Youth Minimum Wage Reform and the Labour Market

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Abstract

This paper analyses the effects of a large reform in the minimum wages affecting youth workers in New Zealand since 2001. Prior to this reform, a youth minimum wage, applying to 16-19 year-olds, was set at 60% of the adult minimum. The reform had two components. First, it lowered the eligible age for the adult minimum wage from 20 to 18 years, and resulted in a 69 percent increase in the minimum wage for 18 and 19 year-olds. Second, the reform raised the youth minimum wage in two annual steps from 60% to 80% of the adult minimum, and resulted in a 41 percent increase in the minimum wage for 16 and 17 year-olds over a two-year period. We use data from the New Zealand Household Labour Force Survey (HLFS) to estimate the impact of these changes on a variety of labour market and related outcomes. We compare the average outcomes of these two groups of teenagers, before and after the policy reform, to those of 20-25 year-olds, who were unaffected by the reform. We find no robust evidence of adverse effects on youth employment or hours worked. In fact, we find stronger evidence of positive employment responses to the changes for both groups of teenagers, and that 16-17 year-olds increased their hours worked by 10-15 percent following the minimum wage changes. Given the absence of any adverse employment effects, we find significant increases in labour earnings and total income of teenagers relative to young adults. However, we do find some evidence of a decline in educational enrolment, and an increase in unemployment and inactivity, although these results depend on the specification adopted.

JEL CLASSIFICATION

J38 – Public Policy

J22 – Time Allocation and Labour Supply

J23 – Employment Determination; Job Creation; Demand for Labour; Self Employment

J24 – Human Capital; Occupational Choice; Labour Productivity

KEYWORDS

Minimum wage, New Zealand, natural experiment, difference-in-differences

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Youth Minimum Wage Reform and the Labour Market

1 Introduction

Until recently, it had been widely believed by economists that the imposition of a binding wage floor, e.g. minimum wage, would reduce the employment of younger and less-skilled workers. Both simple theoretical models of competitive labour markets and time-series evidence on the relationship between minimum wages and youth employment supported this consensus (Brown, Gilroy and Kohen 1982). However, recent empirical research relying on quasi-experimental evaluations of cross-sectional and longitudinal data, in particular Card (1992) and Card and Krueger (1994), has failed to find negative employment effects for young or low-wage workers in the United States. The inherent complications with quasi-experimental evaluations have led some researchers to question the results in these papers (Burkhauser, Couch and Wittenburg 2000; Neumark and Wascher 2000).[1] Still, it seems safe to say that the consensus has been broken and that the empirical evidence indicates, in certain situations, an increase in the minimum wage may not reduce employment.

In this paper, we analyse the effects of a large reform in the minimum wages affecting teenage workers that occurred in New Zealand since 2001. Prior to this change there was an adult minimum wage that applied to workers over the age of 20, and a youth minimum wage, set at 60% of the adult minimum, that applied to 16-19 year-old workers. The 2001 reform involved two components: first, it lowered the eligibility age for the adult minimum wage to 18, resulting in a 69 percent increase in the minimum wage for 18 and 19 year-olds; and second, the youth minimum wage was raised in two annual steps to 80% of the adult minimum, resulting in a 41 percent increase in the minimum wage for 16 and 17 year-olds over this two year period.[2]

These large and focused changes provide an ideal opportunity for studying the effects of minimum wage policy on the youth labour market. Using data from the New Zealand Household Labour Force Survey (HLFS) for the period 1997—2003, we examine changes in the labour market experiences of the two groups of teenagers that are directly affected by the reform and compare these to the changes experienced by young adults, aged between 20 and 25. We focus primarily on the impact of the policy reform on employment and hours

[1] See Card and Krueger (2000) for a reply to Neumark and Wascher's comment on their prior paper.

[2] To emphasize the magnitude of these changes, note that the *large* minimum wage increases analysed by Card (1992) and by Card and Krueger (1994) were 27 percent and 19 percent increases, respectively.

worked by teenage workers, but also examine its impact on a variety of related outcomes: namely educational status, unemployment, inactivity (defined as neither employed nor studying), benefit receipt, labour earnings, and total income.

Our analysis in section IV begins by describing the changes in the wage distributions for both groups of teenage and young adult workers following the minimum wage reforms. This shows there have been significant shifts in the lower tails of the wage distributions for both 16-17 year-olds and 18-19 year-olds since 2001, but little change in the distribution for 20-25 year-olds. However, we also document a significant increase in minimum wage non-compliance for teenage workers since the reforms.

Next we present simple difference-in-differences estimates that compare the average employment and hours worked for both 16-17 and 18-19 year-olds relative to those of 20-25 year-olds before and after the policy reform. We then extend this approach to examine the impact on employment and the other outcomes of interest using regression analysis to control for observable characteristics of the various age groups that may differ. Contrary to standard economic model predictions, these analyses provide no robust evidence of adverse effects of the minimum wage changes on youth employment or hours worked. In fact, we find stronger evidence of positive employment responses to the changes for both groups of teenagers, and that 16-17 year-olds increased their hours worked by 10-15 percent following the minimum wage changes. However, we do find some evidence of a decline in educational enrolment, and an increase in unemployment and inactivity, although these results depend on the specification adopted. Not surprisingly, given the absence of any adverse employment or hours worked effects, we find significant increases in labour earnings and total income of teenagers relative to young adults.

2 Background

2.1 New Zealand's Minimum Wage Legislation

A statutory minimum wage was codified into law in New Zealand in 1983 by the passage of the Minimum Wage Act 1983. This act set a binding wage floor for all workers 20 years or older with the only exemptions being for workers who undertake a set level of training and for disabled workers who are employed in approved sheltered workshops.3 This legislation decreed that the minimum wage rate must be reviewed each year by December 31st. Any changes in the minimum are then typically implemented in the following March. In the 1980s, legal floors were also set on market wages in all industries covered by union collective bargaining awards and these were typically set higher than the minimum wage. This system was abolished in 1991 under the Employment Contracts Act, and the national minimum wage became the only legal wage floor. In March 1994, a youth minimum wage, set at 60% of the adult minimum, was introduced for 16-19 year-olds.

A general election was held in November 1999, following which a coalition government was formed between the Labour Party and the Alliance. The Alliance had campaigned to improve the labour market outcomes of youth workers, and viewed an increase in the youth

[3] If an employee is provided with board and lodging, a deduction of 15 percent for board and 5 percent for lodging can be made against the wage.

minimum wage as critical for such an improvement. An intention to review the youth minimum wage was announced after the 1999 annual review of the minimum wage. In March 2000, a preliminary decision was made to lower the eligibility age for the adult minimum wage from 20 to 18, and to increase the youth minimum wage from 60% to 80% of the adult minimum, with both changes to take effect in July 2000. The intent and details of these proposed changes were announced in a speech by government ministers on 4 April, and concerned individuals were given 10 days to comment on the proposal. These changes were subsequently postponed until the next minimum wage review was implemented in March 2001, and the increase in the youth minimum was introduced in two annual steps from 60% to 70% of the adult minimum in the first, and 70% to 80% in the second. This decision was formally announced on 14 December 2000.

Table 1 summarises the changes to the statutory minimum wages that have occurred since 1990. The adult rate was held constant from 1990 through to 1995, increased 2 percent in 1995 and 1996, followed by a large (10 percent) increase in 1997, was then held constant for 3 years, and has been increased each year since 2000 (by 8, 2, 4 and 6 percent, respectively). The youth minimum rate tracked the adult minimum from its introduction in 1994 until 2001. Lowering the age eligibility for the adult minimum from 20 to 18 in March 2001 had the effect of increasing the minimum wage for 18 and 19 year-olds by 69 percent. Coupled with the 4 and 6 percent increases in the adult minimum wage in March 2002 and 2003, the minimum wage for this group rose by 87 percent between 2000 and 2003, compared to the 13 percent increase in the adult minimum wage. Together with the adult minimum wage changes, the increases in the youth minimum wage from 60% to 70% of the adult minimum in March 2001, and further to 80% in March 2002, each had the effect of increasing the minimum wage for 16 and 17 year-olds by 19 percent and, together with the 6 percent increase in 2003, by 49 percent between 2000 and 2003.

Figure 1 describes the trends in the real minimum wages (in June 1999 dollar values) that applied to 16-17 and 18-19 year-olds, and to adult (20 years and over) workers over the period of our analysis, 1997—2003. Although the statutory minimum wage remained constant at $7 from March 1997 until March 2000, relatively low or negative inflation caused little erosion in the real value of the minimum wages. The 8 percent increase in 2000 provided a combined catch-up and real increase in the minimum wages over those prevailing in the late 1990s. The large changes observed in figure 1 correspond to the shift of 18-19 year-olds from the youth to adult minimum wages in March 2001, and the two-step increase in the youth minimum for 16-17 year-olds from 60% to 70% of the adult minimum in March 2001, and to 80% in March 2002.

2.2 Related Minimum Wage Research

Limited prior research has examined the relationship between minimum wages and labour market outcomes in New Zealand. Maloney (1995), Chapple (1997), and Pacheco and Maloney (1999) each examine the time-series evidence on the relationship between minimum wage changes during the 1980s and early 1990s and employment outcomes for youth and low-skilled workers. Although there is some evidence that these prior minimum wage increases had negative employment effects, the findings, in general, are not robust to different model specifications. Summing up this research, Chapple (1997, p. 47) concludes that “overall consideration of the employment impact of minimum wage rates suggests that

conclusions regarding significant negative employment effects from real minimum wage increases are strikingly non-robust."

Interestingly, Portugal undertook a similar reform of the youth minimum wage in 1987.[4] Pereira (2002) and Portugal and Cardoso (2002) examine the impact of these reforms on youth labour market outcomes using firm level data. Pereira (2002) estimates negative and statistically significant effects of the increase in minimum wages on the employment of 18-19 year-olds, with an implied elasticity in the range –0.2 to –0.4. She also found evidence of a positive spillover effect on the employment of 20-25 year-olds from this reform. In contrast, Portugal and Cardoso (2002) estimate a significant positive impact of the minimum wage change on the employment of the affected teenage groups.[5] Portugal and Cardoso decompose the effect of these changes into "separation" and "accession" effects, and conclude that although there is a reduction in accessions to firms, this impact is outweighed by a reduction in worker separations from firms.

Elsewhere, Abowd, Kramarz, Lemieux and Margolis (2000) examine the impact of minimum wages on youth employment in both France and the US using household survey data. By comparing youth workers whose wages lie between the current and next year's minimum wage, with those workers whose wages are marginally above this level, they find that subsequent employment probabilities of the former group are lower and conclude, for both countries, that real minimum wage changes are typically associated with significant employment effects in line with competitive labour market theory. Currie and Fallick (1996) use data from the US National Longitudinal Survey of Youth to examine the relationship between changes in the minimum wage and youth employment, and find that youth workers who are affected by a minimum wage increase are about 3% less likely to be employed in the following year. Neumark and Wascher (1995) examine spillover effects of minimum wages on teenage school enrolments using state level data, and find negative effects on enrolments and positive (i.e. increasing) effects on inactivity rates.

3 Data Description

The data we use in the analyses in this paper comes from the New Zealand Household Labour Force Survey (HLFS). In this section we begin with a brief discussion of the HLFS, and describe the characteristics of our analysis samples.

3.1 The Household Labour Force Survey

The HLFS is an ongoing quarterly survey which began in 1985, and is designed to produce a comprehensive range of statistics relating to the employed, the unemployed and those not

[4] Prior to 1987, the minimum wage applicable to 18 and 19 year-old workers was set at 75% of the minimum wage applying to adults (aged 20+), and the minimum wage for 15-17 year-olds was set at 50%. In January 1987 the minimum wage for 18-19 year-olds was raised to that of the adult minimum, generating a 49.3 percent increase in the nominal minimum wage for these workers, and the minimum wage for 17 year-olds was raised to 75% of the adult minimum. In 1988, the minimum wage for 15-16 year-olds was raised to 75% of the adult minimum.

