have been associated with the rapid growth in the economy over this period that drew more low-wage workers into employment. Thirdly, it could have resulted from a general increase in wage dispersion in the labour market that made lower wage workers more vulnerable to minimum wage work.

6. The Minimum Wage and Poverty Simulations

Previous sections in this report show how large recent rises in New Zealand's minimum wages may have altered the characteristics of minimum wage workers, including their location in the overall distribution of household income. No estimates produced thus far have specifically accounted for the possible antipoverty impacts of the minimum wage. In this section, we report the results from a series of simulations where the observed earnings of minimum wage workers are increased as the result of a hypothetical 10% increase in the minimum wage. We then ask, given different scenarios, how this policy would likely alter the rate of poverty in this country.

For this analysis, we use a relative measure of poverty set at 50% of median household income in a giver year. The entire sample of HLFS-IS households over the 1997-2008 will be used at the outset for this exercise. The only restrictions are that cases of suspected measurement error in terms of hours of work and earnings were removed (as was done in earlier analysis in previous sections). We then consider two specific subpopulations: households with at least one employed individual, and households with at least one employed minimum wage worker. Throughout these simulations we use our earlier 50-cent band around the most recent minimum wage rates to identify minimum wage workers. As before, all workers who report receiving hourly earnings below this 50-cent band are excluded from this analysis.

Table 5 displays the results from our policy simulations. We begin with 200,361 household observations over our 12-year period. The initial poverty rate is 22.02%. More than one-in-five of these households are receiving less than 50% of equivalised household income. The poverty rate is lower for households with at least one employed member (10.50%), but higher for households with at least one minimum wage worker (26.69%).

<Insert Table 5 here>

The first policy simulation assumes that minimum wages increase by 10%, and that all defined minimum wage workers in our sample experience a corresponding 10% increase in earnings. In other words, we consider what might be considered to be the best-case-scenario where the higher minimum wage results in no reduction in earnings from an associated loss in employment or hours of work. Recomputing the poverty rate after this policy change, we estimate that it would decline from 22.02% to 21.94%. Even with no indirect loss in employment or hours of work from this higher minimum wage, the impact on the poverty rate among all households is very small. The poverty rate declines by 0.08 percentage points, or 0.36% from its initial level. This is undoubtedly related to the finding in the previous section that minimum wage workers are fairly widely dispersed across the income deciles. Lifting the earnings of minimum wage workers can reduce the overall poverty rate, but the effect is relatively small because minimum wage workers are not heavily concentrated in the bottom of the income distribution.[14]

This same increase in earnings from a 10% rise in minimum wages could have much larger antipoverty effects among certain subsets of households. For example, under our approach only households with a worker could possibly benefit from a higher minimum wage. More precisely, these positive effects could only occur among households with a current minimum wage worker. The last two columns in Table 5 show the effects on poverty rates for these subpopulations from a 10% increase in minimum wages with no loss in employment or hours of work. For the households with at least one worker, the poverty rate is estimated to fall from 10.50% to 10.38%. This is a 0.12 percentage-point decline, or a 1.14% decrease in the poverty rate among working households. For households with at least one minimum wage worker, the poverty rate is estimated to fall from 26.69% to 24.20%. This is a 2.49 percentage-point decline, or a 9.33% decrease in the poverty among these households. Thus, although increases in minimum wages would be unlikely to have a substantial impact on the poverty rate among all households, they could have much larger effects among households with minimum wage workers. It is important to

[14] As would be expected, these poverty-reducing effects of a 10% increase in minimum wages would be slightly smaller if minimum wage workers were defined using a narrower 20-cent band (0.06 percentage-point reduction in the poverty rate or 0.27% of its initial level) and slightly larger if minimum wage workers were defined using a broader 100-cent band (0.14 percentage-point reduction or 0.64% of its initial level).

emphasise the rarity of this second subpopulation, only 3.4% of all households in our sample contain a minimum wage worker.

The next row in Table 5 shows what could happen to poverty rates among all three groups of households if minimum wages directly increased earnings by 10%, but indirectly reduced hours of work by 3%. This choice of a subsequent 3% loss in earnings through fewer hours of work is in line with the summary of early empirical evidence on the detrimental effects of the minimum wage from the employment loss found in Brown et al. (1982). Not surprisingly, this assumption of a less-than-offsetting reduction in hours of work stemming from 10% increases in minimum wages makes the already small antipoverty effects among the first two groups of households even smaller. The reduction in the poverty rate among all households is 0.05 percentage points or 0.23%. The reduction in the poverty rate among working households is 0.07 percentage points or 0.67%. Only among the small subpopulation of households currently with a minimum wage worker would we continue to see a larger antipoverty effect from a higher minimum wage. With the indirect loss in hours of work, the even larger direct positive effect on earnings would reduce the poverty rate among these households by 1.52 percentage points (from 26.69% to 25.17%). This amounts to a 5.70% reduction in the poverty rate among households with a minimum wage worker.

Finally, any antipoverty effects from the minimum wage are almost entirely attributable to the increase in earnings experienced by adult workers. If we added 10% to the earnings of teenage workers only, the poverty rate among all households in our sample would remain essentially unchanged. It would decline by only 0.01 percentage points for households with an employed member and by 0.16 percentage points for households with a minimum wage worker. The antipoverty effects of raising the minimum wage for teenagers are particularly weak because less than one-third of minimum wage workers are teenagers, and they are relatively more equally dispersed across the income distribution.

