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**Analysing the Extent and Effects of
Occupational Regulation in New Zealand**

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Abstract: This study is the first to our knowledge to document the extent and correlates of occupational regulation in New Zealand. Using data from the Census and the Survey of Working Life, we estimate that 29% of workers' primary jobs are affected by occupational regulation. This is lower than the 35% reported for the US but close to UK estimates of 28%. Furthermore, we find that holding observable factors constant, occupational regulation is associated with a wage premium of 5%. This is lower than the 18% licensing premium found for the US but within the range of estimates for the UK.

Keywords: Occupational regulation, licensing, wages, New Zealand

JEL Classification: J44

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I. Introduction

Broadly speaking, occupational regulation consists of three types of government intervention into the labour market: registration, certification and licensing. Registration requires individuals to list information such as their name, address and qualifications with a government agency before legally practising an occupation. In contrast, anyone may immediately practise a certified occupation. The government merely awards those practitioners who meet particular standards the use of an additional title. Licensing refers to laws which make it illegal for an individual to work in an occupation for compensation without first meeting a set of requirements set by a government agency or professional body (on behalf of the government).

This study examines the prevalence of occupational regulation in New Zealand (NZ) using the results of a report commissioned by the Ministry of Business, Innovation and Employment (MBIE) - MartinJenkins (2012) - in conjunction with data from the 2013 Census and the 2012 Survey of Working Life (SoWL).

MartinJenkins (2012) contains a list of all regulated occupations in NZ. We use this list to determine which ANZSCO codes¹ refer to regulated jobs and create a corresponding binary variable for individuals' primary occupations within the Census. Overall, 29% of workers' primary occupations are affected by occupational regulation. This figure is lower than Kleiner and Krueger's (2013) estimate that 35% of US employees are either licensed or certified but in line with that of Forth et al. (2011) who report 28% as a conservative estimate of the number of workers affected by occupational regulation in the UK.

Next, we estimate a series of Mincer-type wage regressions on data from the SoWL, with a measure of regulation status as the variable of main interest. Any individual in a primary

¹ ANZSCO stands for the Australia and New Zealand Standard Classification of Occupations and is used by Statistics NZ to record respondents' occupations in survey datasets, like the Census or SoWL (Australian Bureau of Statistics, 2013).

occupation with registration, certification or licensing is considered regulated. An important coding challenge is that occupations in the SoWL are recorded to a more aggregated level than in the Census and often not all occupations in the same grouping are regulated or unregulated. When focusing only on fully regulated or unregulated groups, we find an average hourly wage premium (holding a wide variety of human capital and other factors constant) of about 11%. In order to consider ‘mixed’ groups as well, we create a continuous variable for the percentage of workers in each group who are regulated. This variable is based on the percentage of workers in each group who are in regulated occupations in the Census. The estimated wage premium increases only slightly to 12%.

However, when we add further controls for job characteristics (including ‘subjective’ measures of work conditions available in the SoWL), the average regulation premium drops to 5% in our preferred specification. This is substantially lower than the 18% wage premium found by Kleiner and Krueger (2013) for licensed workers in the US but close to UK estimates of Forth et al (2011) which range from 3 to 10%.

Our finding of a positive wage premium is qualitatively robust to various specification changes (e.g., different sets of regressors and different classifications of ‘regulated occupations’) but must be interpreted with three caveats in mind: First, a variable for the probability of being regulated likely introduces an attenuation bias into the results so true effects of regulation may be larger than we estimate. Second, more restrictive forms of occupational regulation, namely licensing, are likely associated with a higher wage premium than the broad ‘regulation effect’ suggests. Finally, while a positive wage premium is consistent with the notion that occupational regulation serves to create rents for incumbent practitioners, we cannot prove causality. A future longitudinal study may allow for stronger conclusions in this regard.

The remainder of this paper is organised as follows: Section II. provides a background to the characteristics of occupational regulation relevant to this study. Section III. describes our method and data. For convenience, we also present our estimate of the percentage of NZ workers whose primary jobs are regulated in this section, as it is both a result interesting in itself and an intermediate step of our main analysis. Section IV. presents the results of wage/earnings regressions. Section V. concludes with further discussion of our results and their limitations as well as suggestions for future research and public policy.

II. Background to Occupational Regulation

II.A Occupational regulation in New Zealand

Similar to other jurisdictions, the New Zealand Government uses occupational regulation with the explicit goal to protect the public from physical, mental or financial harm (MartinJenkins, 2012). In the case of licensing, providing barriers to entry (such as relevant qualifications) is supposed to ensure minimum quality standards. In the case of certification, consumers benefit by being able to identify practitioners of at least a minimum quality level. Finally, in the case of registration, the threat of having one's registration revoked may be enough to give professionals an incentive to provide a high quality service.