[5] These differences may be due to firm-selection and weighting issues. In particular, Pereira uses a "balanced" sample of firms that existed before and after the reforms, while Portugal and Cardoso used an "unbalanced" sample that includes firms that may exist either before and/or after the reforms. Furthermore, Portugal and Cardoso's results are weighted by firm employment size, whereas Pereira's results are unweighted.

in the labour force who comprise New Zealand's working-age population. The current target population for the survey is the civilian non-institutionalised usually resident New Zealand population aged 15 and over. The HLFS sample frame uses an eight-quarter rotating panel, with one-eighth of households rotating out each quarter, consisting of a representative sample of approximately 15,000 households and 30,000 individuals who have a statutory obligation to respond to the survey.[6]

In the first quarter a household is in the frame, personal interviews are used to collect responses to both a household and an individual questionnaire for each working-age person in the household, while telephone interviews are used in the subsequent quarters. The HLFS collects information on labour-force status, hours worked, and educational status,7 together with basic demographic information, of individuals and households, but does not collect any wage or non-categorical income information. However, since 1997, the June quarter HLFS has included an extensive supplemental questionnaire known as the New Zealand Income Survey (HLFS-IS), which collects information on pre-tax income from wages and salaries, self-employment, government transfers, and other sources for the purpose of producing a comprehensive range of income statistics. The core HLFS survey is often conducted by proxy interview and missing responses in the Income Survey are imputed by Statistics New Zealand.

3.2 The Samples

We construct samples of 16-25 year-olds from both the core HLFS and HLFS-IS supplements. Our analysis of non-income related outcomes (employment, hours worked, studying, unemployment and inactivity) uses quarterly data from the core HLFS survey over the period from the first quarter of 1997 to the third quarter of 2003. Our analysis of income related outcomes (wages, receipt of non-student benefits, weekly earnings and weekly income) uses annual data from the 1997—2003 June quarter HLFS-IS supplements.[8] All our analyses include observations that have been attained by proxy interview and/or where any data has been imputed.[9] Although data from these observations are likely to contain significant measurement error, as can be seen in appendix table A1, they are clearly not randomly distributed in the population.[10] Preliminary analysis suggested that there is potentially large sample selection bias caused by omitting the large numbers of proxy and imputed responses. For this reason, in our regression analysis, we allow the relationship

[6] The sampling frame for the HLFS is updated every five years following the New Zealand Census. When this occurs, more complicated panel rotation rules are used to reduce the transition period to the new frame.

[7] The information collected in the HLFS does not allow us to accurately identify individuals who are studying if they have finished secondary school and are in the labour force. This makes it difficult to meaningfully compare study rates across groups with different participation rates.

[8] Fifteen year-olds are not covered by minimum wage legislation and thus we choose to exclude them from our current analysis. Although they may provide a suitable comparison group, the minimum schooling leaving age of 16 means that all employed 15 year-olds will be school pupils working part-time.

[9] HLFS proxy interviews are used for 50, 38, and 27% of 16-17, 18-19, and 20-25 year-olds respectively. The vast majority of these are conducted with one of the sample member's parents. We only have information on whether any Income Survey data for a particular observation has been imputed: data has been imputed for 11, 13, and 13% of 16-17, 18-19, and 20-25 year-olds, respectively. Also, in rare circumstances, proxy interviews are used for the income survey: this occurs for 4, 2, and 2% of 16-17, 18-19, and 20-25 year-olds respectively.

[10] Appendix tables A1 and A2 present summary statistics comparing the proxy and imputed data to non-proxy, non-imputed observations in the HLFS and HLFS-IS samples. One key finding is that teenagers who are employment are much more likely to have their data collected by a proxy interview.

between all covariates in the models and the outcome of interest to differ for both proxy and imputed observations.

Table 2 presents summary statistics for key demographic characteristics and all outcome variables for our analysis samples. The first two columns pertain to the sample of quarterly data from the HLFS, while the latter two columns pertain to the sample of annual data from the HLFS-IS. The first and third columns describe the characteristics of the full samples and the second and forth columns describe the characteristics of wage and salary workers in these sub-samples. The summary statistics and regression results are estimated using sampling weights created by Statistics New Zealand to increase the representativeness of the samples to take account of the sample frame and non-random survey response and individual attrition.

During 1997—2003, 58 percent of 16-25 year-olds, on average, are employed as wage or salary workers, 30 percent are studying, 8 percent are unemployed, 17 percent are inactive and 15 percent receive a non-student benefit.[11] The average real wage of the wage and salary workers is $11.07 and they work around 31 hours per week. Our quarter sample has 125,486 observations, and our annual sample 31,371, an average of 465 in each age-quarter cell and 523 in each age-year cell respectively.[12] With the exception of hours worked per week being 1.2 hours higher in the annual (June Quarter) sample than quarterly sample, the sample characteristics are almost identical in these two samples.

Our analysis of employment, hours worked, hourly wages, and weekly labour earnings focuses on wage and salary workers, as minimum wage laws do not apply to the self-employed.13 The second and fourth columns pertain to the wage or salary workers in our data. Compared to the full samples, these workers are, on average, older, more likely to be male, married, have European ethnicity (and less likely to be Maori, Pacific Islander or Asian), less likely to be studying or receiving benefit income, and have higher total incomes.

4 Analysis of the Impact of Youth Minimum Wage Changes

Although attention generally focuses on the employment impact of minimum wage changes, several other outcomes are of interest, particularly in the case of youth minimum wages. A sizeable change in the minimum wage for young workers, by making work relatively more attractive, may affect the labour-supply decisions of non-participants. For example, for youth still in school, it may affect their decision of when to leave school and enter the labour market. Our analysis of the impact of the youth minimum wage reforms focuses not only on employment outcomes, but also on a variety of related outcomes.

[11] Note that these states are not all mutually exclusive – e.g. students may also be working. Labour market inactivity is defined as neither working nor studying. Study rates are higher in the annual samples because we are able to use receipt of student benefits to further classify individuals as students.

[12] In our regression analysis, 255 observations are dropped from models of hours worked and 145 observations are dropped from models of labour earnings because of missing data or zero values on these outcomes. An additional 64, 31, 17, and 4 observations are dropped from all models with covariates using the full quarterly sample, the wage and salary quarterly sample, the full annual sample, and the wage and salary annual sample, respectively, because of missing marital status or country of birth. To handle non-positive incomes, we have censored weekly incomes at the 1st percentile of the positive all age income distribution.

[13] We often refer to wage and salary workers simply as 'workers' throughout the paper. When the distinction is not obvious, we will be explicit.

The approach adopted to analyse the impact of changes in the minimum wage for youth workers compares the average outcomes of the age groups affected by the changes, namely 16-17 year-olds and 18-19 year-olds, to those of young adults (aged 20-25) before and after the policy reform in March 2001. Two crucial identifying assumptions underlie this approach. First, it assumes that young adults are not affected by changes to the youth minimum wage. This requires that there are no spillover effects of the changes in the youth minimum wage on the outcomes of those workers not directly affected by the change. This assumption would not be satisfied if, for example, employers bound by the higher minimum wage on youth workers respond by employing more experienced and productive older workers in preference to youth workers. Such a response would lead to the direct effect of the minimum wage increase on youth employment being overstated: the measured impact would consist of the direct effect on youth workers plus the indirect effect on young adult workers. Alternatively, in order to maintain a relative wage difference, a minimum wage increase for youth workers may cause wages for young adult workers to increase, and result in negative employment spillovers for these workers.

The second assumption is that any secular trends in the labour market outcomes for 16-25 year-olds are common across these ages. This assumption requires, for instance, that there are no differential age-specific trends. For example, our estimates could be confounded if demand for teenagers depends more on overall economic conditions than demand for young adults. Underlying trends in outcomes that differ by age group would also violate this assumption.

We begin our analysis with a discussion of the wage distributions for 16-17, 18-19 and 20-25 year-old workers, before and after the policy reforms. To the extent the reforms were binding on low wages, we would expect to see a fall in the incidence of low wages and an increase in the density at or above the new minimum wages. This analysis describes how the youth minimum wage changes affected the teenage wage distributions, together with a sense of the size of the group of teenage workers affected by the minimum wage changes. In addition, if the only changes we observe are in the sub-minimum ranges for teenage workers, this would provide some confidence in our identification strategy:

Following the discussion of changes in the wage distributions, we describe the trends in the outcomes of interest for the three age groups over the sample period. However, it is difficult to capture the complex relationship between age, year, and minimum wage effects on labour market outcomes in a graphical manner alone. We next formalise the analysis to quantify the impact of the youth minimum wage policy changes on these outcomes. We begin with simple difference-in-differences estimates of the effects of the changes in youth minimum wages on teenage employment and hours worked, that compares teenage outcomes with young adult outcomes, before and after the reforms. In order to control for possible confounding factors, we then extend this approach using regression analyses of the effects of the changes in youth minimum wages on these, as well as the other outcomes (study, unemployment, inactivity and benefit-receipt rates, and earnings and incomes).

4.1 The Wage Distributions

To the extent that the minimum wage is binding on youth workers, we would expect to see a reduction in density below and an increase in density at or above, the (new) minimum wage in the wage distributions for 16-17 and 18-19 year-olds following the 2001 youth minimum

wage reforms. Figure 2 presents kernel density estimates of the distributions of log real actual hourly wages at each worker's main job, separately for 16-17, 18-19, and 20-25 year-olds for the four years before (1997-2000), and the three years after (2001-2003), the minimum wage changes.[14] The solid and dashed lines in each figure describe the pre- and post-reform wage distributions respectively, while the two vertical lines indicate the 2000 and the 2002 minimum wage rates pertaining to each age group.

The top-left graph presents the kernel densities for the 16-17 year-old workers. Comparing the pre- and post-reform distributions, there is a significant reduction in the density at the lower end of the wage distribution following the minimum wage reform, and a large increase in the mass at wages just above the 2002 minimum wage is also apparent. Although not apparent in this figure, the initial (2001) increase resulted in a fall in wages both in the range between the 2000 and 2001, and between the 2001 and 2002, minimum wages.[15] The second (2002) increase resulted in a further reduction in the mass around the 2001 minimum wage level.

The top-right graph in figure 2 presents the kernel densities for 18-19 year-olds. In comparison to the densities for 16-17 year-olds described above, there are two points to note. First, the affected group of 18-19 year-old workers is relatively smaller than that of 16-17 year-olds. That is, the fraction of the 18-19 year-olds pre-reform distribution below the 2002 minimum wage is less than the corresponding fraction for 16-17 year-olds. Second, the reduction in density in the affected range for 18-19 year-olds is also less than for 16-17 year-olds. Nonetheless, there does appear to be a small reduction in mass below the 2002 minimum wage in the post-reform distribution of 18-19 year-olds.[16]

The bottom graph in figure 2 presents the kernel densities for 20-25 year-olds' wages before and after the 2001 reforms. These graphs suggest that the wage distribution for 20-25 year-olds was quite stable over the period around the youth minimum wage reforms, which is reassuring for our analysis, although it seems there was a small drop in mass in the left tail of the distribution. This provides some confidence that the changes in the lower-end of the wage distribution for 16-17 and 18-19 year-olds were driven by the youth minimum wage reform, and that 20-25 year-olds' wages were largely unaffected. This reform appears to have shifted the lower-end of the wage distribution to the right for both 16-17 and 18-19 year-olds relative to older adults. Also, the shift in the wage distribution is larger for 16-17 year-olds than for 18-19 year-olds,[17] partly because the minimum wage reform was less binding on 18-19 year-olds' wages.

