

# **The Efficacy of the Minimum Wage as an Antipoverty Tool**

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# The Efficacy of the Minimum Wage as an Antipoverty Tool

Tim Maloney and Gail Pacheco \*

## 1. Introduction

This study takes advantage of substantial and varied changes to NZ's minimum wages since 2000 to better understand their potential importance for reducing poverty in this country. 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. Section 2 of this paper begins with a discussion of both the recent changes to statutory minimum wages in New Zealand (NZ), 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 over alternative definitions of minimum wage work and analyzes our empirical findings on the incidence of minimum wage in NZ between 1997 and 2008. Section 4 examines descriptive statistics and regression results on the relationship between effective minimum wages and the dispersion of minimum workers across the income distribution. Section 5 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. Finally, Section 6 draws some conclusions from this study.

## 2. Recent History of the Minimum Wage in NZ

Table 1 shows the legislated changes to nominal minimum wages in NZ between September 1990 and April 2008. In September 1990, teenagers were exempt from the minimum wage. Adults aged 20 and over faced a minimum wage of \$6.125. A centralised wage-setting system was in place, and was characterised by compulsory unionism and national awards with blanket coverage provisions. Over the subsequent nine years, 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. Yet, during the 1990s, the adult minimum wage was allowed to erode slightly relative to both inflation and the general wage level. Consequently, the National Government extended minimum wage protection to teenagers, but allowed this basic wage floor to erode at least slightly in real terms and relative to the average wage.

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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, and re-established the primacy of trade unions in collective contract negotiations. 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. Annual increases in the minimum wage began in 2000 (see Table 1). Over the nine-year period between September 1999 and September 2008, the adult real minimum wage increased by 32.9%. The Labour Government also implemented even larger changes in the minimum wages faced by teenagers. From March 2001, they extended the adult rate to all workers aged 18 and over. This resulted in the real minimum wage for 18-19 year olds increasing by 122.8% between September 1999 and 2008.

The minimum wage for 16 and 17 year-olds was gradually raised to parity with the adult rate. Initially, it 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 since their 16<sup>th</sup> birthday or complete their training programmes.

**Table 1**  
**Changes to Legislated Minimum Wages in NZ**  
**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

Note: 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 their 16<sup>th</sup> 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’.

The recent history of minimum wage policy in NZ 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. In comparison, 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.

### ***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. The HLFS is a quarterly survey of the resident population in NZ and averages around 16,000 households nationwide per quarter. The IS, which solicits detailed information on sources and amounts of income received by members of each household, has been added to the June HLFS since 1997. This annual data source provides the most consistent, nationally-representative information on earnings, as well as personal and household characteristics in NZ. The period from 1997 to 2008 covers three years prior to the recent changes in the minimum wage, along with the remaining years over which these changes have been 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, and increases the possibility of measurement error due to the misreporting of either earnings or hours of work.

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, and 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.

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). 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. 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.

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. Once we acknowledge that measurement error can occur in computing hourly earnings, there would seem to be little justification for it to be one-sided. 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. 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 NZ 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 used to gauge the robustness of our findings.

Table 2 displays our findings on minimum wage incidence over the 12 years between 1997 and 2008. On average, slightly less than one out of every twenty workers (4.8%) is defined as a minimum wage worker using our 50-cent band<sup>1</sup>. However, across the period from 1997 to 2008, this minimum wage incidence ranged from as little as just over 1% in 1998 to just over 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%.<sup>2</sup>

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<sup>1</sup> 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 earnings or working positive hours, the self-employed and those with reporting to usually work more than 60 hours per week.

<sup>2</sup> 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%).

**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
<i>n</i>	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

Source: 1997 to 2008 June HLFS Income Supplements.

Note: 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 and 50 cents above the current minimum wage. Band limits are computed in constant 2008 dollars. Full-time workers are defined as usually working 30 or more hours per week; part-time workers less than 30 hours per week.

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%). 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.

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 in minimum wages facing all teenagers by June 2008 meant that more than 60% of teenage workers could be classified as minimum wage workers by the end of our sample period.<sup>3</sup>

The increase in minimum wage incidence among adults was less dramatic, but still substantial. 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.

The remaining columns in Table 2 show how minimum wage incidence changed across the sample period for specific demographic groups.<sup>4</sup> 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 both unqualified workers and Maori or Pacific Island workers.

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

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<sup>3</sup> 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.

<sup>4</sup> 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 slightly 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.