However, MBIE guidelines (MBIE, 2015) note that such intervention is not costless. There is always at least the cost of administering the regulation itself, costs of complying for practitioners, and often the cost of a reduction in labour market efficiency. Higher wages to those regulated, the topic of this paper, may be indicative of a reduction in labour market efficiency. Therefore, MBIE suggests the level regulation (if any) must bring about a reduction in harm that at least offsets the costs of the intervention. Registration and certification are less costly than licensing but are expected to reduce harm by less. Licensing is the most costly

form of regulation and, in theory, should only be applied when there is a large potential for harm.

In 2012, MartinJenkins published a report commissioned by MBIE called ‘Occupational regulation, scoping the need for a review’ (available from MBIE on request). The authors conclude that occupational regulation in NZ is extensive and heterogeneous. In particular, they identify 98 occupations affected by occupational regulation of which 30 are subject to certification, 3 to registration, and the remaining 65 to licensing. They include this list of occupations in an appendix to their report, alongside a brief description of the regulatory regime of each included occupation. The reported details include: the Act of Parliament enabling the regulation, which government Ministry is ultimately responsible for the regulatory regime, the type of group which implements the regulation (otherwise known as the regulatory body), in the case of licensing or certification, the qualification requirement, and the initial monetary cost of obtaining the license, certification, or registration. Regulatory bodies include statutory bodies, Crown entities, government departments, professional bodies, the District Court, and local governments.² There is extensive variation among the types of jobs regulated and among the regulations themselves. Regulated occupations range from low skilled jobs such as taxi-drivers to high skilled jobs such as doctors. Regulation requirements are also wide ranging. For example, initial registration costs vary from just \$160 to over \$2,000 and qualification requirements range from none to postgraduate training.

MartinJenkins report that at least 20% of NZ workers are in regulated occupations. They arrive at this figure by adding up available estimates, produced privately by industry bodies, of the total number of workers involved in each relevant occupation. The absence of such

² Statutory bodies include the Chartered Professional Engineers Council and the Dental Council. The Civil Aviation Authority is an example of a regulatory Crown entity. Boiler attendants and crane operators are examples of occupations directly regulated by a government department - MBIE. Lawyers are regulated by the Law Society, a professional body. Local governments issue licenses to bar managers. Auctioneers are one of the professions regulated by the District Court.

estimates for a large number of regulated occupations means MartinJenkins' 20% figure is a lower bound.

II.B A simple theory of occupational licensing

Economic theorising on the topic of occupational regulation dates back to Adam Smith (1774) but has almost exclusively focused on the most restrictive form - licensing. We review the economic theory of licensing, and particularly its wage effects, here.³

A simple theory of wages and licensing begins with government intervention into a labour market. The government imposes minimum standards which are assumed to correlate with output quality. Standards are enforced by an assumed costless supply of unbiased 'gatekeepers' and 'enforcers'. Gatekeepers screen entrants into an occupation and exclude those individuals whose characteristics suggest a tendency towards low quality output (or high risk to the consumer). Enforcers monitor incumbent practitioners, punishing those who let the quality of their output drop below the minimum standard with revocation of their license. In this setting, the quality of the profession is expected to rise; however, the quantity of the good or service provided diminishes.

Like any monopoly situation, entry requirements restrict supply and create rents (at least for those individuals for whom the cost of being licensed is not too high). The existence of these rents may in principle motivate some individuals to invest in human capital as to be allowed into the profession. The threat of losing rents may also give incumbents a further incentive to invest in order to maintain high standards. This suggests that licensing can raise quality and increased prices may therefore signal higher quality - not merely supply restrictions.

There are numerous extensions and critiques of this simple theory. One extension shows how licensing can reduce problems caused by asymmetric information about the quality of

³ Readers who are interested in a more detailed outline of the theories may refer to Forth et al. (2011), Gittleman, Klee and Kleiner (2015), Kleiner (2000) or Kleiner and Krueger (2013).

goods. Leland (1979) considers an adverse selection problem. In the absence of licensing, consumers cannot distinguish between high quality providers and their low quality counterparts. Thus a consumer's willingness to pay a provider for the service in question is based on expected quality, not actual quality, leading to high quality providers dropping out of the market. He shows that minimum quality standards can alleviate this problem leading to welfare gains. However, he also shows that standards will be set too high if an industry self-imposes them.

Shapiro (1986) considers a professional as an agent of the consumer who has imperfect incentives to supply a high quality service. Here, licensing may improve welfare by first inducing human capital investment which subsequently reduces the marginal cost to a practitioner of providing a high quality service.