7. Conclusions

After experiencing few changes to effective minimum wages during the 1990s, New Zealand substantially raised the adult minimum wage after 2000 and eliminated the gap between the teenage and adult minimum wages. Between

September 1999 and September 2008, real minimum wages increased by 122.8% for teenagers and 32.9% for adults. As a consequence, the country went from a situation where very few workers were paid the minimum wage to one where this was true for nearly one out of ten adult workers and one out of every two teenage workers. This period of significant policy change provides an excellent opportunity to study the possible labour market effects associated with substantial increases in the effective minimum wage. In addition, differences in both the timing and magnitude of the increases in minimum wages for distinct age groups can aid our ability to isolate their effects in the labour market.

We define minimum wage workers in this study as individuals with usual hourly earnings within a narrow band on either side of the current or previous statutory minimum wage for their age group. Annual data from the Income Supplements to the Household Labour Force Survey between 1997 and 2008 are used for this analysis. They show that workers who are female, Maori or Pacific Islanders, without formal educational qualifications, part-time employees and those located in the retail, accommodation, cafe and restaurant industries are all relatively more likely to work for the minimum wage. These workers have experienced the largest increases in minimum wage incidence since 1997.

We find that minimum wage workers tend to be concentrated in the lowest income deciles. Approximately 40% of minimum wage workers live in households from the bottom three income deciles (equivalised for household size). Yet, more than 16% of minimum wage workers live in households from the top three income deciles. There was no evidence of a distinct change in the overall dispersion of minimum wage workers across the income distribution during the 1997-2008 sample period. However, our regression analysis suggests that, without the substantial increases in real minimum wages over this period, minimum wage workers would have become more equally dispersed across the income deciles. Increases in both teenage and adult minimum wages resulted in a greater concentration of minimum wage workers in the bottom of the income distribution.

The incidence of minimum wage work varies considerably across the distribution of household income. A given worker in the lowest income decile is many times more likely to work for the minimum wage than a given worker in the highest income decile. The largest absolute percentage-point increases in minimum wage incidence stemming from the substantial increases in both teenage and adult

minima in New Zealand occurred in the lowest income deciles. By 2006-2008, the minimum wage incidence rates for workers in the bottom and top income deciles were 32.9% and 3.2%, respectively. Our regression analysis confirms that the majority of these increases in minimum wage incidence were linked to increases in statutory minimum wages. Increases in adult minimum wages were relatively more important at explaining rises in incidence rates in the lower income deciles, where teenage minimum wages had slightly larger marginal effects in the higher income deciles.

Finally, policy simulations using 1997-2008 data on the earnings and income of New Zealand households suggest that a 10% increases in minimum wages, without any offsetting reduction in earnings due to an associated loss in employment or hours of work, would lower the poverty rate (defined as living in a household below 50% of median equivalised household income) by less than one-tenth of a percentage point. This small impact is due to the fact that many low income households do not contain working members who could take advantage of higher minimum wages to boost household income, and many minimum wage workers do not live in poor households.

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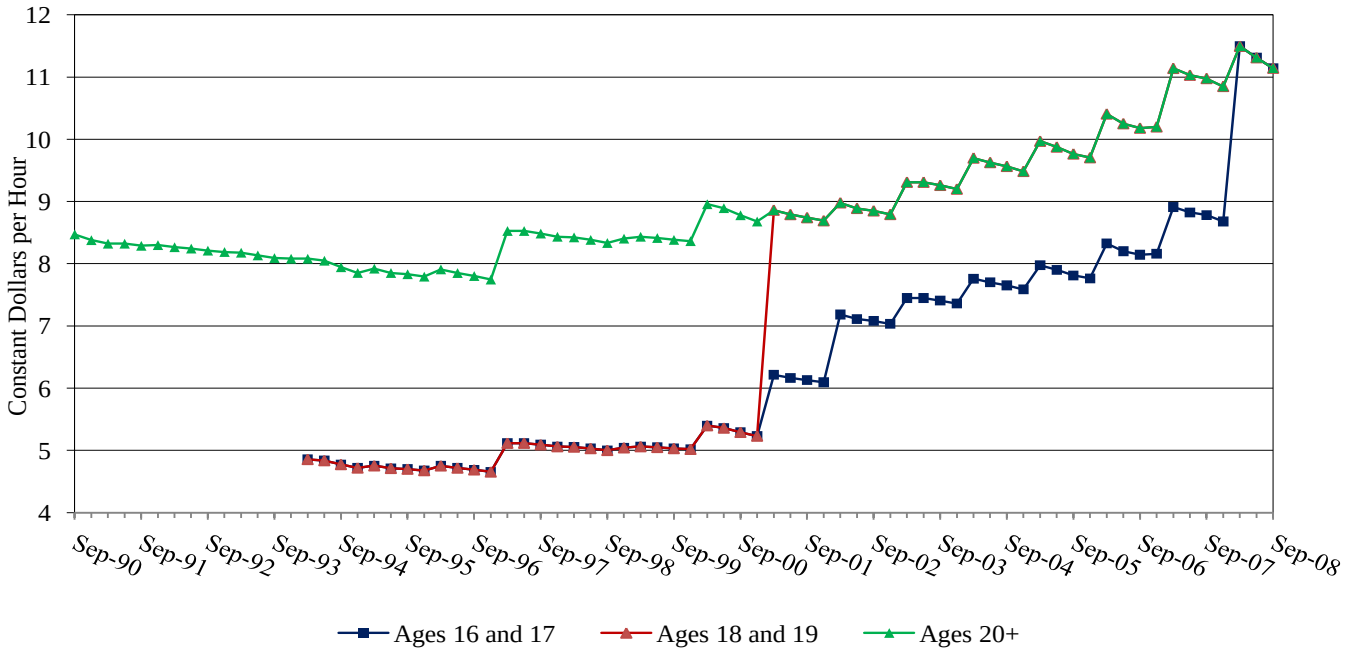
Table 1
Changes to Legislated Minimum Wages in New Zealand
September 1990 to April 2008