Several industries are more likely to create minimum wage jobs.<sup>5</sup> The final two columns of Table 2 show minimum wage incidence in the combined industries of retail, accommodation and 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%) in these industries compared to all others (0.98%). In 2008, minimum wage incidence had increased nearly 18-fold (31.68%) in the aggregate retail, accommodation, and cafe and restaurant industry, but less than eight-fold (7.83%) in all other industries.

#### ***4. The Income Dispersion of Minimum Wage Workers***

We now turn to the effectiveness of minimum wages as an antipoverty tool. We begin by 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.<sup>6</sup> 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. 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 are used to compare the periods immediately preceding and following recent changes to minimum wages in NZ. 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.

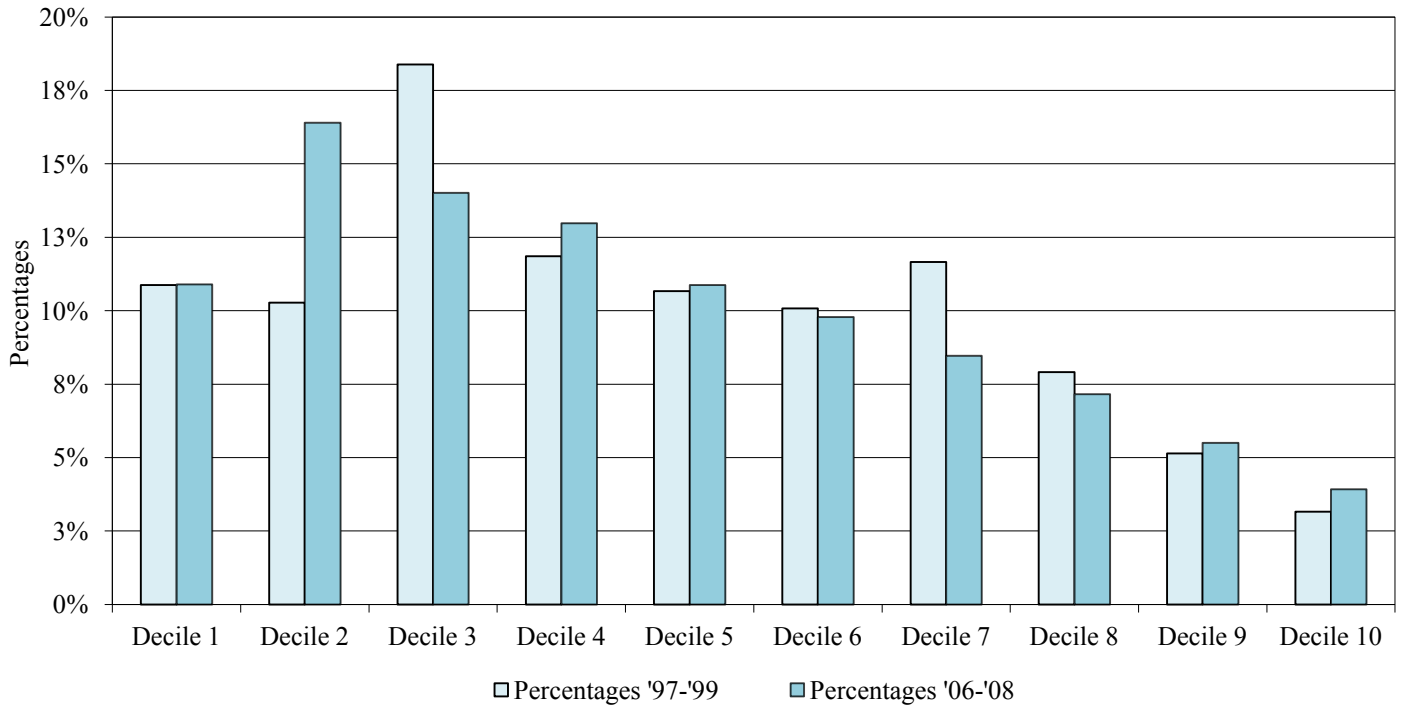
Figure 3 displays the histograms on the distribution of minimum wage workers across equivalised household income deciles for the 1997-1999 and 2006-2008 periods. The lighter bars display the income dispersion of minimum wage workers in the earlier period. Somewhat surprisingly, minimum wage workers were 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 1997-1999 period. Only decile three contained more than 12% of minimum wage workers during this earlier period (18.4%). However, it would be fair to conclude that minimum wage workers were relatively more likely to be located in lower income deciles. For example, 39.5% of minimum wage workers were located in the bottom three deciles in 1997-1999. Only 16.2% of minimum wage workers were located in households in the top three income deciles during this same period. Another way to state this result is that minimum wage workers were 2.44-times more likely during

<sup>5</sup> The industries containing a disproportionate number of minimum wages during the early years of these minimum wage increases was first reported by Pacheco (2007).