Friedman (1962) questions the assumption of unbiased gatekeepers and enforcers. He thinks of occupational licensing as a form of 'capture' arguing that licensing systems are almost always run by, and for, incumbents - not for the public interest. He suggests that the practise of 'grandfathering', which is allowing existing workers to bypass new entry requirements, is evidence that licensing leads to additional monopoly rents. Friedman also questions whether meeting licensing standards does in fact raise quality within professions especially if incumbents have influence over the standards. If not, this would suggest that any wage gains to incumbents from licensing are from supply restrictions, not increased quality.

However, importantly for this paper, the above extensions and critiques do not detract from the simple theory's testable hypothesis that licensed workers earn higher wages. Instead, they suggest that the simple theory understates the potential for wage gains.

II.C Existing evidence on the wage effects of occupational regulation

To date, there has been little empirical work on the topic of occupational regulation – starkly so in comparison to other labour market institutions such as the minimum wage or labour unions (Figure 1). This disparity is surprising given the characteristics of labour markets. For example, in the US, 35% of workers have been estimated to be licensed but only 11% are in unions and just 4% earn at or below the federal minimum wage (Kleiner and Krueger 2013; US Bureau of Labor Statistics 2014). As shown below, in NZ, 29% of workers are in an occupation regulated in some way. With 17% of NZ workers in labour unions and only 2% earning the minimum wage, the labour market situation is similar to the US (Companies Office 2013, MBIE 2013). However, Kleiner and Krueger (2013) note that over time, at least in the US, occupational licensing has become more prevalent while unions have been in decline. This may explain some of the historical disparity in research interest.

There are two general types of studies on occupation regulation: i) studies focused on a single occupation and ii) studies which estimate the average effect of regulation across all workers in a labour market. The former focus on occupations that do not require a significant amount of training so as to isolate the direct monopoly effects of licensing. Timmons and Thornton (2010) show that tougher licensing requirements increased earnings for barbers in the US between 11 and 22%. Timmons and Mills (2015) argue that licensing of opticians in the US does not appear to increase the quality of care provided to customers but wages increased by 4%. Although these studies and others do find evidence of wage premiums due to licensing, it is difficult to generalise from individual case studies.

This paper follows the approach of the second set of studies, particularly Kleiner and Krueger (2013) and Forth et al. (2011). Kleiner and Krueger (2013) focus on occupational licensing in the US. Their seminal paper begins with a suggestion that the lack of empirical work on licensing may be in part due to the lack of a comprehensive dataset that clearly identifies whether a worker is subject to regulation and the extent of regulation. In the US, the

regulatory status of an occupation often differs by state or even county. Kleiner and Krueger's (2013) contribution is therefore a presentation of the results of a specially designed national survey directly asking respondents for their regulatory status (if they held a license or certification). Their survey has also been specially designed for estimating wage regressions with a wider set of controls than normally available. The authors estimate that 35% of US workers are in regulated professions - with 29% affected by licensing alone. Furthermore, their regression results suggest that licensing is associated with wages that are on average 18% higher than the unregulated average even when controlling for factors such as education, age, and ethnicity. Certification is associated with much smaller wage gains.

Forth et al. (2011) do not have access to a specially designed survey directly asking about the regulatory status of respondents. Instead, they obtain what they believe to be the most complete list of regulated occupations (102 in total) available for the UK in order to determine which codes in the Standard Occupation Classification (2000) refer to regulated occupations. Then, they use the Quarterly Labour Force Survey to estimate the percentage of workers who are affected by occupational regulation, concluding that between 14 and 31% of workers were in licensed occupations in 2010. They run two sets of wage regressions: cross sectional and difference in differences. Cross sectional regressions suggest that licensed workers on average earn 4% more than the average unregulated worker. Registered workers earn between 7 and 10% more. Over the period 2001-2010, security guards, care workers, social care managers, childcare workers, and automotive technicians experienced a change in their regulatory status in the UK. These occupations can be used in a difference-in-differences model. Only the licensing of security guards had a significant positive effect on wages (hourly wages increased by 6%). It is difficult to generalise with so few cases but perhaps this suggests a small but still positive wage effect of licensing.

In summary, as of 2012, occupational regulation affected 98 occupations in NZ, or at least 20% of workers. Economic theory suggests that licensing, the most restrictive form of regulation, should lead to higher wages within the affected profession. Existing empirical work from the US and UK appears to support this hypothesis. The remainder of this paper tries to more accurately estimate the percentage of NZ workers who are regulated and test the wage hypothesis within NZ.

III. Method

III.A Mapping occupational regulation in New Zealand

We begin by obtaining a list of occupations which MartinJenkins (2012) determine to be regulated. We then match these occupations to their respective ANZSCO code(s) in the spirit of Forth et al. (2011). We use the MartinJenkins (2012) list almost without change. The only deviation is that we choose to also consider all members of the New Zealand Fire Service, Police and much of the Defence Force as being subject to licensing.⁴ This is because in each of these cases practising the occupation is conditional on meeting the skill requirement laid down by the (monopolistic) organisation and this fits the definition of licensing.