Date of Legislated Change	Age Group		
	Ages 16-17	**Ages 18-19**	**Ages 20+**
September 1990	**NA**	**NA**	$6.125
March 1994	$3.68	$3.68	$6.125
March 1995	$3.75	$3.75	$6.25
March 1996	$3.83	$3.83	$6.375
March 1997	$4.20	$4.20	$7.00
March 2000	$4.55	$4.55	$7.55
March 2001	$5.40	$7.70	$7.70
March 2002	$6.40	$8.00	$8.00
March 2003	$6.80	$8.50	$8.50
April 2004	$7.20	$9.00	$9.00
March 2005	$7.60	$9.50	$9.50
March 2006	$8.20	$10.25	$10.25
April 2007	$9.00	$11.25	$11.25
April 2008	$12.00*	$12.00	$12.00

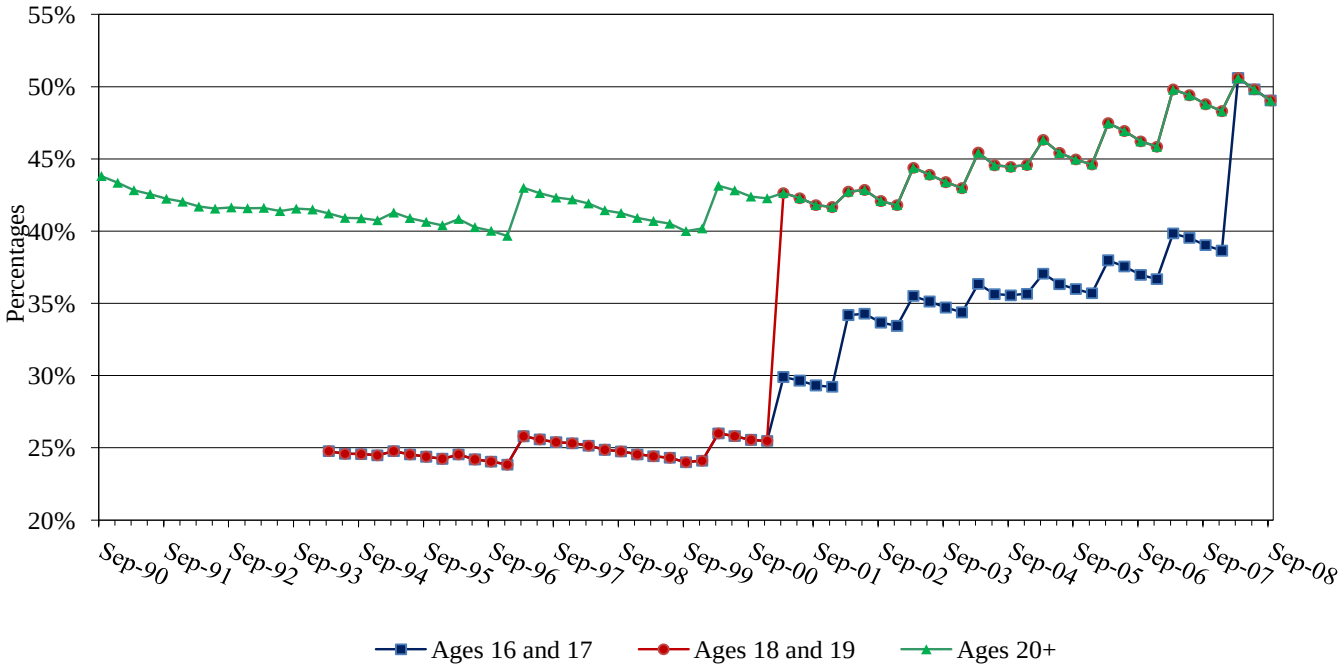
Notes: No minimum wage existed for teenagers prior to March 1994. The asterisk * for April 2008 indicates that this was the minimum wage for 16 and 17 year-olds after 3 months or 200 hours of work accumulated across all employers following the 16th birthday. A lower minimum wage existed for this age group (80% of this figure or $9.60) if they were otherwise classified as 'New Entrants'.

Figure 1
Adult and Teenage Minimum Wages in Constant Dollars
September 1990 to September 2008



Notes: No minimum wage existed for teenagers prior to March 1994. See the notes at the bottom of Table 1 for an explanation for the different minimum wages that face 16 and 17 year-olds beginning in April 2008. All legislated hourly minimum wage rates in this figure were adjusted to constant dollars using the Consumer Price Index with a base period of June 2006.

Figure 2
Adult and Teenage Minimum Wages Relative to Average Hourly Earnings
September 1990 to September 2008



Notes: No minimum wage for teenagers prior to March 1994. See the notes at the bottom of Table 1 for an explanation for the different minimum wages that face 16 and 17 year-olds beginning in April 2008. All legislated hourly minimum wage rates in this figure were divided by Average Ordinary-Time Hourly Earnings taken from the Quarterly Employment Survey.