[14] If there is a delay either in employers' complying with higher minimum wages and/or in their employment responses, the wage distributions may differ across the post-reform years. In addition, for 16-17 year olds, there were two significant changes in the minimum wages. Although there is some evidence of such effects, both for reasons of parsimony and age-group sample size, we prefer to combine the observations in the three post-reform years. Figure 3 presents summaries of relevant aspects of the annual wage distributions. Each kernel density is evaluated at the same 250 evaluation points, using an Epanechnikov adaptive kernel with an average half width of 0.0175 units, and each observation is weighted by the product of its sampling weight and the number of hours worked on the main job (see Van Kern, 2003, for details of adaptive kernel density estimation). The scale on each graph has been converted to real units but is a log-scale.

[15] Note that, although employers knew in 2001 that the youth minimum was to rise from 70% to 80% in 2002 of the adult minimum, they didn't know what the 2002 adult minimum would be.

[16] A more noticeable change is the large increase in density just above the 2002 minimum wage, which is due partly to the fall in density below the minimum.

[17] For example, the post-reform average wage for 16-17 year-olds is 7 percent higher than the pre-reform average, while the increase for 18-19 year-olds is only 4 percent.

We next summarise relevant aspects of the year-specific wage distributions for the three age groups of workers over the sample period. Figure 3 describes the annual trends in the hours-weighted fractions of workers reporting wages below the current minimum wage, exactly equal to the current minimum, below the next year's minimum, and the average wages. In each graph, we use dashed, solid and dotted lines to represent the 16-17, 18-19 and 20-25 year-olds' respectively, and mark the 2001, 2002, and 2003 minimum wage change dates with vertical lines.

First, the top-left graph shows the fraction of wage or salary workers whose current main-job wage is below the current minimum wage. Assuming that no workers are excluded from the minimum wage coverage, and that there is accurate reporting of wages, this statistic measures the degree of non-compliance with the statutory minimum wage.[18] The fraction of workers in each age group reporting sub-minimum wages lay between 1 and 8 percent in the pre-reform years, was typically highest for 16-17 year-olds and lowest for 18-19 year-olds, and tended to decline over this period.[19] Following the minimum wage reform, the fractions of teenage workers paid below the minimum wage increased substantially, while the fraction of young adults was largely unaffected. In particular, the fraction of 18-19 year-olds affected increased from 1 percent in 2000 to 12 percent in 2001 and 2002, and 13 percent in 2003; while the fraction of 16-17 year-olds increased from 3 percent in 2000 to 6 percent in 2001, 9 percent in 2002, and 8 percent in 2003. Assuming that both the incidence of exemptions and the structure of measurement error in reported wages was reasonably stable over this period, these increases imply a significant increase in non-compliance with the statutory minimum wage.[20]

Second, the top-right graph in figure 3 shows the fraction of workers who are paid exactly the minimum wage in each year. This provides another measure of the extent to which the minimum wage binds. Prior to the youth minimum wage reform, a small (less than 1 percent) and declining fraction of workers in each age group reported earning exactly the minimum wage, further suggesting that these minimum wages were essentially non-binding. After the reform, in 2001, 1 percent of 16-17 year-old workers and 2 percent of 18-19 year-old workers reported exactly the minimum wage, and these fractions increased to 6 and 7 percent, and 2 and 4 percent, respectively in 2002 and 2003.[21]

Third, the bottom-left graph in figure 3 shows the fraction of workers whose current wage is below the next year's (nominal) minimum wage. This provides a measure of the degree to

[18] Recall that the legislation allows worker disability and training exemptions from the minimum wage, as well as a room and board allowance to be deducted from wages by their employer. In addition, individuals may report their wage in one of three ways: (1) their gross pay in their last paycheck together with the hours worked in that pay period; (2) their hourly wage which is hours weighted if they worked at more than one wage in the last week; or (3) their salary and their hours worked in the last week. Although we expect minimum wage exemptions to have relatively little effect on the incidence of workers paid sub-minimum wages, measurement error in reported wages, either directly or through reported earnings or hours, is likely to be common and may generate a significant number of sub-minimum wage observations.

[19] Given the nominal minimum wage was constant between 1997 and 1999, the declining trends are not too surprising. However, there is no apparent effect of the 10 percent increase in minimum wages in 2000 of the fractions paid below minimum.

[20] Such non-compliance may include employers who were unaware of the change, those who responded slowly (e.g., some June quarter interviews would occur fairly soon after the change came into effect in March), as well as those who willingly refused to comply.

[21] We suspect that part of the large fraction of 18-19 year-olds reporting the minimum wage in 2002 is due to the minimum wage being exactly $8.00, rather than a binding minimum wage effect per se. That is, there is a strong tendency for reported (and probably actual) wages to be at round nominal values.

which current workers may be affected by next year's minimum wage.[22] Not surprisingly, given the constant nominal minimum wage and low inflation between 1997 and 1999, the fraction of workers paid below next year's minimum wage is only marginally different from the fraction paid below the current minimum. However, there is a noticeable difference between the comparable fractions below the current and next-year minimum wages for 16-17 and 18-19 year-olds following the youth minimum wage changes. In 2000, 2001 and 2002 18, 16 and 25 percent of 18-19 year-old workers reported wages below the next year's minimum, compared to the 12, 12 and 13 percent of workers reporting sub-minimum wages in 2001, 2002 and 2003. Ignoring measurement error issues, and in the absence of possible employment effects, this implies the compliance rate for the affected 18-19 year-olds of 25-50 percent. Similarly, that 12, 15 and 21 percent of 16-17 year-old workers report wages in 2000, 2001 and 2002 below the following year's minimum, compared to the 6, 9 and 8 percent of workers who are report sub-minimum wages in 2001, 2002 and 2003, suggests a compliance rate for affected 16-17 year-olds of 40-60 percent. Although not part of our subsequent analysis, we have also presented the fractions of 2003 workers with wages below the 2004 minimum wage: these are 22, 23 and 7 percent of 16-17, 18-19, and 20-25 year-olds respectively.

Fourth, the bottom-right graph in figure 3 shows the average real wage at each worker's main job in each age-group and year. After falling between 1997 and 1999, the average real wages of 16-17 year-olds workers increased steadily from $7.60 in 2000 to $8.40 per hour in 2003. In contrast, and somewhat surprisingly given the shift in the wage distribution, the average real wages for 18-19 year-olds actually fell between 2000 and 2002 from $9.38 to $9.11 per hour,[23] before increasing dramatically to $10.24 per hour in 2003. As expected the average real wage of 20-25 year-old workers was reasonably flat over the 1997-2003 period at around $12.50 per hour, and showed no increase between 2000 and 2003.

4.2 Outcome Trends over the Period

We now turn our attention to describing the trends over the sample period in a variety of outcomes of interest to this analysis for the three age groups used above.[24] The two main outcomes that we focus on are being employed which captures the extensive margin of labour market adjustment, and the number of hours worked conditional on being employed which captures the intensive margin. Figure 4 graphs the quarterly trends in the fractions of each age group that is employed as a wage or salary worker, and the average actual weekly hours worked by wage or salary workers from the first quarter 1997 until the third quarter 2003.[25] Simple models for the impact of the minimum wage changes predict a change in outcomes for teenage workers would occur after the first quarter 2001.

The employment and hours-worked graphs in figure 4 display the importance of both age effects (young adults are more likely to work, and also to work more hours, than teenagers),

[22] This measure is obviously subject to the same exemption and measurement error conditions discussed above. In addition, it also ignores any secular changes to the wage distribution that may affect this statistic although, as discussed above for the 20-25 year-olds, there is little to suggest that this factor is important over the period.

[23] This is partly due to the apparent constancy of nominal wages at round numbers above the minimum wage, which tended to erode in real terms.

[24] Each outcome is measured for the seven days prior to the HLFS interview.

[25] Results for all quarterly outcomes are seasonally adjusted by regressing quarterly indicator variables on the 27 quarters of data for each age-group and subtracting the average quarterly variation from the mean. This allows seasonal patterns to differ for each age-group.

and business cycle (and other) effects over time. Employment levels declined from 1997 until 1999 (2000 for 17-18 year-olds), before increasing over the later part of the period. The minimum wage changes that occurred after 2001 do not appear to have had a substantial effect on employment rates of teenage workers relative to young adults, although the trends for the different groups do vary somewhat. The employment rates of 18-19 year-olds picked up later than 16-17 and 20-25 year-olds, and continued to increase from 2001, while the employment of these other groups stabilized or fell a little. A similar story is observed for hours worked. Average hours worked for both 18-19 and 20-25 year-olds remained fairly stable over the sample period, while the hours for 16-17 year-olds were fairly constant or weakly increasing over the sample period, until a noticeable increase in 2002. These two graphs suggest that, except perhaps hours worked by 16-17 year-olds in 2002, there is little to suggest that employment or hours worked by teenage workers was affected by the minimum wage increases.

In figure 5 we present the quarterly patterns for other outcomes that may be affected by the youth minimum wage changes: namely study, unemployment, and inactivity (neither working nor studying) rates. Over the sample period, study rates fell slightly for 16-17 year-olds, and were reasonably stable or slightly increasing for 18-19 and 20-25 year-olds. Unemployment and inactivity rates tended to fall for 18-19 and 20-25 year-olds but were relatively stable for 16-17 year-olds. However, as with the employment and hours worked in figure 4, there is little, if any, systematically apparent change in the trends around 2001 for teenagers relative to young adults to suggest an impact of the minimum wage changes.

Figure 6 graphs the annual trends in the fraction receiving non-student benefits, the average actual weekly earnings for wage and salary workers, and the average actual weekly income for all individuals in each age group over the same sample period, derived from the June quarter HLFS-IS. The trends in the fractions receiving benefits suggest there may have been an increase for teenagers compared to young adults after 2001, although the age-group trends differ somewhat. Changes in average weekly earnings conditional on employment reflect the combination of changes in hours worked and changes in wage rates over time. This outcome allows us to evaluate the effect of the minimum wage reform on the average wage and salary worker. On the other hand, as changes in average weekly income also factor in the possible displacement effects that an increase in the minimum wage may have (i.e. some workers lose their jobs and receive either lower or zero income), it provides a better overall measure of the welfare effects of the minimum wage reform. Both of these graphs show similar patterns. The average earnings and incomes of 20-25 year-olds were roughly constant over the sample period, while 18-19 year-olds' earnings increased until 2001 before falling in 2002, and their incomes increased slightly. Both the average earnings and incomes of 16-17 year-olds show a distinct increase after 2000 that is consistent with, and suggestive of, the increase in minimum wages of this group in 2001 and 2002.

The descriptive evidence presented here is suggestive of, at best, weak effects of the large increases in the minimum wages for young workers. We next formalise the analysis to control for these and other factors, and quantify the impact of the youth minimum wage policy changes on these outcomes. We begin with a very simple difference-in-differences framework and then control for various factors in a sequential manner in order to help understand their impact on the estimated minimum wage effects.

4.3 Difference-in-Differences Estimates of Employment and Hours Worked

Table 3 summarises the levels and changes in the employment rates and hours worked conditional on employment before and after the 2001 youth minimum wage policy changes for 16-17, 18-19, and 20-25 year-olds. We present the data by age group in columns (1) – (3), and the differences between the 16-17 and the 20-25 year-olds' outcomes, and between the 18-19 and the 20-25 year-olds' outcomes, in columns (4) and (5) respectively. Panel A pertains to the employment rate, while panel B pertains to hours worked. Within each panel, rows 1 and 2 show the average outcomes in the period before (1997q1-2001q1) and after (2001q2-2003q3) the policy change respectively, and row 3 presents the change in these outcomes. The numbers in bold at the bottom right of each panel are the simple difference-in-differences estimates of the impact of the minimum wage changes on the respective outcomes.

Panel A shows that the fractions of 16-17, 18-19 and 20-25 year-olds employed as wage or salary workers increased by 1.2, 0.6 and 0.5 percentage points, respectively, after the policy reform. Comparing the changes for 16-17 and 18-19 year-olds to that of 20-25 year-olds gives the simple difference-in-differences estimates of the effect of the minimum wage increases was to increase employment for 16-17 year-olds by 0.7 percentage points, and for 18-19 year-olds by 0.1 percentage points. However, neither of these estimates is statistically significantly different from zero.