We are reasonably confident that the list of regulated occupations is complete for several reasons: MartinJenkins built their list on a pre-existing one from the Australian Productivity Commission reducing the chance of omission; the MartinJenkins list was also published close to both of our datasets - the December 2012 SoWL and March 2013 Census - so there is little chance of it having been out of date for our purposes (to the best of our knowledge, there were no relevant law changes over that period); and finally, for many occupations the Careers New

⁴ Some defence force personnel carry out sets of tasks for which they could find paid employment as a civilian. If an occupation is unregulated in the civilian work force, we treat personnel carrying out the same job within the defence force as also unregulated. A radio technician is an example of such occupation.

Zealand website (www.careers.govt.nz) contains information on their regulatory status (providing us a source to cross check the MartinJenkins list against). However, the possibility of a regulated occupation being omitted from our list remains.

We match the list of regulated occupations to their relevant ANZSCO codes. ANZSCO works by identifying a set of occupations covering all jobs in the Australian and New Zealand labour markets⁵; it then defines these occupations by their attributes and groups them on the basis of similarity into successively broader categories. Categories have five hierarchical levels, from the least aggregated to the most: ‘occupation’, unit group, minor group, sub-major group, and major group (Table A1).⁶ ‘Occupation’ is defined as a set of jobs that require the performance of similar or identical sets of tasks. An example of an ‘occupation’ is a dentist. In a detailed enough survey, like the Census, any person who has the job of a dentist, dental practitioner, or dental surgeon would have his/her job recorded as 252312, the ‘occupation’ code for a dentist. ANZSCO is designed so that anyone using one of these three job descriptions is performing a set of tasks almost identical to anyone else using one of the other two job descriptions. If an individual instead worked as an endodontist, oral and maxillofacial surgeon, oral pathologist, orthodontist, paedodontist, periodontist, or prosthodontist his/her job would be recorded with ANZSCO code 252311. This is a different ‘occupation’ to a dentist but it is the same unit group of dental practitioners. Jobs within the same major group share the same first digit in their ANZSCO coding, jobs in the same sub-major group share the same first two digits, jobs in the same minor group the same three digits, jobs in the same unit group the same four digits, and finally jobs in the same ‘occupation’ share the entire six digit code.

Our matching procedure involves going through all 1,023 ‘occupation’ definitions within ANZSCO and determining which ones are regarded as regulated based on MartinJenkins

⁵ Only jobs which may legally be undertaken for pay and profit are included.

⁶ Note that we place the word *occupation* in quotation marks whenever we refer to the ANZSCO level.

(2011). One immediate limitation of our matching procedure is that not all jobs in an ANZSCO definition of an occupation may be all regulated or unregulated. Such an example is ANZSCO ‘occupation’ 149999 of ‘Hospitality, Retail, and Service Managers not elsewhere classified’. This occupation includes brothel keepers and taxi proprietors who are regulated but also laundrette owners and weight loss centre managers who are unregulated. We exclude these occupations (6 in total) from our analysis. Classifying each of the ANZSCO occupations as either fully regulated or unregulated allows us to determine which individuals in the Census and SoWL were indeed subject to regulation.

III.B Data

Unit record data were sourced from the 2013 NZ Census and the December 2012 Household Labour Force Survey (HLFS). The HLFS is a quarterly survey of households living at private addresses and provides many of NZ official statistics on the labour market. This particular HLFS was supplemented by the SoWL. This is an additional survey for HLFS respondents who at the time of the survey indicated they were currently employed. For our purposes, we are only interested in individuals who responded to the SoWL, so hereafter we simply refer to the SoWL.⁷

Neither the Census nor the SoWL contain any questions on licences to practise or on other forms of occupational regulation. However, the Census contains ANZSCO ‘occupation’ group (six-digit) codes for all primary jobs held by employed persons in the survey. Therefore, it is possible to use the matching described above to determine whether or not a Census respondent’s primary occupation is regulated.

⁷ Access to the Census and the SoWL was provided to us by Statistics NZ under conditions designed to give effect to the security and confidentiality provisions of the Statistics Act 1975. The results presented in this study are entirely our own work not that of Statistics NZ.