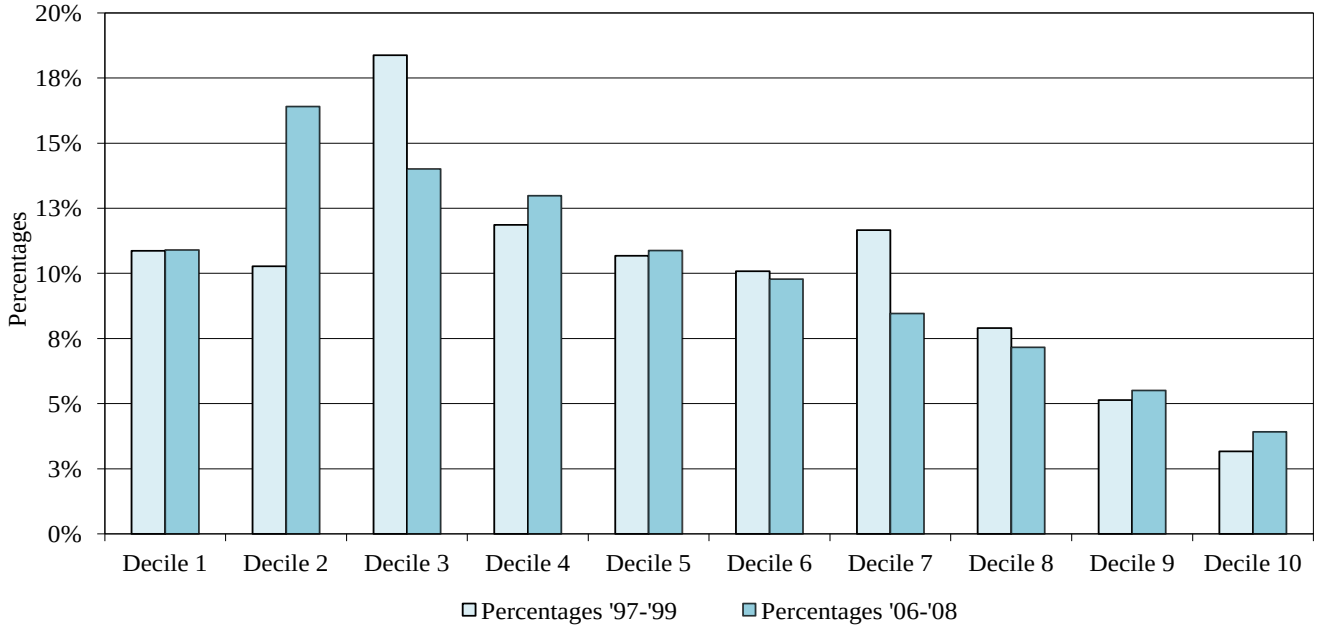
Table 2
Minimum Wage Incidence across Demographic Groups
June 1997 to June 2008

	Estimated Percentages of Minimum Wage Workers:												
Year	All	Teens: Aged 16 to 19	Adults: Aged 20+	Females	Males	Without Education Quals	With Education Quals	Maori or Pacific Islander	Other Ethnicities	Part Time	Full Time	Retail, Accommodation, Cafes or Restaurants	Other Industries
97	2.73	2.71	2.73	3.14	2.31	4.61	2.14	4.92	2.32	4.87	2.14	4.27	2.39
98	1.05	2.04	0.97	1.27	0.82	1.31	0.97	0.57	1.14	1.86	0.79	1.86	0.86
99	1.12	2.57	1.01	1.18	1.05	1.86	0.89	1.55	1.04	2.30	0.75	1.79	0.98
00	1.79	3.46	1.66	2.09	1.47	2.59	1.55	2.56	1.62	3.85	1.14	3.14	1.49
01	3.07	21.00	1.74	3.60	2.53	3.77	2.87	3.59	2.97	7.09	1.89	7.78	2.05
02	3.39	22.63	1.99	3.71	3.06	3.70	3.30	4.45	3.15	8.11	2.00	8.57	2.23
03	3.64	24.45	2.11	4.52	2.74	5.20	3.23	5.17	3.30	9.43	1.94	9.82	2.18
04	4.27	25.85	2.73	5.63	2.88	6.39	3.59	5.48	4.01	11.05	2.36	11.29	2.72
05	4.26	27.23	2.67	5.69	2.80	6.07	3.73	5.32	4.03	11.62	2.32	12.09	2.59
06	8.02	30.30	6.43	10.00	5.99	12.12	6.75	10.87	7.37	20.86	4.79	18.88	5.78
07	10.02	38.83	8.01	12.83	7.06	16.21	7.87	15.92	8.72	24.78	6.10	23.78	7.00
08	12.05	61.57	8.46	14.71	9.27	17.15	10.17	18.08	11.24	28.78	7.60	31.68	7.83
97-08	4.80	22.66	3.49	5.93	3.62	7.27	4.03	6.59	4.43	11.28	2.94	11.67	3.29
n	143,166	9,739	133,427	72,831	70,335	33,787	109,379	24,277	118,889	31,808	111,358	25,766	117,400

Notes: Data in this table were taken from the 1997 to 2008 June HLFS Income Supplements. Minimum wage workers are defined as individuals who receive usual, regular-time hourly earnings within a band between 50 cents below the previous minimum wage (in effect until either February or March of that year) and 50 cents above the current minimum wage (in effect since March or April of that year). To be comparable over time, these band limits are computed in constant June 2008 dollars. All observations on workers reporting hourly earnings below this minimum wage band are excluded from this table. This decision eliminated less than 1.9% of all possible observations on workers over this sample period. Full-time workers are defined as usually working 30 or more hours per week; part-time workers less than 30 hours per week.