Similarly, panel B shows that weekly hours worked increased by 1.31 hours for 16-17 year-olds, and decreased by 0.03 and 0.36 hours for 18-19 and 20-25 year-olds, respectively, after 2001. The resulting difference-in-differences estimates of the policy change are 1.67 hours for 16-17 year-olds, and 0.33 hours for 18-19 year-olds, respectively. The estimated increase for 16-17 year-olds is statistically significant and represents a large relative increase in hours worked (from a base of 17.4 hours per week, the 1.67 hours estimated increase represents a 10 percent increase).

4.4 Regression Analysis of Employment

We now extend the simple difference-in-differences analysis of the impact of the youth minimum wage changes using regression methods to control for other sources of variation that may confound the estimates of interest. In this subsection, we focus on the minimum wage impact on employment and present results from a variety of regressions, before considering the other outcomes in the next subsection. Ignoring individual and time subscripts, the basic regression specification we use is

$$Y = \delta_{16-17} * (age16\text{-}17 * Post\text{-}2001) + \delta_{18-19} * (age18\text{-}19 * Post\text{-}2001) + X'\beta + u \qquad (1)$$

where *Y* is the outcome of interest (Employment here), *age16-17* and *age18-19* are dummy variables for the respective teenage groups, *Post-2001* is a dummy variable for the post-reform period, *X* is a vector of variables to control for other factors influencing the outcome, and *u* is an error term to capture unobserved effects. All specifications include single-age dummy variables to capture systematic age differences in the outcomes assumed constant over time, and quarter-specific dummy variables to flexibly capture time-varying effects due to aggregate business cycle and other factors assumed constant across age groups As the

analysis essentially compares group averages of outcome variables to determine the effect of the policy reform, we present Huber-White robust standard errors that allow for arbitrary correlation in individual error terms within age-quarter cells. Our main focus of interest are the coefficients δ_{16-17} and δ_{18-19}, which represent the effects of the minimum wage reform on 16-17 and 18-19 year-olds controlling for other factors.

Table 4 contains the estimated minimum wage reform impacts on employment based on a variety of specifications. In the first column we present the difference-in-differences specification from table 3, except that it also includes the age- and quarter-specific dummy variables. The estimated impacts on teenage employment are 0.5 and 0.0 percent for 16-17 and 18-19 year-olds respectively, and as with the difference-in-differences estimates, are not statistically significantly different from zero. In column (2), we control for the demographic characteristics of the sample using dummy variables for gender, ethnicity, marital status, New Zealand born, urbanicity, and region of residence, and the relative size of the population of each age group (16-17, 18-19, 20-21, 22-25) in a particular year. The estimated employment effects in this specification are -0.6 and -1.0 percent for 16-17 and 18-19 year-olds but again are insignificantly different from zero.

As discussed above, if the policy reform has a direct effect on teenage workers it may also have an indirect effect on the outcomes of young adults. To examine this possibility, the specification in column (3) allows the policy change to have spillover effects on 20-21 year-olds, by including a dummy variable, *age20-21*Post-2001*, that is equal to 1 for 20-21 year-olds after 2001 and 0 otherwise.[26] To the extent that a spillover effect exists, the coefficients δ_{16-17} and δ_{18-19} will represent the <u>direct</u> effects of the minimum wage changes on teenagers, while the coefficient on this variable (δ_{20-21}) will represent the <u>indirect</u> effect on 20-21 year-olds. The results for this specification continue to find modest and statistically insignificant impacts on teenage employment.

In column (4) we repeat the previous specification but, in addition, include an indicator variable for whether a proxy interview was used and interact this with each of the control variables. This allows the outcomes of proxy and non-proxy respondents to differ across the dimensions of the control variables but assumes that these outcomes are not differentially affected by the minimum wage reforms. The estimated impacts from this specification are only marginally different from those in column (3).[27]

The specification in column (5) allows the policy impact to vary across the three post-reform years by including separate dummy variables for the periods following each of the 2001, 2002 and 2003 changes: *2001* equals 1 for the 4 quarters from second quarter 2001 to first quarter 2002 and 0 otherwise, *2002* equals 1 for the 4 quarters from second quarter 2002 to first quarter 2003 and 0 otherwise, and *2003* equals 1 in the second and third quarters of 2003 and 0 otherwise. This might be important for 16-17 year-olds, given the phasing in of the reforms for that group. In fact, F-tests for the null hypotheses of constant year-effects for each of the age groups rejects the hypothesis for 16-17 (p-value=0.02) and 20-25 year-olds (p-value<0.01), but accepts the hypothesis for 18-19 year-olds (p-value=0.23). The estimated employment effects for 16-17 year-olds vary from a 2.2 percent increase in 2001

[26] The results are comparable using a single-year spillover for 20 year-olds.

[27] Although proxy controls in this specification have little impact on the estimated minimum wage effects, such controls have significant and important impacts in the subsequent specifications included in table 4. Proxy controls in this and all subsequent regressions are jointly significant at less than the 1% level.

(significant at the 10% level), to essentially zero in 2002, and a 2.5 percent decline in 2003. A similar pattern is found for 18-19 and 20-25 year-olds: for 18-19 year-olds the estimates range from a 0.7 percent increase in employment in 2001 to a 1.9 percent decline in 2003, although with no statistical significance; for 20-25 year-olds, the estimates range from a 4.2 percent increase in 2001 (significant at the 1% level), to a 1.9 percent decline in 2003. Although the 2001 estimate for 20-21 year-olds is quite strong suggesting significant positive spillover effects for this group, the absence of any strong direct effects on 18-19 year-olds does draw into question the robustness of this interpretation, as well our identification strategy more generally.

The results in column (5) suggest that, although the individual estimates are generally insignificant, the small overall effects estimated in the previous specifications disguise quite different point estimates and patterns across the three years. In column (6), we allow for age-specific seasonal variation in employment by interacting quarterly dummy variables with each age dummy variable. The results in this specification are qualitatively the same as those in column (5).[28]

The final specification presented in table 4 also includes age-specific linear time trends to control for possible secular trends in the outcomes. The motivation for this is provide by suggestion in some of the descriptive graphs in figures 4-6 of age-group specific trends in the outcomes. For example, the study rate of 16-17 year-olds appears to be trending upwards prior to 2001, while the study rate of 20-25 year-olds is possibly trending down. The results in column (7) imply that while controlling for such trends has a limited effect on the point estimates of the impact of the minimum wage changes for 16-17 and 20-21 year-olds, it has a large effect on the estimates for 18-19 year-olds. The minimum wage reform is estimated to have increased employment for 18-19 year-olds by 3-3.5 percent in each of the post-reform years, and the estimates for 2001 and 2002 are significant at the 5% level. The F-statistic for the joint hypothesis that the time trend coefficients are zero is significant at the 1% level.

4.5 Regression Analysis of Other Outcomes

We now turn to the impact of the youth minimum wage changes on the seven other outcomes of interest: hours worked conditional on employment, studying, unemployment, inactivity, receipt of benefit income, the logarithm of actual weekly earnings for wage or salary workers, and the logarithm of actual weekly income. Although the results in column (7) of table 4 provide statistical support for the inclusion of age-specific time trends, we are not confident that this is the correct specification. Both because of this and the sensitivity of the results for employment to this issue, in the analysis of the impact on other outcomes we present two sets of results that, respectively, exclude and include such trends. First, table 5 presents the results for employment from column (6) of table 4 in column (1), and the results from analogous specifications that exclude age-specific time trends for the other outcomes in columns (2)-(8).[29]

In column (2), the results for hours worked show that 16-17 year-olds increased their hours worked by a large and statistically significant 2.2 hours per week (or 10-15 percent) in 2002

[28] The seasonal control variables are jointly significant in this and all subsequent specifications at better than the 1% level.

[29] In particular, the specifications for the quarterly outcomes are the same as that in column (6) of table 4, while for the annual outcomes they include age-specific and annual dummy variables, covariates, 20-21 spillover and allow the three year effects.

and 2003, but there was little impact of the minimum wage changes for 18-19 or 20-21 year-olds. The results in column (3) show statistically significant falls in the fraction of 16-17 year-olds studying of about 3-4 percent in each year after the minimum wage increases. We also estimate, generally smaller, drops in study rates for the 18-19 year-olds of 1-2 percent: these estimates are statistically significant in 2001 and 2002. The results in column (4) imply the unemployment rate for 16-17 year-olds increased a statistically significant 2 percent in 2001 and was marginally and insignificantly higher in the latter years, while there's no systematic evidence of any effect on 18-19 year-olds' unemployment. Given the fluidity between unemployed and not-in-the-labour-force states for many youth, inactivity (defined as neither working nor studying) may provide a more reliable outcome measure than unemployment for these age groups. In column (5), we estimate there was a significant increase in the fraction of 16-17 year-olds who are inactive after 2001, around 2 percent in each of the three years. Again, there is no systematic evidence of effects on the inactivity of the two older age groups. The results in column (6) for the receipt of benefits show increased rates for 16-17 year-olds, which are significant in the latter two years. For 16-17 year-olds, the results for these four outcomes and employment collectively suggest that, following the increases in the minimum wage, there was a drop in study enrolment which was accompanied by increasing inactivity and benefit receipt with little change in employment, although there was a large increase in hours worked by those employed.

In columns (7) and (8) of table 5 we present the regression results for changes in log weekly earnings and log weekly income. Given that the minimum wage increases increased the average wages of teenage workers, and without adverse employment effects, it is not surprising that we find an increase in earnings for these groups. The earnings results for 16-17 year-olds show strong increases in earnings after 2001 from about 15 percent in 2001, to 22 and 29 percent in 2002 and 2003, while for 18-19 year-olds the increases were more modest due to the more muted average wage increase, rising to about 14 percent by 2003. As earnings are only available for those who are employed, we also examine the impact on individuals' total weekly income, which is available for the non-employed and arguably provides a better measure of the welfare effects of the minimum wage change. In comparison to the earnings results, the results in column (6) show smaller, although still significant for 16-17 year-olds, increases in teenagers' income of 7-16 percent for 16-17 year-olds and 0-8 percent for 18-19 year-olds.

In table 6 we report the results from specifications for each of the eight outcomes that include age-specific linear trends in addition to the earlier controls. The F-statistic for the joint hypothesis that the time trend coefficients are zero is significant at the 5% level or better for all outcomes except hours worked, suggesting secular trends in these outcomes is potentially important. Including these trends also has a dramatic effect on some of the estimated impacts. In particular, in addition to the stronger positive impacts on 18-19 and 20-21 year-olds' employment seen in table 4, the significant adverse impacts on 16-17 year-olds study and unemployment seen in table 5 no longer hold. Also, the estimated impacts on 16-17 year-olds' benefit receipt, earnings and income are larger and more significant than previously, and the positive impacts on 18-19 year-olds income disappear and become significantly negative in 2003.

5 Concluding Discussion

In this paper, we examined the impact of large increases in minimum wages for teenage workers that occurred in New Zealand in the early 2000s. We believe there are four important conclusions that can be drawn from the results of the various analyses presented here. First, given the size of the minimum wage increases and the rightward shifts in the wage distributions (especially for 16-17 year-olds), we find no consistent and robust evidence of any adverse effects of the changes on teenage employment. In fact, in contrast to simple competitive model predictions of the effect of minimum wage increases, the only statistically significant point estimates imply possible positive employment responses to the changes. The estimated 2.2-2.3 percent increase in 16-17 year-olds 2001 employment, reported in columns (4) and (5) of table 4, imply an employment elasticity with respect to the minimum wage change of about 0.25; while the estimated 3.0 and 3.6 percent increases in 18-19 year-olds 2001 and 2002 employment, reported in column (7), imply an elasticity of about 0.08. Furthermore, we find compelling evidence that 16-17 year-olds increased their hours worked by 10-15 percent following the minimum wage changes in 2002 and 2003, although the strength of the increase depends on the presence or absence of age-specific time trends.