For the purpose of determining the percentage of individuals' main jobs in NZ affected by occupational regulation, the Census has the advantage of a very large sample size (by virtue of its purpose to survey the entire population). Over 2 million respondents in 2013 had paid employment. Therefore, any estimates are subject to negligible sampling errors. The Census also provides a rich set of demographic variables so interesting correlates of occupational regulation can be observed. However, for our purposes, the Census has a major drawback: individuals' income is presented in broad ranges, too broad for any regression to pick up a wage premium on occupational regulation of the order found by Kleiner and Krueger (2013) or Forth et al. (2011). Furthermore, this variable combines annual income from all sources not just a person's main occupation which might bias our results in an unknown direction.

Therefore, for our wage regressions, we use the SoWL. This survey had 17,046 respondents out of approximately 30,000 individuals who initially answered the HLFS. We exclude 51 individuals from the SoWL because they did not have a specific ANZSCO 'occupation' coded. Only employees were asked to report hourly wages and weekly earnings were only asked of employees and sole traders. After excluding employers and individuals who chose not to respond to the earnings questions, the SoWL sample size drops to 12,546 individuals.⁸

III.C Summary statistics and an estimate of the percentage of New Zealand workers affected by occupational regulation

Overall, approximately 29% of NZ workers are in primary occupations where occupational regulation applies (Table 1). Men (35%) are more likely to be in regulated occupations than women (22%). Minority groups are somewhat less likely than NZ Europeans (30%) to be in regulated occupations with Asians the least likely (24%). This may be related to fewer migrants being employed in regulated occupations than NZ born individuals (23 vs. 29%). However,

⁸ Like us, Kleiner and Krueger (2013) and Forth et al. (2011) also only use employee data in their hourly wage regressions.

by 20 years in NZ, the gap between migrants and natives closes. Being regulated is positively associated with income and educational qualification. Those earning \$100,000 or more annually are around 2.5 times more likely to be in regulated occupations than those earning less than \$20,000. Likewise, an individual with a postgraduate degree is twice as likely to be in a regulated occupation as someone whose highest qualification is NCEA level two or less. Consistent with regulation being associated with higher education, more than 60% of professionals are regulated. Technicians and trades workers, and machinery operators and drivers are also highly regulated at 50 and 82%, respectively.

Our estimate of the extent of occupational regulation in NZ is not strictly comparable to Kleiner and Krueger's (2013) finding that 35% of US employees are licensed or certified - we measure the number of workers whose primary jobs are subject to regulation not the number of workers who hold a license or certification. However, it seems likely that occupational regulation is much less prevalent in NZ than in the US. Why this is the case is beyond the scope of the current paper but it is consistent with anecdotal evidence that many occupations regulated in the US are not in NZ. For example, in some US states, interior decorators, pet groomers and hair braiders are licensed (The Economist, 2011) but they are not in NZ. Our estimate is much closer to the preferred estimate of 28% for the UK reported by Forth et al. (2011).

As mentioned above, we cannot use the Census to estimate the wage premium associated with regulation. Instead, we turn to the SoWL (with descriptive statistics available in Table A2). Wage/earnings data from the SoWL immediately reveal a higher pay for regulated individuals (Table 2). In all measures of financial compensation, the regulated means are substantially higher than the means for unregulated workers. However, a large part of this difference is likely due to different types of workers in regulated vs. unregulated jobs and to

the different nature of regulated occupations. Our wage regressions below control for an extensive set of such characteristics.

III.D Model

Like Forth et al. (2011), Kleiner and Krueger (2013), and Gittleman, Klee and Kleiner (2015), we use a Mincer wage model to estimate the average effect of occupational regulation (of any type) on wages. Specifically, we estimate regressions of the following form:

$$\ln(w_i) = \beta_0 + \beta_R R_i + \text{Controls} + \varepsilon_i$$

Where $\ln(w_i)$ is the natural logarithm of an individual's wage, R_i is an individual's regulation status, and ε_i is an error term.

In our simplest specification, R_i is a binary variable but since the SoWL only contains three-digit ANZSCO codes it is not simply equal to one if a person's 'occupation' is regulated (and equal to zero otherwise). Instead, it is equal to one only if all 'occupations' within the same three-digit grouping (minor group) are regulated. It is equal to zero if either all 'occupations' in the same minor group are unregulated or there is a mix of regulated and unregulated 'occupations'. Out of the 98 three-digit groupings, 18 are all regulated, 54 all unregulated, and the remaining 26 mixed. Our regressors include a dummy variable 'regulation missing' for individuals in the mixed category and β_R is hence supposed to represent the average amount a worker in a regulated occupation can expect to earn above the average of someone in an unregulated occupation when holding all controls constant. However, since around 30% of individuals with wage data are in the mixed category the estimate of β_R may be biased (in an unknown direction).