Figure 3

Dispersion of Minimum Wage Workers across Equivalised Household Income Deciles
1997 to 1999 and 2006 to 2008



Notes: Data in this table were taken from the 1997 to 2008 June HLFS Income Supplements. Household income was equivalised by dividing the annual dollar amount by the square root of the number of individuals living within the household. The distribution of all minimum wage workers across these equivalised household income deciles are recorded and averaged over the three-year periods (1997 to 1999 and 2006 to 2008). See the notes at the bottom of Table 2 for the definition of minimum wage workers used in this study.

Table 3

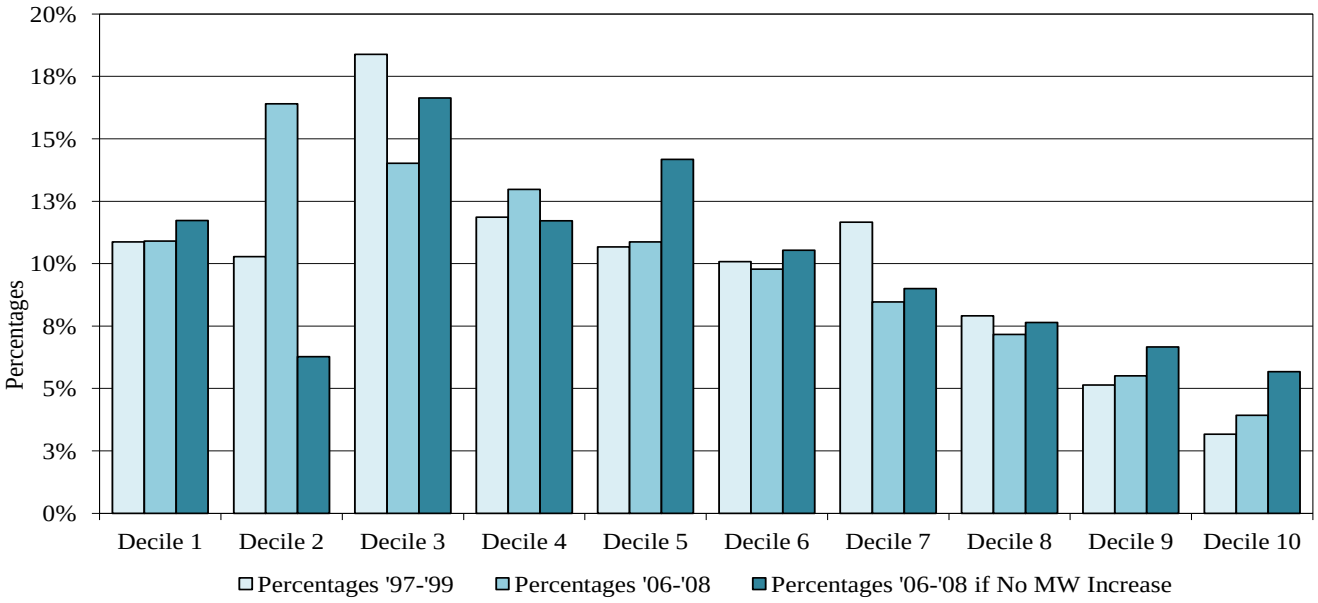
Multinomial Logit Regression Results on the Location of Minimum Wage Workers in Equivalised Household Income Deciles
June 1997 to June 2008

	Estimated Partial Derivatives on Probability of Being in Decile:									
Regressors	1	2	3	4	5	6	7	8	9	10
Constant	0.005 (0.148)	-0.944*** (0.166)	0.289 (0.188)	-0.065 (0.189)	0.340* (0.179)	0.061 (0.154)	0.017 (0.133)	0.036 (0.111)	0.102 (0.092)	0.167** (0.072)
Age 16 or 17	0.037 (0.161)	0.562*** (0.180)	-0.180 (0.203)	0.129 (0.194)	-0.301* (0.178)	0.051 (0.150)	-0.010 (0.128)	-0.014 (0.107)	-0.148* (0.088)	-0.126* (0.069)
Age 18 or 19	0.189 (0.228)	0.022 (0.349)	-0.117 (0.288)	0.002 (0.285)	-0.051 (0.243)	0.106 (0.202)	-0.036 (0.175)	0.010 (0.139)	-0.008 (0.108)	-0.117 (0.081)
Age 20 to 29	0.017 (0.010)	-0.006 (0.012)	-0.009 (0.013)	-0.002 (0.013)	-0.007 (0.013)	-0.023** (0.012)	0.025** (0.010)	0.008 (0.008)	0.004 (0.007)	-0.006 (0.006)
Age 50+	0.025** (0.012)	0.034*** (0.013)	-0.005 (0.016)	-0.040** (0.016)	-0.012 (0.015)	-0.006 (0.013)	0.023** (0.011)	-0.002 (0.010)	-0.012 (0.008)	-0.005 (0.006)
Female	-0.031*** (0.008)	-0.034*** (0.009)	-0.010 (0.010)	-0.005 (0.010)	0.032*** (0.010)	0.021*** (0.008)	0.020*** (0.007)	0.010* (0.005)	-0.002 (0.004)	-0.001 (0.003)
Maori or Pacific Islander	-0.006 (0.009)	-0.026** (0.010)	0.039*** (0.011)	0.008 (0.012)	0.008 (0.011)	0.005 (0.010)	0.005 (0.008)	0.003 (0.007)	-0.017*** (0.006)	-0.019*** (0.005)
New Zealand Born	-0.036*** (0.009)	0.007 (0.010)	0.002 (0.012)	-0.002 (0.011)	-0.011 (0.011)	0.009 (0.009)	0.008 (0.008)	0.016** (0.006)	0.001 (0.005)	0.006 (0.004)
School or Post-School Qualification	0.019** (0.009)	-0.013 (0.009)	-0.033*** (0.011)	0.004 (0.011)	0.003 (0.010)	-0.002 (0.009)	0.005 (0.007)	0.002 (0.006)	0.009* (0.005)	0.006 (0.004)
University Degree	0.041** (0.017)	0.004 (0.020)	-0.030 (0.025)	-0.025 (0.025)	-0.018 (0.023)	-0.029 (0.021)	0.003 (0.017)	0.021* (0.012)	0.016 (0.010)	0.019** (0.008)
Dependent Child in Household	0.035*** (0.003)	0.040*** (0.004)	0.035*** (0.004)	0.013** (0.004)	-0.014*** (0.004)	-0.028*** (0.004)	-0.020*** (0.004)	-0.028*** (0.003)	-0.021*** (0.003)	-0.014*** (0.002)
No Other Adult in Household	0.206*** (0.011)	0.257*** (0.012)	0.199*** (0.014)	-0.008 (0.017)	-0.042** (0.016)	-0.149*** (0.018)	-0.164*** (0.019)	-0.134*** (0.016)	-0.096*** (0.013)	-0.069*** (0.011)