Second, although the individual-year estimates are reasonably imprecise, the results for employment in columns (5)-(7) of table 4 imply the impacts vary over time, and the overall impacts in columns (1)-(4) tend to disguise this variation. In particular, the individual-year estimates are consistent with there being a positive impact on teenage employment following the changes in 2001, no impact in 2002, and a negative impact in 2003.

Third, the results are sensitive to the decision to include age-specific time trends in the regression. On the one hand, including time trends in the employment regression strengthens the positive employment response following the 2001 reforms for 18-19 year-olds. However, although we find evidence of adverse effects on teenage study, unemployment and inactivity rates in the absence of trends, these results are not robust to the inclusion of time trends. That these outcomes have, to our eyes, the most apparent trends (see figure 5) casts doubt on the robustness of the strong results of adverse impacts presented in table 5.

Finally, there is consistent evidence of strong increases in the earnings and income for 16-17 year-olds, although the magnitudes of the estimated increases depend on the presence or absence of time trends: our sense is that the magnitudes in the absence of time trends are more believable. There is also some, less compelling, evidence of increases for 18-19 year-olds.

One important caveat to the analysis is that there has been an increase in either real or apparent non-compliance: although the density in the affected regions of the wage distributions fell following the minimum wage reforms, there has been a significant increase in the fraction of teenage workers reporting sub-minimum wages.

What sort of models can rationalise these findings? Card and Krueger (1995) discuss the limitations of, and several simple extensions to, the standard neoclassical economic model of minimum wage effects that allow for a richer set of impacts, including the possibility that employment may rise following a minimum wage increase. The extensions allow for various market imperfections excluded from the standard model, such as search costs, incomplete

information, market power, and dynamic versus static responses. Dickens, Machin and Manning (1999) develop a general model in which labour market frictions provide employers with some monopsony power. Their model provides ambiguous predictions: depending on level of the minimum wage, it may have either conventional negative impacts on employment, or neutral or positive impacts. As the pre-reform youth minimum wages were comparatively low, we suspect that these types of extensions to the standard model provide the theoretical basis for understanding our findings. However, given the recent increases, whether such benign effects continue going forward remains a moot point.

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Table 1 – Summary of Minimum Wage Changes

Effective Date	Nominal Minimum Wage Affecting		
	Adults	**18-19 Year-olds**	**16-17 Year-olds**
17 September 1990	6.13	---	---
31 March 1994[(a)]	---	3.68	3.68
22 March 1995	6.25 (2.0)	3.75 (1.9)	3.75 (1.9)
18 March 1996	6.38 (2.0)	3.83 (1.9)	3.83 (1.9)
1 March 1997	7.00 (9.8)	4.20 (9.7)	4.20 (9.7)
6 March 2000	7.55 (7.9)	4.55 (8.3)	4.55 (8.3)
5 March 2001[(b)]	7.70 (2.0)	7.70 (69.2)	5.40 (18.7)
18 March 2002[(c)]	8.00 (3.9)	8.00 (3.9)	6.40 (18.5)
24 March 2003	8.50 (6.3)	8.50 (6.3)	6.80 (6.3)
1 April 2004	9.00 (5.9)	9.00 (5.9)	7.20 (5.9)
Increase (2000 — 2003)	12.6%	86.8%	49.5%

Notes: Percentage increase reported in parentheses.

(a) Youth minimum wage introduced for 16-19 year-olds at 60 percent of the adult rate.

(b) Adult minimum wage applied to 18-19 year-olds; minimum wage for 16-17 year-olds raised to 70 percent of the adult minimum wage. Announced 14 December 2000.

(c) Minimum wage for 16-17 year-olds raised to 80 percent of the adult minimum wage.

Table 2 – HLFS Sample Characteristics

	Quarterly Samples		Annual Samples	
	Full Sample	Workers	Full Sample	Workers
	(1)	(2)	(3)	(4)
Age	20.38	20.83	20.39	20.86
	(0.03)	(0.03)	(0.02)	(0.03)
Female	0.49	0.47	0.49	0.48
	(0.003)	(0.004)	(0.003)	(0.004)
Married	0.18	0.20	0.18	0.20
	(0.004)	(0.005)	(0.004)	(0.005)
New Zealand Born	0.84	0.88	0.83	0.88
	(0.005)	(0.004)	(0.006)	(0.005)
Pakeha	0.67	0.76	0.68	0.76
	(0.007)	(0.006)	(0.008)	(0.007)
Maori	0.15	0.12	0.15	0.12
	(0.004)	(0.003)	(0.005)	(0.004)
Pacific Islander	0.07	0.06	0.07	0.06
	(0.004)	(0.004)	(0.005)	(0.004)
Asian	0.06	0.03	0.06	0.03
	(0.003)	(0.002)	(0.004)	(0.003)
Wage or Salary Worker	0.58	1.00	0.58	1.00
	(0.004)		(0.005)	
Hours worked [(a)]	30.5	30.5	31.7	31.7
Last week	(0.2)	(0.2)	(0.3)	(0.3)
Studying	0.30	0.12	0.34	0.15
	(0.004)	(0.003)	(0.006)	(0.004)
Unemployed	0.08	0.00	0.08	0.00
	(0.002)		(0.002)	
Inactive	0.17	0.00	0.16	0.00
	(0.003)		(0.004)	
Received			0.15	0.006
Non-student benefits			(0.004)	(0.002)
Hourly Wage			11.07	11.07
			(0.06)	(0.06)
Labour earnings [(a)]			361.6	361.6
Last week			(3.0)	(3.0)
Total income			260.0	378.9
Last week			(2.7)	(2.9)
Total Observations	125,486	70,993	31,371	17,450
No. Proxies	43,485	25,151	694	236
No. Imputes			3,969	2,463

Notes: Estimated standard errors that control for Primary Sampling Unit (PSU) cluster in parentheses. All summary statistics are weighted by the HLFS sampling weights. Wages, earnings and incomes are in constant (June 1999) dollar values, adjusted using the CPI.

[(a)] Hours worked and labour earnings are conditional on working in wage or salary employment.

Table 3 – Difference-in-Differences' Estimates of Changes in Employment and Hours Worked

	Age group			Difference (from 20-25)	
	16-17	18-19	20-25	16-17	18-19
(A) Wage or Salary Employment					
1. Before	0.426	0.552	0.650	-0.223	-0.098
(1997q1-2001q1)	(0.007)	(0.008)	(0.006)	(0.009)	(0.008)
	[18,049)	[15,402]	[44,702]		
2. After	0.439	0.559	0.655	-0.216	-0.096
(2001q2-2003q3)	(0.009)	(0.011)	(0.008)	(0.011)	(0.010)
	[11,116]	[9,450]	[26,767]		
3. Difference	0.012	0.006	0.005	**0.007**	**0.001**
(After – Before)	(0.011)	(0.012)	(0.008)	**(0.012)**	**(0.012)**
(B) Actual Main Hours Worked Last Week (Conditional on Employment)					
1. Before	17.375	28.394	34.364	-16.989	-5.969
(1997q1-2001q1)	(0.334)	(0.343)	(0.207)	(0.383)	(0.339)
	[7,417]	[8,160]	[28,200]		
2. After	18.687	28.368	34.006	-15.318	-5.637
(2001q2-2003q3)	(0.380)	(0.388)	(0.268)	(0.406)	(0.396)
	[4,838]	[5,139]	[16,984]		
3. Difference	1.313	-0.026	-0.358	**1.671**	**0.332**
(After – Before)	(0.482)	(0.481)	(0.288)	**(0.510)**	**(0.505)**

Notes: Estimated standard errors in parentheses: number of observations in square brackets.

Table 4 – Regression Estimates of Changes in Employment

	Age & Quarter	Covariates	20-21 Spillover	Proxy Controls	Separate Year Effects	Age-specific Seasonals	Time Trends
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Age 16-17*	0.005	-0.006	-0.000	0.002			
Post-2001	(0.008)	(0.008)	(0.009)	(0.009)			
2001					0.022*	0.023*	0.016
					(0.011)	(0.012)	(0.016)
2002					0.001	0.001	-0.002
					(0.011)	(0.010)	(0.018)
2003					-0.025	-0.021	-0.021
					(0.015)	(0.015)	(0.022)
Age 18-19*	-0.000	-0.010	-0.006	-0.002			
Post-2001	(0.008)	(0.008)	(0.008)	(0.008)			
2001					0.007	0.007	0.030**
					(0.012)	(0.011)	(0.015)
2002					0.001	0.002	0.036**
					(0.009)	(0.008)	(0.015)
2003					-0.019	-0.012	0.029
					(0.012)	(0.013)	(0.020)
Age 20-21*			0.011	0.013			
Post-2001			(0.010)	(0.010)			
2001					0.042***	0.044***	0.050***
					(0.012)	(0.011)	(0.013)
2002					0.008	0.009	0.023
					(0.013)	(0.011)	(0.015)
2003					-0.019	-0.004	0.012
					(0.015)	(0.014)	(0.023)
F-statistic (Proxies)				16.05	15.89	15.10	16.67
				(0.00)	(0.00)	(0.00)	(0.00)
F-statistic (Seasonals)						3.41	3.32
						(0.00)	(0.00)
F-statistic (Time trends)							2.41
							(0.01)
Observations	125,486	125,422	125,422	125,422	125,422	125,422	125,422
R-squared	0.04	0.10	0.10	0.11	0.11	0.11	0.11

Notes: Coefficients followed by one, two, and three stars are significantly different from zero at the 10, 5, and 1 percent level, respectively. All specifications are estimated using OLS and include single age-specific and quarter-specific effects. Huber-White robust standard errors, which allow for arbitrary correlation in individual error terms within age-quarter cells, are in parentheses, except probability values for the F-statistics. The covariates included are dummy variables for gender, marital status, ethnicity, New Zealand born, urbanicity, and region of residence, and the relative size of the population of each age group (16-17, 18-19, 20-21, 22-25) in a particular year. The F-statistics test the joint significance of the proxies, age-specific seasonal effects, and age-specific linear time trends.

Table 5 – Regression Estimates of Changes in Hours Worked and Other Outcomes

	Employment (1)	Hours Worked (2)	Studying (3)	Unemployed (4)	Inactive (5)	Received Benefits (6)	Log Labour Earnings (7)	Log Total Income (8)
Age 16-71*								
2001	0.023*	0.346	-0.035***	0.020***	0.020***	0.020	0.159***	0.077**
	(0.012)	(0.574	(0.009)	(0..006)	(0.007)	(0.013)	(0.038)	(0.034)
2002	0.001	2.246***	-0.044***	0.011	0.019***	0.030**	0.217***	0.161***
	(0.010)	(0.452)	(0.009)	(0.007)	(0.006)	(0.013)	(0.050)	(0.045)
2003	-0.021	2.186***	-0.039***	0.006	0.023***	0.030**	0.287***	0.069**
	(0.015)	(0.462)	(0.012)	(0.008)	(0.008)	(0.013)	(0.025)	(0.034)
Age 18-19*								
2001	0.007	-0.307	-0.019**	0.007	0.012	0.001	0.111**	0.046
	(0.011)	(0.559)	(0.009)	(0.006)	(0.008)	(0.017)	(0.055)	(0.053)
2002	0.002	0.109	-0.015**	-0.000	0.010	0.012	0.085	0.084**
	(0.008)	(0.610)	(0.007)	(0.006)	(0.007)	(0.013)	(0.053)	(0.037)
2003	-0.012	1.237	-0.005	-0.002	-0.002	-0.011	0.143***	-0.004
	(0.013)	(0.817)	(0.013)	(0.006)	(0.007)	(0.017)	(0.049)	(0.055)
Age 20-21*								
2001	0.044***	-0.465	-0.030***	-0.003	-0.007	0.011	-0.040	0.094**
	(0.011)	(0.486)	(0.008)	(0.006)	(0.008)	(0.017)	(0.072)	(0.037)
2002	0.009	0.181	0.004	-0.010*	-0.010	-0.001	0.045	0.032
	(0.011)	(0.390)	(0.009)	(0.006)	(0.008)	(0.016)	(0.046)	(0.046)
2003	-0.004	0.404	-0.021**	-0.007	0.014	0.006	0.016	0.038
	(0.014)	(0.570)	(0.010)	(0.005)	(0.011)	(0.020)	(0.024)	(0.033)
Observations	125,422	70,707	125,422	125,422	125,422	31,354	17,301	31,354
R-squared	0.11	0.20	0.37	0.02	0.09	0.11	0.38	0.35

Notes: Coefficients followed by one, two, and three stars are significantly different from zero at the 10, 5, and 1 percent level, respectively. Huber-White robust standard errors, which allow for arbitrary correlation in individual error terms within age-quarter cells, are in parentheses. Regressions in columns (1)-(5) include single age-specific, quarter-specific effects, other covariates and age-specific seasonal effects (as specified in table 4, column (6)); those in columns (6)-(8) are estimated using annual data and thus include single age-specific and year-specific effects and other covariates.