Our preferred model specification contains a continuous regulation variable. We obtain it by estimating from the Census the fraction of individuals in each three-digit ANZSCO group who are in regulated 'occupations'. We then assume that the estimated proportion (0-1) for

each three-digit group represents the probability that a person in the SoWL with the same code is regulated. β_R has the same interpretation as before but without the systematic bias of an unknown magnitude and sign. However, as some individuals are now by design of R_i effectively misclassified into the ‘treatment’ and ‘control’ groups, there will be an attenuation bias present.

Besides ‘regulation missing’ when R_i is binary, our controls include: demographic characteristics (gender, ethnicity, marital status, place of birth, region of residence, and whether the respondent lives rurally), human capital proxies (age, tenure as measured by weeks in the current occupation, and highest qualification), ‘objective’ job characteristics (whether permanent or temporary, union membership, whether an employee or self-employed, industry, one-digit ANZSCO code, and whether or not the individual has unusual hours), and self-reported ‘subjective’ job characteristics (whether the individual reported being moderately or highly stressed, whether the individual believes he/she has a moderate or higher chance of losing the current job in the next 12 months for reasons beyond his/her control, whether the individual reportedly faced harassment, discrimination or bullying at work in the last 12 months, and whether the individual reported being overall satisfied or very satisfied with all aspects of his/her main job).

The above controls are essential because, as previous literature and our descriptive statistics highlight, regulation status is correlated with other wage determining factors such as age, education and gender (Kleiner and Krueger, 2013; Kleiner, 2000). We use OLS to estimate different specifications of our model and correct standard errors for heteroskedasticity.

IV. Results

As a starting point, we estimate univariate regressions with the log of either hourly wages or weekly earnings regressed on either the binary measure of regulatory status or the

continuous measure. In these simple models, being in a regulated occupation is on average associated with approximately 25 to 28% higher hourly wages than the unregulated average, or on average 48 to 53% higher weekly earnings than the unregulated average (Table 3). Due to the large differences in the effects on hourly wages and weekly earnings, one can immediately speculate that a large portion of the weekly regulation premium is due to regulated workers being more likely to work fulltime rather than directly due to the regulations themselves.

Next, we estimate our model with a partial set of controls. These controls are variables most commonly found in other wage regressions and hence most comparable with previous studies: sex, age, marital status, union membership status, tenure (defined as the number of weeks an individual has been in his/her current job), highest qualification (Kleiner and Krueger (2013) instead have a variable for the number of years of schooling), and ethnicity. In all specifications (Tables 3 and 4), regulation is still associated with substantial – even if smaller – wage gains. In particular, a regulated worker can expect to earn on average around 11 to 12% more than an unregulated worker per hour and between 22 and 24% more per week. Estimates for control variables (Table 4) accord with expectations, based on theory and previous empirical research. For example, holding all observables constant, there is a significant wage gap between men and women in NZ (like in Genç and Smith, 2015) and there is little difference in weekly earnings between the average European New Zealander and the average Maori worker (similar to Genç and Smith, 2015).

As expected, the addition of further controls (Tables 3 and A3) reduces the size of the coefficients on the regulation variable. In particular, adding controls for the place of birth and residence, industry, the type of employment contract, unusual work hours (working at least once in the early morning, evening, night or weekend during the last 4 weeks), and the four measures of self-reported ‘subjective’ job characteristics discussed above reduces the hourly

wage premium for regulated workers to 5-8%. The gap between regulation coefficients in the weekly and hourly earnings specifications persists. The average regulated worker earns 13-17% more per week than his/her unregulated counterpart.

V. Conclusion

In our preferred specification with a full set of controls and a continuous measure of occupational regulation, regulated workers can expect to earn 5% more per hour than their unregulated counterparts. We prefer specifications using hourly wages to those using weekly earnings to be consistent with Kleiner and Krueger (2013) and Forth et al. (2011). Regressions with weekly earnings provide a robustness check on the sign of the wage premium and suggest an even larger differential.

As mentioned above, the 5% estimate using a continuous measure of regulation is subject to an attenuation bias. In reality, individuals are either in regulated professions or not and any value between 0 and 1 is therefore partially a misclassification and leads to attenuated estimates. The fact that we find economically and statistically significant, positive regulation coefficients in all model specifications makes us confident that a positive wage premium does exist. Furthermore, due to the attenuation bias, it is likely larger in reality than what our estimates suggest.

Another caveat is that we do not measure the effects of licensing, certification and registration separately. This is partly because the SoWL dataset contains ANZSCO codes only up to the three digit level and this is too coarse to determine a specific regulation status. For example, there are no three-digit ANZSCO groups made up entirely of ‘occupations’ affected by certification or registration. Using continuous measures of licensing, certification, and registration might be a possibility for future research. However, even jobs within the same ‘occupation’ may have different types of regulation. Also, since there is a lot of heterogeneity

even among regulation schemes of the same type a measure of the broad ‘regulation effect’ probably still provides a good benchmark.