Local Unemployment Rate	0.003 (0.003)	0.007* (0.004)	-0.002 (0.004)	0.000 (0.004)	-0.003 (0.004)	0.003 (0.003)	0.003 (0.003)	-0.004* (0.002)	-0.003 (0.002)	-0.004** (0.002)
Age 16 or 17 ● Log of Real Minimum Wage	**-0.085 (0.054)**	**0.097 (0.060)**	**-0.079 (0.068)**	**-0.022 (0.061)**	**0.021 (0.053)**	**-0.014 (0.044)**	**0.017 (0.036)**	**0.025 (0.028)**	**0.044* (0.023)**	**-0.003 (0.017)**
Age 18 or 19 ● Log of Real Minimum Wage	**-0.111 (0.087)**	**0.349** (0.140)**	**-0.066 (0.110)**	**0.040 (0.109)**	**-0.104 (0.089)**	**-0.063 (0.073)**	**0.009 (0.064)**	**-0.009 (0.049)**	**-0.032 (0.037)**	**-0.013 (0.026)**
Age 20+ ● Log of Real Minimum Wage	**-0.014 (0.057)**	**0.382*** (0.064)**	**-0.099 (0.073)**	**0.050 (0.074)**	**-0.129* (0.070)**	**-0.022 (0.060)**	**-0.026 (0.052)**	**-0.021 (0.044)**	**-0.046 (0.036)**	**-0.074** (0.029)**
N	6,868									
Log Likelihood Function	-14,224.9									
Pseudo R^2	0.0772									

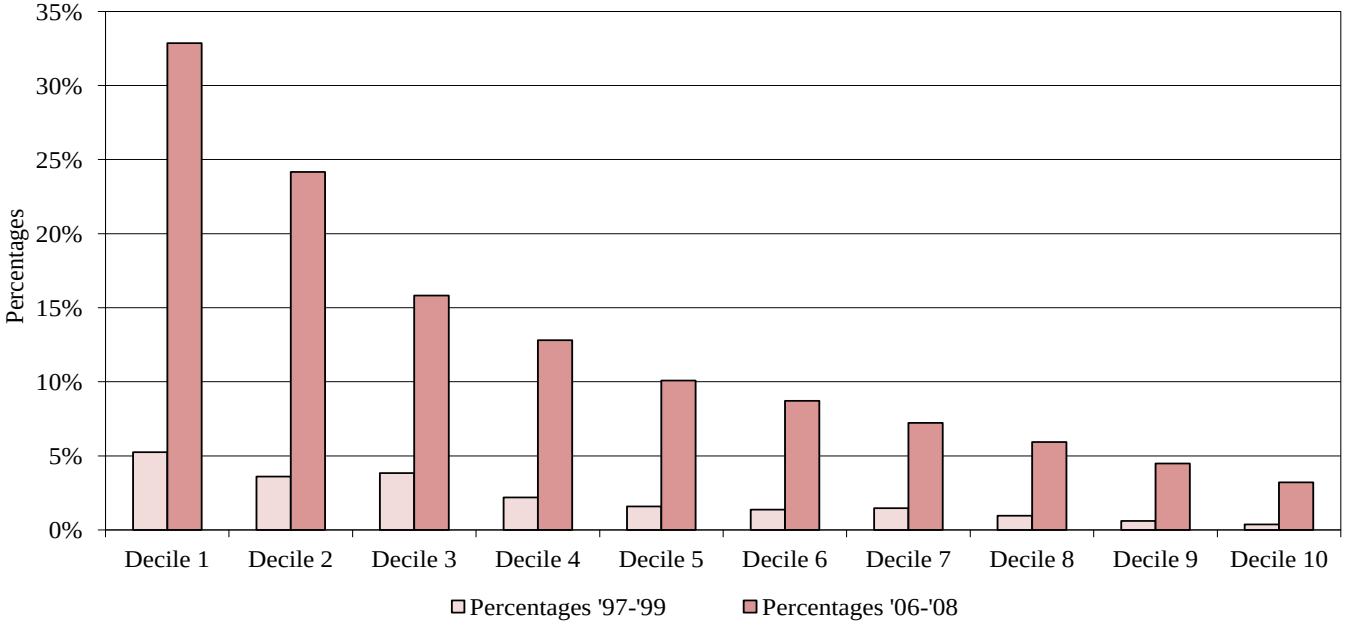
Notes: Data in this table were taken from the 1997 to 2008 June HLFS Income Supplements. See the notes at the bottom of Table 2 for the definition of minimum wage workers used in this study. The dependent variable equals one if a minimum wage worker is observed in a given equivalised household income decile; zero otherwise.