Table 6 – Regression Estimates with Age-specific Linear Time Trends

	Employment (1)	Hours Worked (2)	Studying (3)	Unemployed (4)	Inactive (5)	Received Benefits (6)	Log Labour Earnings (7)	Log Total Income (8)
Age 16-71*								
2001	0.016	0.087	-0.012	0.012	0.017*	0.043**	0.284***	0.199***
	(0.016)	(0.682)	(0.011)	(0.008)	(0.009)	(0.018)	(0.053)	(0.045)
2002	-0.002	1.789**	-0.012	-0.002	0.018*	0.065***	0.358***	0.300***
	(0.018)	(0.746)	(0.013)	(0.011)	(0.010)	(0.022)	(0.067)	(0.056)
2003	-0.021	1.519	0.001	-0.013	0.023*	0.084***	0.407***	0.187***
	(0.022)	(0.921)	(0.016)	(0.013)	(0.013)	(0.026)	(0.081)	(0.067)
Age 18-19*								
2001	0.030**	-0.569	-0.030***	-0.002	0.014	-0.023	0.048	-0.011
	(0.015)	(0.691)	(0.011)	(0.009)	(0.012)	(0.020)	(0.047)	(0.047)
2002	0.036**	-0.295	-0.030**	-0.013	0.012	-0.017	-0.056	-0.047
	(0.015)	(0.804)	(0.012)	(0.011)	(0.013)	(0.024)	(0.063)	(0.060)
2003	0.029	0.755	-0.023	-0.019	0.002	-0.046	-0.055	-0.183**
	(0.020)	(1.152)	(0.017)	(0.013)	(0.016)	(0.029)	(0.075)	(0.076)
Age 20-21*								
2001	0.050***	-0.127	-0.034***	0.001	0.001	0.004	0.024	0.131***
	(0.013)	(0.538)	(0.010)	(0.007)	(0.010)	(0.017)	(0.070)	(0.041)
2002	0.023	0.542	-0.003	-0.006	0.003	-0.004	0.074	0.026
	(0.015)	(0.560)	(0.014)	(0.009)	(0.012)	(0.024)	(0.059)	(0.060)
2003	0.012	0.907	-0.028*	-0.004	0.031*	0.006	0.019	-0.007
	(0.023)	(0.779)	(0.017)	(0.011)	(0.017)	(0.025)	(0.075)	(0.082)
F-statistics	2.49	1.01	5.85	2.14	1.99	5.31	4.99	5.20
(Time trends)	(0.01)	(0.44)	(0.00)	(0.02)	(0.03)	(0.00)	(0.00)	(0.00)
Observations	125,422	70,707	125,422	125,422	125,422	31,354	17,301	31,354
R-squared	0.11	0.20	0.37	0.02	0.09	0.11	0.38	0.36

Notes: Coefficients followed by one, two, and three stars are significantly different from zero at the 10, 5, and 1 percent level, respectively. Huber-White robust standard errors, which allow for arbitrary correlation in individual error terms within age-quarter cells, are in parentheses, except probability values for the F-statistics. Regressions in columns (1)-(5) include single age-specific, quarter-specific effects, other covariates, age-specific seasonal effects and linear quarterly time-trends (as specified in table 4, column (7)); those in columns (6)-(8) are estimated using annual data and thus include single age-specific and year-specific effects, other covariates, and age-specific linear annual time-trends. The F-statistics test the joint significance of the age-specific linear time trends.

Figure 1 – Real Minimum wage by Age Group

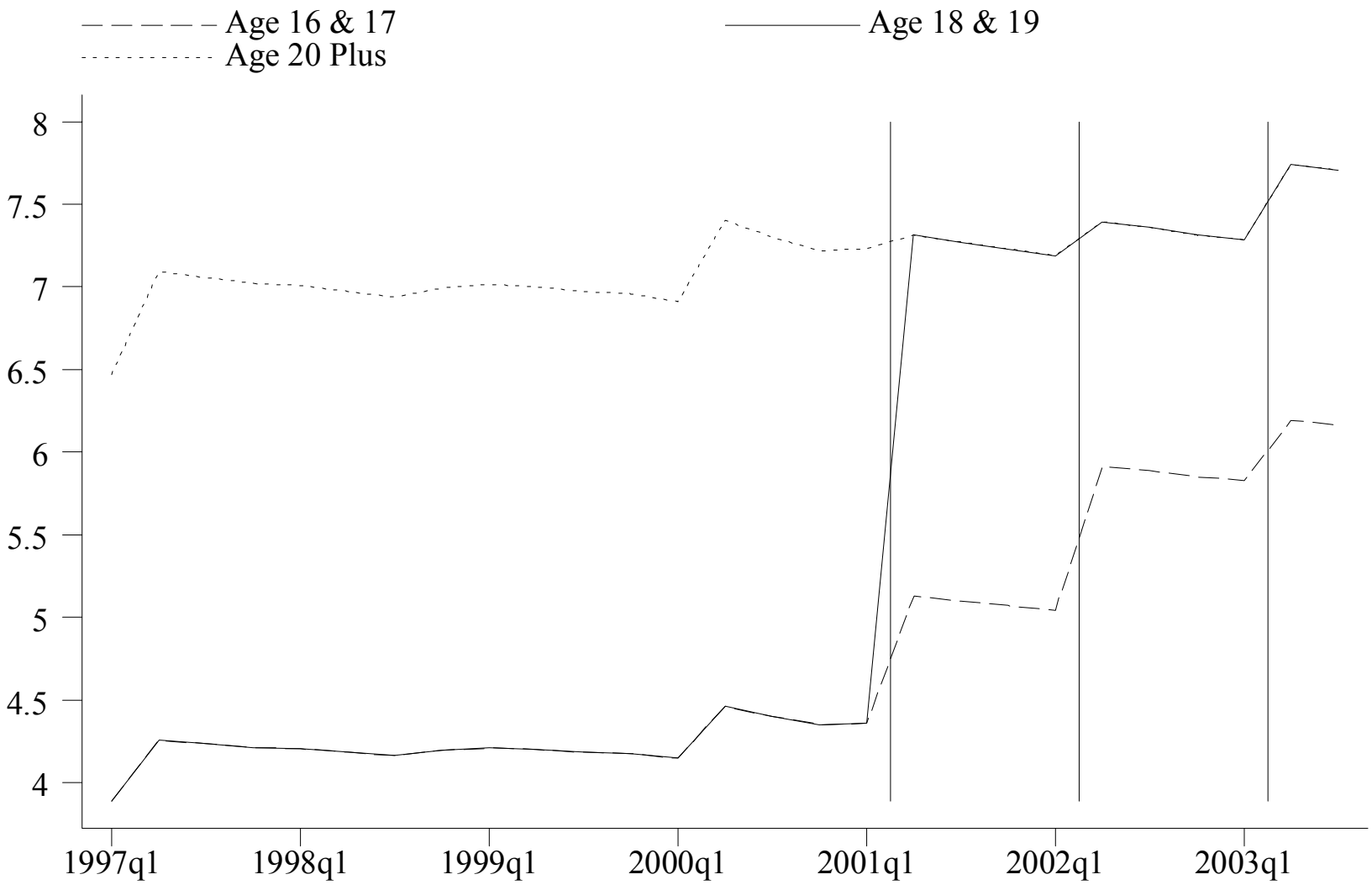
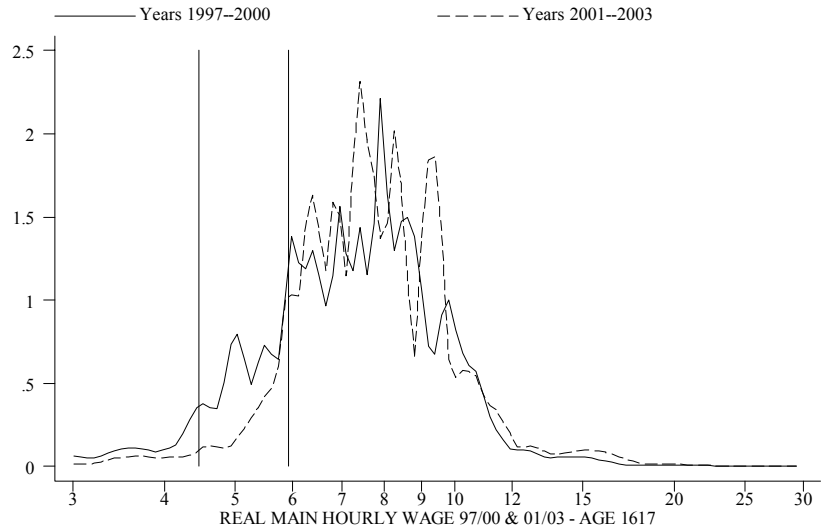
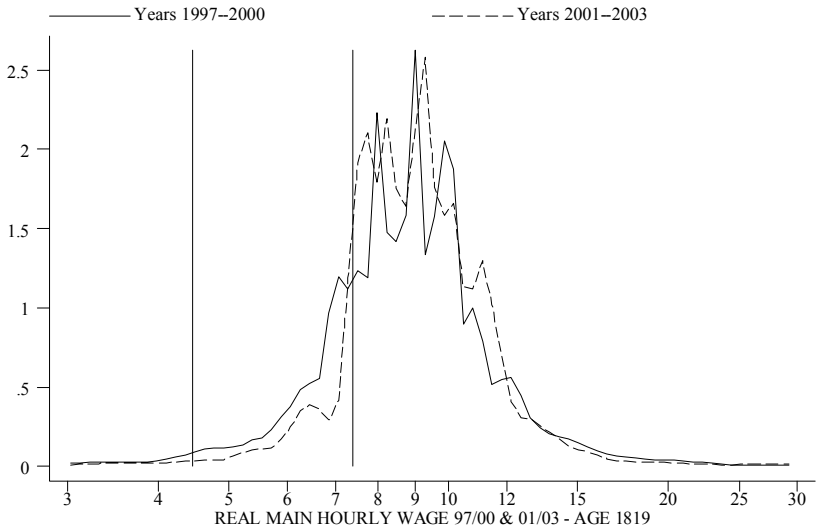