With this in mind, our estimate of the broad ‘regulation effect’ is expected to be lower than any comparable estimate of the ‘licensing effect’ alone. Economic theory suggests that licensing may lead to higher wages even when its effects on education and skills are already accounted for. This is not true for certification and registration. Kleiner and Krueger (2013) provide some evidence for this by showing that certification is not associated with higher wages once individuals’ education is accounted for. So even without an attenuation bias, we might still expect our results to be lower than Kleiner and Krueger’s (2013) estimate of an 18% licensing premium. Forth et al. (2011) report that licensing is associated with 4% higher wages, registration with 10% higher wages, and certification with 3% higher wages. Our results should be compared to their 3-10% range.⁹

While a positive wage premium is consistent with the notion that occupational regulation (or at least licensing) serves to create rents for incumbent practitioners, we cannot prove causality of the estimated relationship. In other words, while we find that occupational regulation is associated with higher wages and that this premium cannot be explained by a host of observable characteristics, our estimate could still (at least partially) reflect a premium for unmeasured human capital that correlates with licensing. Future research may use a panel of SoWL cross sections in a difference-in-differences framework examining wage changes for workers in newly regulated occupations compared to workers whose regulation status has remained constant.

Finally, we suggest that future research focuses on a broader range of effects of occupational regulation in NZ. An understanding of how occupational regulation affects costs to consumers,

⁹ Forth et al.’s (2011) finding that registration is associated with higher wage gains than licensing is hard to reconcile with both theory and Kleiner and Krueger (2013).

quality of products and services, and the careers of 'locked out' individuals (those who would have entered or continued to practise an occupation absent regulation) is needed for two reasons: First, even if future research confirms a causal link between occupational regulation and higher wages, this is not necessarily indicative of welfare losses. One would need to show that changes in cost and quality of goods and services do not counterbalance the loss of efficiency due to a monopoly. Empirical evidence from the US suggests that occupational licensing has no beneficial effects on cost or quality (Colbert and Murray, 1999; Timmons and Mills, 2015) but NZ studies on the topic are lacking. Second, this paper shows clearly that occupational regulation is prevalent in NZ, more so than the minimum wage or labour unions. Therefore, even if policymakers are not concerned about the effects of occupational regulation on economic efficiency, much could be gained by understanding its wider consequences.

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Figure 1: Number of publications per year in economics journals on the subjects of occupational licensing, minimum wages, and labour unions

The first graph on the left is the number of articles published in economics journals per year on the topic of “occupational licensing” or “occupational licensure”. The middle graph is the number of articles on the topic of “minimum wage”. The graph on the right is the number of articles on the topic of “labour unions”, “labor unions” or “trade unions”. Source: Web of Science (2015)

Table 1: Descriptive Statistics from the Census

Sub-population	% regulated	Standard deviation	Base population
Total population	28.751	45.260	1,847,259
Sex			
Male	34.777	47.626	963,408
Female	22.178	41.544	883,851
Ethnicity*			
European	29.638	45.666	1,311,129
Maori	28.946	45.351	95,433
Pacific Islander	27.475	44.639	63,963
Asian	23.578	42.449	189,543
MELAA**	28.308	45.049	15,282
Age			
15-24 years	19.910	39.932	163,440
25-44 years	30.545	46.060	737,124
45-64 years	30.120	45.878	748,704
65+ years	27.708	44.756	315,642
Total income			
Less than \$20,000	13.815	34.506	344,577
\$20,001-\$40,000	22.845	41.984	515,919
\$40,001-\$60,000	34.538	47.549	442,854
\$60,001-\$100,000	40.821	49.150	554,064
\$100,000 or more	34.308	47.474	158,832
Highest qualification			
Level 2 certificate or less	19.476	39.601	674,901
Level 3 certificate	17.157	37.700	174,036
Level 4 or 5 certificate	35.766	47.931	302,490
Level 6 diploma	42.679	49.461	307,107
Bachelor's degree/other Level 7 qualification	45.944	49.835	66,981
Post-graduate degree	38.891	48.750	141,798
Years in NZ			
Born in NZ	29.170	45.455	1,332,003
0-2 years	23.134	42.169	53,739
20+ years	29.179	45.459	22,638
Relationship status			
Married or in civil union	30.724	46.135	949,908
Divorced or dissolved	28.938	45.347	146,322
Never married nor ever in a civil union	26.119	43.928	621,993
ANZSCO major groups			
Managers	11.220	31.561	327,360
Professionals	61.409	48.681	4148,82
Technicians and trades workers	49.810	50.000	224,172
Community and personal service workers	16.145	36.795	168,123
Clerical and administrative workers	2.356	15.168	224,982
Sales workers	5.248	22.299	176,004
Machinery operators and drivers	81.953	38.458	102,882
Labourers	0.000	0.000	208,854

Figures presented are based on frequencies which were randomly rounded to an adjacent base three number in order to preserve confidentiality.