Figure 4
Dispersion of Minimum Wage Workers across Equivalised Household Income Deciles
1997 to 1999 and 2006 to 2008



Notes: Data in this table were taken from the 1997 to 2008 June HLFS Income Supplements. See the notes at the bottom of Table 2 for the definition of minimum wage workers, and the notes at the bottom of Figure 3 for the definition of equivalised household income used in this study. The percentages of minimum wage workers in each income decile in the latter period were estimated based on our multinomial regression results reported in Table 3assuming that there had been no increases in real minimum wages over our sample period. These percentages were predicted by multiplying the estimated partial derivatives on the log of the minimum wages in each income decile by the average changes between periods in the log minimum wages for the three age groups in this income decile. The resulting figures were then subtracted from the observed average percentage of minimum wage workers in this decile between 2006 and 2008.

Figure 5
Incidence of Minimum Wage Work in Equivalised Household Income Deciles
1997 to 1999 and 2006 to 2008



Notes: Data in this table were taken from the 1997 to 2008 June HLFS Income Supplements. See the notes at the bottom of Table 2 for the definition of minimum wage workers, and the notes at the bottom of Figure 3 for the definition of equivalised household income used in this study. The percentages of all workers receiving hourly earnings in our minimum wage band are recorded across these equivalised household income deciles and averaged over the three-year periods (1997 to 1999 and 2006 to 2008).

Table 4

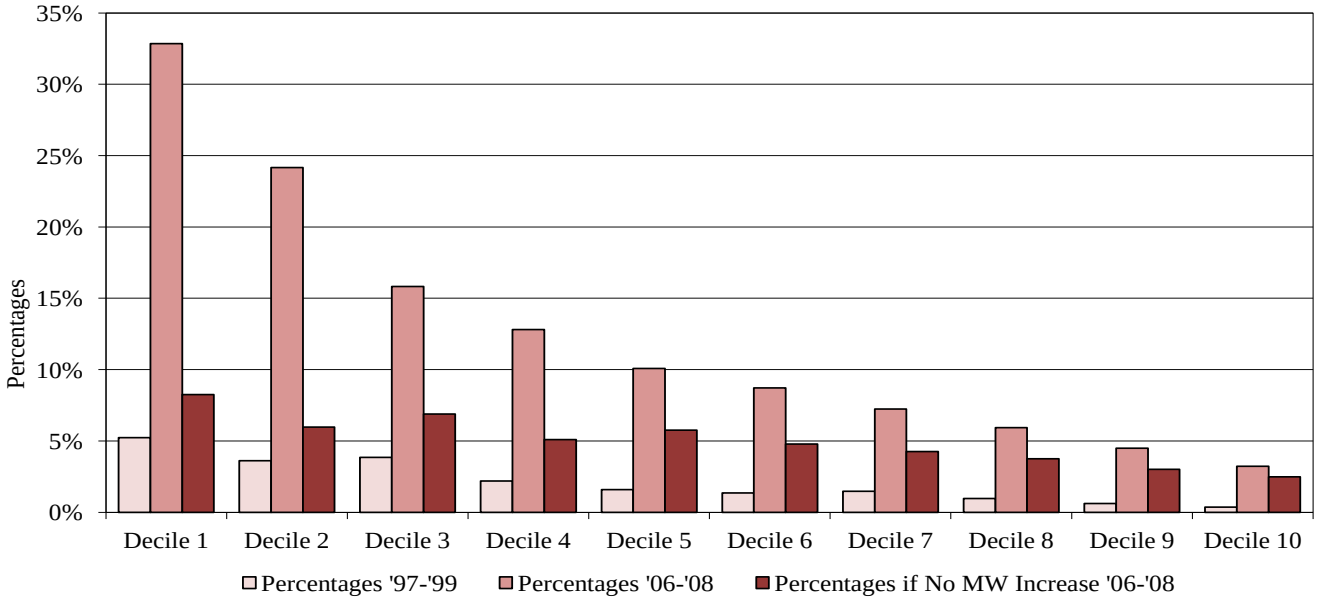
Probit Regression Results on Probability of Being a Minimum Wage Worker by Equivalised Household Income Decile
June 1997 to June 2008