Figure 2 – Hours Weighted Hourly Wage Kernel Densities





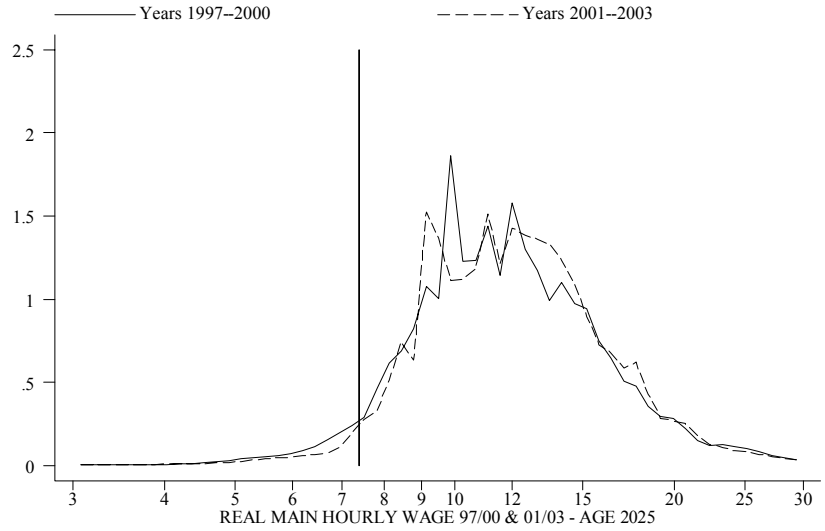


Figure 3 – Real Wages and the Minimum Wage

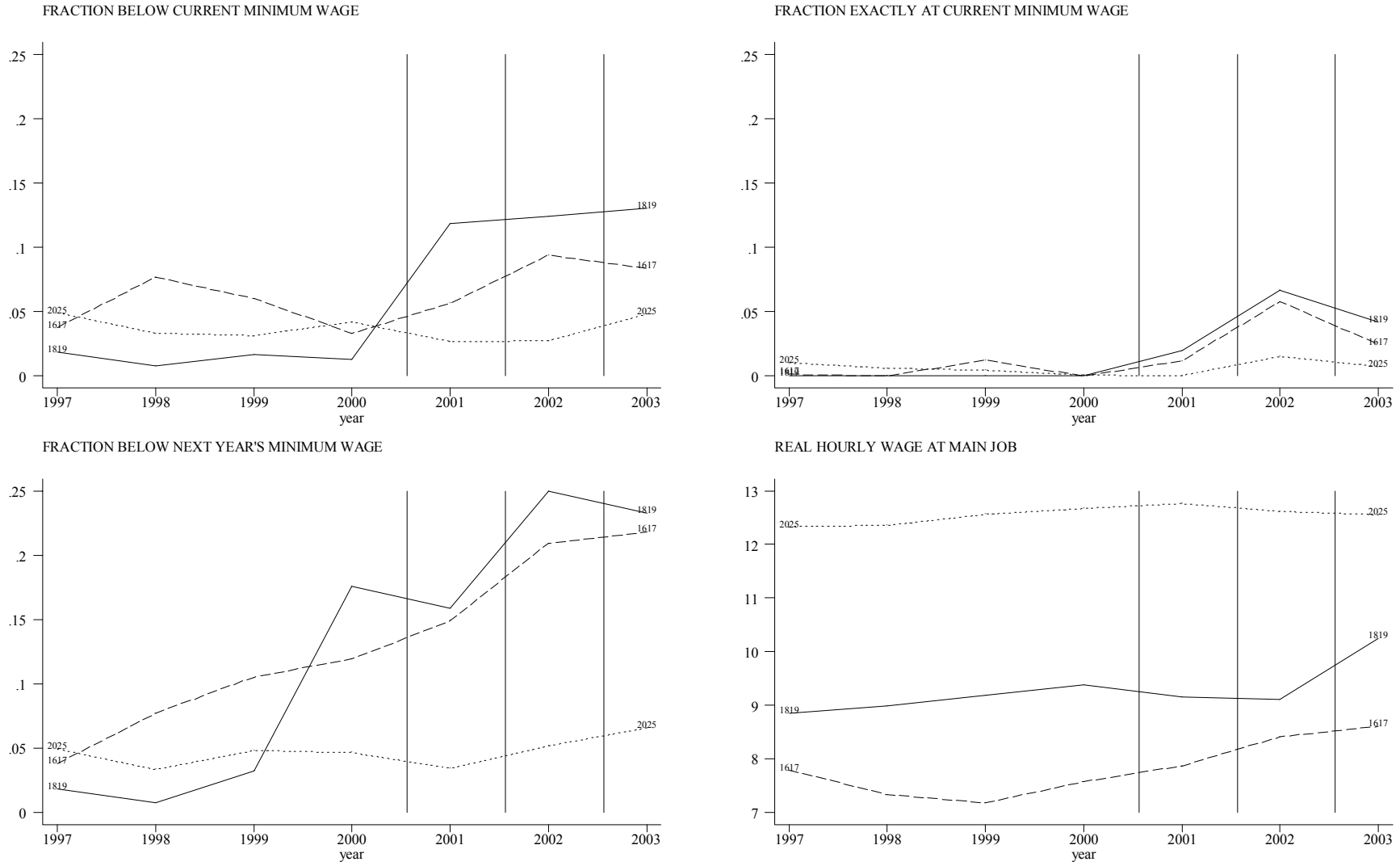
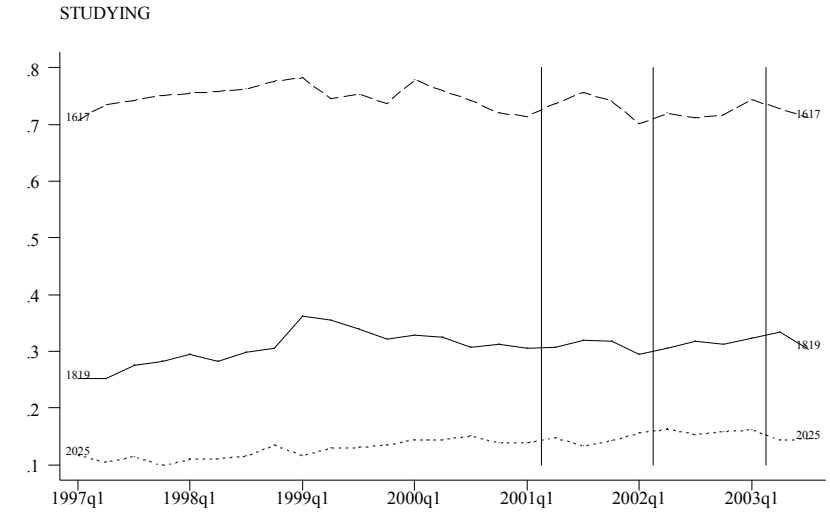
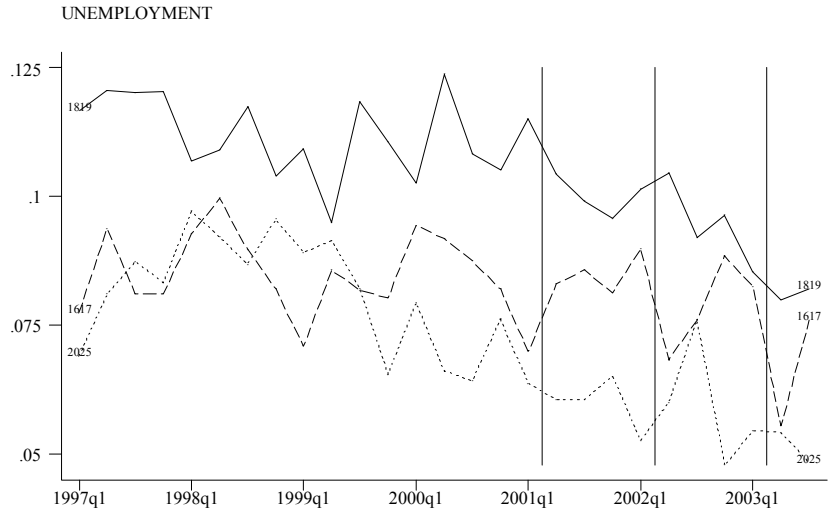