<sup>6</sup> It is not possible to identify particular families that might exist within a household in the HLFS.

this three-year period to live in households with the lowest 30% of equivalised income compared to households with the highest 30% of equivalised income.

**Figure 3**  
Dispersion of Minimum Wage Workers across Equivalised Household Income Deciles  
1997 to 1999 and 2006 to 2008



Source: 1997 to 2008 June HLFS Income Supplements.

Note: The distribution of all minimum wage workers across these equivalised household income deciles are averaged over two three-year periods (1997 to 1999 and 2006 to 2008).

Our findings suggest that minimum wage workers in NZ are more 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 NZ 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. 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.<sup>7</sup>

<sup>7</sup> It should be noted that Card and Krueger used income measures for the family, where we use income defined for the household.

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 this period looks fairly similar to the pattern in the earlier period. There was a notable increase in the percentages of minimum wage workers in decile two, and declines 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%). 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 that 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, such as changes household composition, and a booming economy. 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.

Consider a multinomial logit regression model, where the probability that a minimum wage worker will be located in one of the ten equalised 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. We therefore estimate 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 equalised 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.

**Table 3: Multinomial Logit Regression Results on the Location of Minimum Wage Workers in Household Income Deciles: 1997 - 2008**

Regressors	Estimated Partial Derivatives on Probability of Being in Decile:									
	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)
NZ 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)
<b>Age 16 or 17 • Log of Real Minimum Wage</b>	<b>-0.085 (0.054)</b>	<b>0.097 (0.060)</b>	<b>-0.079 (0.068)</b>	<b>-0.022 (0.061)</b>	<b>0.021 (0.053)</b>	<b>-0.014 (0.044)</b>	<b>0.017 (0.036)</b>	<b>0.025 (0.028)</b>	<b>0.044* (0.023)</b>	<b>-0.003 (0.017)</b>
<b>Age 18 or 19 • Log of Real Minimum Wage</b>	<b>-0.111 (0.087)</b>	<b>0.349** (0.140)</b>	<b>-0.066 (0.110)</b>	<b>0.040 (0.109)</b>	<b>-0.104 (0.089)</b>	<b>-0.063 (0.073)</b>	<b>0.009 (0.064)</b>	<b>-0.009 (0.049)</b>	<b>-0.032 (0.037)</b>	<b>-0.013 (0.026)</b>
<b>Age 20+ • Log of Real Minimum Wage</b>	<b>-0.014 (0.057)</b>	<b>0.382*** (0.064)</b>	<b>-0.099 (0.073)</b>	<b>0.050 (0.074)</b>	<b>-0.129* (0.070)</b>	<b>-0.022 (0.060)</b>	<b>-0.026 (0.052)</b>	<b>-0.021 (0.044)</b>	<b>-0.046 (0.036)</b>	<b>-0.074** (0.029)</b>

N = 6,868 Pseudo R<sup>2</sup> = 0.0772

Source: 1997 to 2008 June HLFS Income Supplements.

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. This finding is sensible as having a dependent child in the household directly deflates equivalised income 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. Consequently, having no other adult in the household appears to significantly increase the probability that a minimum wage worker will be located in a lower income decile.