	Estimated Partial Derivatives on Incidence of Minimum Wage Work in Decile:									
Regressors	1	2	3	4	5	6	7	8	9	10
Constant	-2.406***	-1.794***	-0.928***	-0.780***	-0.460***	-0.426***	-0.335***	-0.249***	-0.168***	-0.089***
	(0.163)	(0.118)	(0.078)	(0.057)	(0.043)	(0.039)	(0.032)	(0.028)	(0.023)	(0.018)
Age 16 or 17	0.937***	0.865***	0.598**	0.870***	0.314	0.693**	0.586*	0.322	0.030	0.015
	(0.009)	(0.129)	(0.293)	(0.143)	(0.306)	(0.273)	(0.322)	(0.336)	(0.085)	(0.058)
Age 18 or 19	0.925***	0.906***	0.638*	0.116	0.273	0.482	0.414	0.406	0.192	0.029
	(0.016)	(0.072)	(0.327)	(0.298)	(0.347)	(0.363)	(0.385)	(0.407)	(0.325)	(0.091)
Age 20 to 29	0.061***	0.056***	0.051***	0.044***	0.029***	0.022***	0.031***	0.019***	0.015***	0.009***
	(0.014)	(0.011)	(0.008)	(0.006)	(0.005)	(0.004)	(0.004)	(0.003)	(0.003)	(0.002)
Age 50+	-0.013	0.004	-0.009	-0.010**	0.001	0.001	0.009***	0.003	-0.000	0.001
	(0.013)	(0.010)	(0.006)	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.001)
Female	-0.007	0.026***	0.041***	0.030***	0.026***	0.021***	0.015***	0.010***	0.006***	0.003***
	(0.010)	(0.007)	(0.004)	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Maori or Pacific Islander	0.036***	0.005	0.027***	0.009**	0.002	0.002	0.003	0.003	-0.001	-0.000
	(0.012)	(0.008)	(0.006)	(0.004)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)
New Zealand Born	-0.017	-0.004	-0.008	-0.008**	-0.009***	-0.004	-0.004*	0.000	-0.002	-0.000
	(0.010)	(0.008)	(0.005)	(0.004)	(0.003)	(0.003)	(0.002)	(0.002)	(0.001)	(0.001)
School or Post-School Qualification	-0.021**	-0.043***	-0.037***	-0.020***	-0.010***	-0.016***	-0.010***	-0.010***	-0.007***	-0.007***
	(0.010)	(0.008)	(0.005)	(0.004)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)
University Degree	-0.054***	-0.054***	-0.042***	-0.031***	-0.020***	-0.020***	-0.014***	-0.010***	-0.010***	-0.010***
	(0.013)	(0.008)	(0.005)	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Dependent Child in Household	-0.012***	-0.015***	-0.010***	-0.008***	-0.006***	-0.006***	-0.001	-0.001	0.001	0.001**
	(0.004)	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
No Other Adult in Household	-0.002	0.025***	-0.013***	-0.034***	-0.025***	-0.023***	-0.018***	-0.011***	-0.008***	-0.004***
	(0.010)	(0.008)	(0.005)	(0.003)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)

Local Unemployment Rate	0.009** (0.004)	0.003 (0.003)	-0.001 (0.002)	0.001 (0.001)	-0.000 (0.001)	0.001 (0.001)	0.001* (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)
Age 16 or 17 ● Log of Real Minimum Wage	**0.621*** (0.078)**	**0.609*** (0.068)**	**0.315*** (0.039)**	**0.234*** (0.028)**	**0.170*** (0.020)**	**0.135*** (0.017)**	**0.106*** (0.013)**	**0.087*** (0.012)**	**0.067*** (0.010)**	**0.036*** (0.007)**
Age 18 or 19 ● Log of Real Minimum Wage	**0.644*** (0.090)**	**0.513*** (0.084)**	**0.279*** (0.043)**	**0.297*** (0.043)**	**0.150*** (0.022)**	**0.129*** (0.017)**	**0.100*** (0.015)**	**0.073*** (0.012)**	**0.052*** (0.010)**	**0.032*** (0.007)**
Age 20+ ● Log of Real Minimum Wage	**0.934*** (0.065)**	**0.676*** (0.048)**	**0.327*** (0.030)**	**0.276*** (0.022)**	**0.155*** (0.016)**	**0.143*** (0.015)**	**0.108*** (0.012)**	**0.079*** (0.010)**	**0.052*** (0.008)**	**0.025*** (0.007)**
N	5,583	7,518	11,989	13,852	15,487	16,574	17,373	17,990	18,391	18,409
Log Likelihood Function	-1,986.1	-2,353.2	-2,969.5	-2,679.2	-2,282.3	-2,274.5	-2,625.6	-2,295.1	-1,350.6	-1,034.1
Pseudo R^2	0.140	0.165	0.147	0.190	0.220	0.224	0.239	0.266	0.275	0.316

Notes: Data in this table were taken from the 1997 to 2008 June HLFS Income Supplements. See the notes at the bottom of Table 2 for the definition of minimum wage workers used in this study. In each of the equivalised household income deciles, the dependent variable equals one if an individual is a minimum wage worker; zero otherwise.

Figure 6
Incidence of Minimum Wage Workers in Equivalised Household Income Deciles
1997 to 1999 and 2006 to 2008



Notes: Data in this table were taken from the 1997 to 2008 June HLFS Income Supplements. See the notes at the bottom of Table 2 for the definition of minimum wage workers, and the notes at the bottom of Figure 3 for the definition of equivalised household income used in this study. The estimated percentages of workers who would have received a constant real minimum wage in the latter period were based on our probit regression results reported in Table 4. These percentages were predicted by multiplying the estimated partial derivatives on the log of the minimum wages in each income decile by the average changes between periods in the log minimum wages for the three age groups in this income decile. The resulting figures were then subtracted from the observed average percentages between 2006 and 2008.

Table 5
Antipoverty Simulations for the Earnings Increases Associated with a 10% Rise in the Minimum Wage

	All Households	Households with a Worker	Households with a Minimum Wage Worker
Initial Poverty Rate	22.02%	10.50%	26.69%
Estimated Poverty Rate if:			
• 10% added to usual earnings from minimum wage jobs	21.94%	10.38%	24.20%
• 10% added to usual earnings from minimum wage jobs, offset by 3% reduction in usual weekly hours of work	21.97%	10.43%	25.17%
N	200,361	143,166	6,868

Notes: Data used in this table were taken from the 1997 to 2008 June HLFS Income Supplements. Poverty is defined as having equivalised household income below 50% of median equivalised household income in a year.