Figure 4 – Wage and Salary Employment and Hours Worked

Figure 5 – Studying, Unemployment and Inactivity





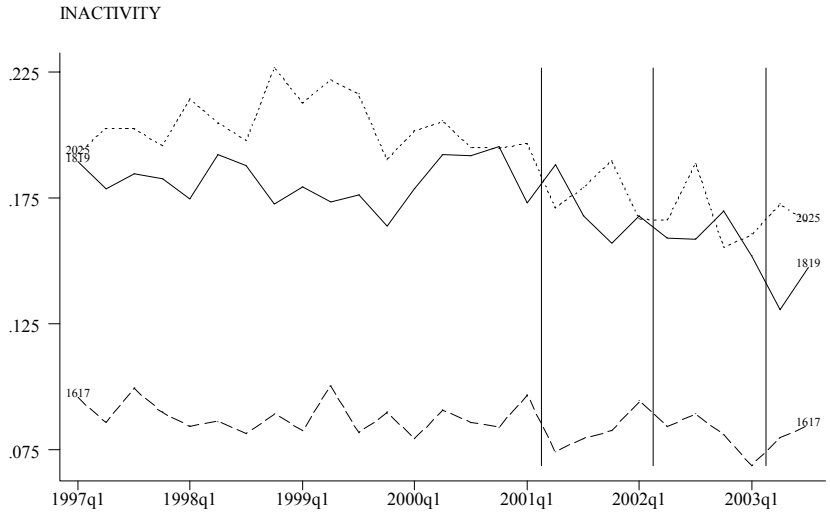


Figure 6 – Benefits, Weekly Labour Earnings and Total Income

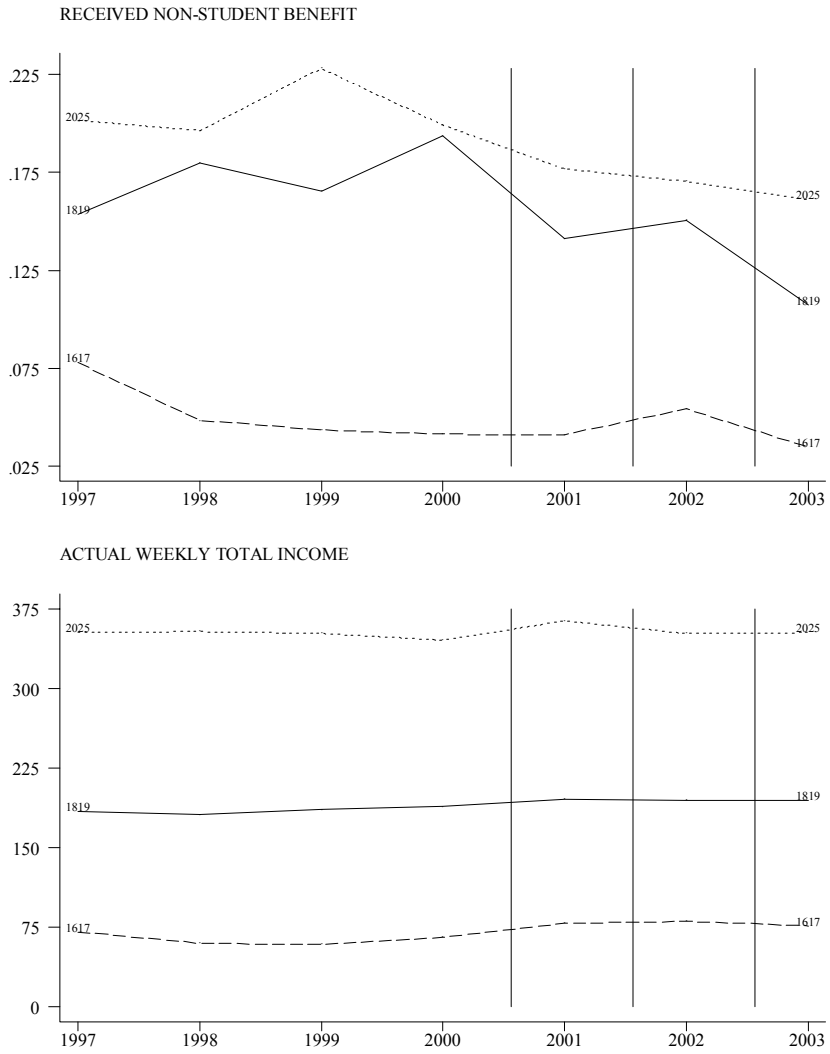


Table A1 – Sample Characteristics of HLFS Non-Proxy and Proxy Responses

	16-17 Year-Olds				18-19 Year-Olds				20-25 Year-Olds			
	1997-2000		2001-2003		1997-2000		2001-2003		1997-2000		2001-2003	
	Non	Proxy	Non	Proxy	Non	Proxy	Non	Proxy	Non	Proxy	Non	Proxy
Age	16.49	16.47	16.50	16.47	18.53	18.47	18.52	18.45	22.54	22.33	22.46	22.20
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)
Female	0.49	0.46	0.49	0.45	0.54	0.44	0.52	0.44	0.53	0.42	0.52	0.41
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(.003)	(.004)	(.004)	(0.01)
Married	0.02	0.01	0.03	0.02	0.08	0.04	0.09	0.04	0.29	0.24	0.29	0.24
	(.002)	(.001)	(.002)	(.002)	(.003)	(.003)	(.004)	(.004)	(.003)	(.004)	(.003)	(0.01)
New Zealand	0.84	0.86	0.82	0.85	0.83	0.84	0.80	0.81	0.86	0.84	0.81	0.79
Born	(.004)	(.004)	(0.01)	(.005)	(.004)	(.005)	(0.01)	(0.01)	(.002)	(.003)	(.003)	(.005)
Pakeha	0.68	0.68	0.62	0.66	0.67	0.67	0.64	0.65	0.71	0.67	0.65	0.63
	(.005)	(.005)	(0.01)	(0.01)	(.005)	(0.01)	(0.01)	(0.01)	(.003)	(.004)	(.003)	(0.01)
Maori	0.15	0.17	0.17	0.16	0.16	0.16	0.15	0.14	0.15	0.15	0.15	0.13
	(.004)	(.004)	(.005)	(.005)	(.004)	(.005)	(.005)	(0.01)	(.002)	(.003)	(.003)	(.004)
Pacific	0.07	0.06	0.08	0.07	0.07	0.07	0.07	0.08	0.06	0.08	0.07	0.10
Islander	(.003)	(.003)	(.003)	(.003)	(.003)	(.003)	(.003)	(.005)	(.001)	(.002)	(.002)	(.004)
Asian	0.05	0.05	0.08	0.06	0.06	0.06	0.08	0.08	0.04	0.06	0.08	0.09
	(.002)	(.002)	(.004)	(.003)	(.002)	(.003)	(.004)	(.005)	(.001)	(.002)	(.002)	(.003)
Wage or Salary	0.43	0.42	0.44	0.43	0.52	0.60	0.54	0.59	0.63	0.70	0.64	0.70
Worker	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(.003)	(.004)	(.003)	(0.01)
Hours worked	17.25	17.49	19.03	18.30	27.93	28.99	28.30	28.49	33.96	35.28	33.45	35.39
Last week	(0.26)	(0.25)	(0.32)	(0.32)	(0.25)	(0.28)	(0.30)	(0.37)	(0.12)	(0.17)	(0.15)	(0.22)
Studying	0.73	0.76	0.71	0.75	0.30	0.30	0.31	0.33	0.12	0.12	0.15	0.16
	(.005)	(.004)	(0.01)	(0.01)	(.005)	(0.01)	(0.01)	(0.01)	(.002)	(.003)	(.003)	(.004)
Unemployment	0.10	0.07	0.09	0.07	0.13	0.09	0.10	0.07	0.09	0.07	0.06	0.05
	(.003)	(.003)	(.004)	(.003)	(.003)	(.004)	(.004)	(.004)	(.002)	(.002)	(.002)	(.003)
Inactive	0.10	0.08	0.09	0.07	0.21	0.15	0.17	0.13	0.22	0.16	0.18	0.13
	(.003)	(.003)	(.004)	(.003)	(.004)	(.005)	(.005)	(0.01)	(.002)	(.003)	(.003)	(.004)
Observations	8,802	9,247	5,782	5,334	9,301	6,101	6,038	3,412	32,176	12,526	19,902	6,865

Notes: Estimated standard errors controlling for Primary Sampling Unit (PSU) cluster in parentheses. All summary statistics are weighted by the HLFS sampling weights.

Table A2 – Sample Characteristics of HLFS-IS Non-Proxy, Proxy and Impute Responses

	16-17 Year-Olds						18-19 Year-Olds						20-25 Year-Olds					
	1997-2000			2001-2003			1997-2000			2001-2003			1997-2000			2001-2003		
	Non	Proxy	Impute	Non	Proxy	Impute	Non	Proxy	Impute	Non	Proxy	Impute	Non	Proxy	Impute	Non	Proxy	Impute
Age	16.48	16.41	16.56	16.48	16.44	16.52	18.53	18.44	18.52	18.50	18.35	18.50	22.47	22.31	22.60	22.38	22.16	22.47
	(0.01)	(0.06)	(0.02)	(0.01)	(0.03)	(0.03)	(0.01)	(0.08)	(0.02)	(0.01)	(0.05)	(0.03)	(0.02)	(0.16)	(0.05)	(0.02)	(0.13)	(0.05)
Female	0.48	0.42	0.43	0.48	0.43	0.44	0.51	0.40	0.45	0.51	0.42	0.46	0.52	0.45	0.42	0.51	0.34	0.42
	(0.01)	(0.06)	(0.02)	(0.01)	(0.03)	(0.03)	(0.01)	(0.08)	(0.02)	(0.01)	(0.06)	(0.03)	(0.01)	(0.05)	(0.01)	(0.01)	(0.04)	(0.02)
Married	0.01	0.01	0.01	0.02	0.01	0.04	0.07	0.04	0.05	0.07	0.04	0.08	0.28	0.16	0.25	0.28	0.23	0.25
	(.002)	(0.01)	(0.01)	(.003)	(0.01)	(0.01)	(.005)	(0.03)	(0.01)	(0.01)	(0.02)	(0.01)	(.005)	(0.03)	(0.01)	(0.01)	(0.03)	(0.01)
New Zealand	0.85	0.63	0.86	0.84	0.76	0.79	0.83	0.54	0.86	0.81	0.64	0.84	0.86	0.72	0.87	0.81	0.62	0.83
Born	(0.01)	(0.06)	(0.02)	(0.01)	(0.03)	(0.02)	(0.01)	(0.08)	(0.02)	(0.01)	(0.05)	(0.02)	(.004)	(0.04)	(0.01)	(.005)	(0.04)	(0.01)
Pakeha	0.68	0.54	0.67	0.66	0.49	0.61	0.68	0.44	0.66	0.65	0.46	0.63	0.71	0.50	0.69	0.67	0.42	0.61
	(0.01)	(0.06)	(0.02)	(0.01)	(0.03)	(0.03)	(0.01)	(0.08)	(0.02)	(0.01)	(0.06)	(0.03)	(.005)	(0.05)	(0.01)	(0.01)	(0.04)	(0.02)
Maori	0.15	0.17	0.16	0.16	0.17	0.20	0.15	0.05	0.19	0.14	0.16	0.18	0.14	0.22	0.16	0.14	0.13	0.17
	(0.01)	(0.04)	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)	(0.03)	(0.02)	(0.01)	(0.04)	(0.02)	(.004)	(0.04)	(0.01)	(.004)	(0.03)	(0.01)
Pacific	0.07	0.04	0.08	0.08	0.13	0.05	0.07	0.12	0.08	0.08	0.06	0.07	0.07	0.06	0.09	0.07	0.16	0.08
Islander	(.004)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(.005)	(0.05)	(0.01)	(0.01)	(0.03)	(0.01)	(.003)	(0.02)	(0.01)	(.003)	(0.03)	(0.01)
Asian	0.05	0.07	0.04	0.07	0.10	0.09	0.06	0.20	0.05	0.08	0.22	0.08	0.04	0.12	0.04	0.08	0.17	0.07
	(.004)	(0.03)	(0.01)	(.005)	(0.02)	(0.02)	(.004)	(0.06)	(0.01)	(0.01)	(0.05)	(0.01)	(.002)	(0.03)	(0.01)	(.003)	(0.03)	(0.01)
Wage or Salary	0.41	0.27	0.52	0.43	0.24	0.54	0.52	0.27	0.65	0.53	0.31	0.64	0.64	0.37	0.65	0.65	0.50	0.67
Worker	(0.01)	(0.05)	(0.02)	(0.01)	(0.03)	(0.03)	(0.01)	(0.07)	(0.02)	(0.01)	(0.05)	(0.03)	(0.01)	(0.05)	(0.01)	(0.01)	(0.04)	(0.01)
Hours worked	16.32	14.80	18.14	17.91	12.03	20.82	27.30	24.64	28.76	28.01	26.93	29.74	34.10	33.29	34.82	33.45	34.38	33.83
Last week	(0.40)	(2.87)	(1.21)	(0.43)	(1.55)	(1.30)	(0.41)	(6.04)	(1.03)	(0.46)	(3.19)	(1.05)	(0.21)	(3.08)	(0.58)	(0.24)	(1.62)	(0.64)
Studying	0.78	0.89	0.66	0.76	0.83	0.64	0.38	0.54	0.21	0.38	0.60	0.28	0.17	0.21	0.11	0.21	0.28	0.13
	(0.01)	(0.04)	(0.02)	(0.01)	(0.02)	(0.03)	(0.01)	(0.08)	(0.02)	(0.01)	(0.06)	(0.02)	(.004)	(0.04)	(0.01)	(.005)	(0.04)	(0.01)
Unemployment	0.10	0.13	0.06	0.08	0.05	0.04	0.11	0.06	0.09	0.10	0.04	0.03	0.08	0.03	0.05	0.06	0.02	0.03
	(0.01)	(0.04)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.04)	(0.01)	(0.01)	(0.02)	(0.01)	(.003)	(0.02)	(0.01)	(.003)	(0.01)	(0.01)
Inactive	0.09	0.04	0.08	0.07	0.11	0.05	0.16	0.21	0.17	0.14	0.11	0.08	0.20	0.41	0.15	0.16	0.23	0.11
	(.005)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.06)	(0.02)	(0.01)	(0.04)	(0.01)	(.004)	(0.05)	(0.01)	(.005)	(0.03)	(0.01)
Received Non-	0.05	0.06	0.09	0.04	0.05	0.06	0.18	0.25	0.13	0.14	0.18	0.05	0.21	0.45	0.18	0.17	0.32	0.13
Student benefits	(.004)	(0.03)	(0.01)	(.004)	(0.01)	(0.01)	(0.01)	(0.07)	(0.02)	(0.01)	(0.04)	(0.01)	(.004)	(0.05)	(0.01)	(.005)	(0.04)	(0.01)
Labour earnings	120.28	115.91	145.28	150.28	89.48	184.14	257.63	226.25	246.37	277.26	249.93	289.36	436.63	356.53	472.82	433.75	397.94	502.24
Last week	(3.35)	(21.76)	(9.06)	(4.57)	(11.25)	(11.34)	(4.16)	(64.26)	(9.98)	(4.98)	(33.91)	(10.84)	(3.33)	(35.07)	(8.27)	(3.64)	(24.57)	(9.62)
Total Income	57.70	45.99	109.81	74.76	29.74	130.79	183.41	133.61	199.87	193.14	126.04	216.53	344.60	243.95	396.45	344.14	266.79	441.77
Last week	(1.75)	(10.84)	(6.75)	(2.53)	(4.49)	(9.35)	(3.02)	(25.18)	(9.28)	(3.69)	(17.82)	(11.22)	(2.80)	(18.11)	(7.51)	(3.27)	(17.85)	(9.67)
Observations	3,553	78	461	2,622	224	347	2,977	42	437	2,344	78	345	8,618	110	1,380	6,594	162	999

Notes: Estimated standard errors controlling for Primary Sampling Unit (PSU) cluster in parentheses. All summary statistics are weighted by the HLFS sampling weights. Wages, earnings and incomes are in constant (June 1999) dollar values, adjusted using the CPI.