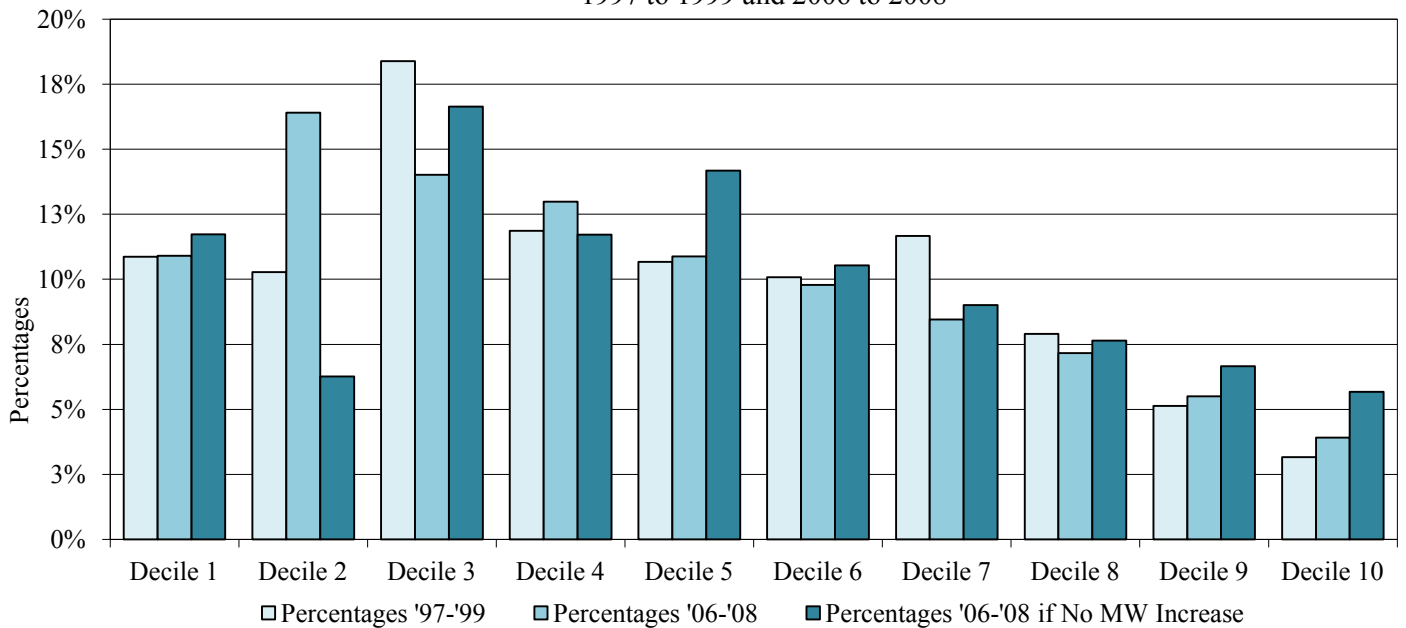
Regional unemployment rates have minimal impacts on the income dispersion of minimum wage workers. A positive and significant effect is estimated on the probability of being in decile two, and negative and significant effects are estimated on being located in the eighth and tenth deciles. These results suggest that an increase in the unemployment rate would slightly increase the ‘target efficiency’ of the minimum wage.

Finally, real minimum wages are found to have relatively weak statistical relationships with the income dispersion of minimum wage workers across the three age groups. Increases in the real minimum wage for 16-17 year olds 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.

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 and relative to the middle and top income decile.

Finally, we can summarise these regression results in Table 3 by returning to the earlier 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. The darkest 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. 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.

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



Source: 1997 to 2008 June HLFS Income Supplements.

Note: The percentages of minimum wage workers in each income decile in the latter period 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.

Not surprisingly, given the results reported in Table 3, the biggest adjustment to the income dispersion of minimum wage workers occurred in the second income decile. Most of the substantial increase in the proportion of minimum wage workers observed in this decile between periods (10.3% to 16.4%) can be attributed directly to the legislated increases in real minimum wages. If real minimum wages had not increased over this period, we estimate that the 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. Firstly, 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. 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. Without these legislated increases, there would have been far fewer minimum wage workers in decile two.

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. We estimate that if real minimum wages had not increased, this odds ratio would have fallen to 1.73 by 2006-2008. Recall that with the actual increases in the minimum wage, this odds ratio increased slightly to 2.49. 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 Minimum Wage and Poverty Simulations*

Section 4 showed how large recent rises in minimum wages in NZ may have altered the characteristics of minimum wage workers, including their location in the overall distribution of household income. No estimates have produced thus far 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 under a couple of 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 given 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.

Table 4 displays the results from our policy simulations. We begin with 200,361 household observations and an initial poverty rate of 22.02%. 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%).

**Table 4: Antipoverty Simulations (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%
<i>N</i>	200,361	143,166	6,868

Source: 1997 to 2008 June HLFS Income Supplements.

Note: Poverty is defined as having equivalised household income below 50% of median equivalised household income in a year.

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 this best-case-scenario, the estimated poverty rate would decline from 22.02% to 21.94%. Therefore, 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.

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 4 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 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 4 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. 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.



## 6. *Conclusions*

After experiencing few changes to effective minimum wages during the 1990s, NZ after 2000 substantially raised the adult minimum wage and eliminated the gap between the teenage and adult minimum wages. 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 every ten adult workers and one out of every two teenage workers. This recent episode in NZ's history 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, and 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 clear change during 1997-2008 period in the overall dispersion of minimum wage workers across the income distribution. 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.

Finally, policy simulations using 1997-2008 data on the earnings and income of NZ households suggest that a 10% increase 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 facts 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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