* Respondents to the Census may identify with more than one ethnic group (up to six). In order to limit the number of categories, we define 'Europeans' as those individuals who choose only to identify as of New Zealand European or European ethnicity. The other categories of Maori, Pacific Islander, Asian and MELAA refer to individuals who identified as either solely of the relevant ethnicity or both of the relevant ethnicity and European. An individual who does not fit any of the above categories is included under 'Other'.

** MELAA refers to Middle Eastern/Latin American/African.

Table 2: Descriptive Statistics from the SoWL

Wage/earnings	Regulated mean	Standard deviation	Unregulated mean	Standard deviation
Hourly wage	30.70	31.08	23.47	21.19
Self-employed weekly earnings	1,553.44	1,964.40	965.20	1,466.08
Employee weekly earnings	1,253.07	1,136.97	804.88	720.27
Total weekly earnings	1,296.79	1,294.37	827.28	865.74

Figures presented are based on frequencies which were randomly rounded to an adjacent base three number in order to preserve confidentiality.

Table 3: Estimates of the impact of regulation on wages/earnings

<i>Panel A. Binary measure of regulatory status</i>						
Dependent variable	Univariate model		Partial set of controls		Full set of controls	
	Log hourly wage	Log weekly earnings	Log hourly wage	Log weekly earnings	Log hourly wage	Log weekly earnings
Regulated	0.247*** (0.014)	0.533*** (0.020)	0.110*** (0.013)	0.242*** (0.019)	0.077*** (0.014)	0.166*** (0.021)
R ²	0.075	0.074	0.377	0.307	0.486	0.445
Observations	10,704	11,964	10,704	11,964	10,266	11,514

<i>Panel B. Continuous measure of regulatory status</i>						
Dependent variable	Univariate model		Partial set of controls		Full set of controls	
	Log hourly wage	Log weekly earnings	Log hourly wage	Log weekly earnings	Log hourly wage	Log weekly earnings
Regulated	0.283*** (0.010)	0.483*** (0.154)	0.120*** (0.010)	0.224*** (0.015)	0.045*** (0.012)	0.126*** (0.019)
R ²	0.069	0.060	0.341	0.303	0.484	0.444
Observations	10,689	11,949	10,689	11,949	10,251	11,496

Note: Heteroskedasticity-consistent standard errors in parentheses

*** $p < 0.01$

The partial set of controls includes: sex, age, marital status, union membership status, tenure, highest qualification, and ethnicity. The full set of controls adds: the type of employment contract, place of birth and residence, industry, unusual work hours, and self-reported 'subjective' job characteristics (moderate or high stress, moderate or high chance of losing the current job, harassment/discrimination/bullying at work, and overall job satisfaction).

Table 4: Estimates of the impact of regulation on wages: partial set of controls

Dependent variable	<i>Binary measure of regulatory status</i>		<i>Continuous measure of regulatory status</i>	
	Log hourly wage	Log weekly earnings	Log hourly wage	Log weekly earnings
Regulated	0.110*** (0.013)	0.242*** (0.019)	0.120*** (0.010)	0.224*** (0.015)
Regulation missing	0.110*** (0.009)	0.210*** (0.015)	--	--
Female	-0.139*** (0.008)	-0.417*** (0.014)	-0.138*** (0.008)	-0.422*** (0.013)
Age	0.033*** (0.002)	0.085*** (0.003)	0.033*** (0.002)	0.087*** (0.003)
Age ² /1,000	-0.360*** (.0200)	-1.002*** (0.039)	-0.367*** (0.02)	-1.016*** (0.0387)
Married	0.097*** (0.010)	0.116*** (0.018)	0.099*** (0.010)	0.121*** (0.018)
Union membership	-0.003 (0.008)	0.055 (0.013)	-0.007 (0.008)	0.050*** (0.013)
Tenure/1,000	0.327*** (0.035)	0.595*** (0.044)	0.334*** (0.035)	0.610*** (0.045)
Tenure ² /10,000	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.002 (0.003)
NCEA 1	0.088*** (0.015)	0.072** (0.029)	0.0900*** (0.015)	0.076*** (0.030)
NCEA 2	0.125*** (0.016)	0.073** (0.033)	0.129*** (0.016)	0.081** (0.033)
NCEA 3	0.167*** (0.017)	0.142*** (0.034)	0.173*** (0.017)	0.148*** (0.034)
Certificate/diploma	0.145*** (0.010)	0.178*** (0.019)	0.148*** (0.010)	0.187*** (0.0193)
Bachelor's degree	0.449*** (0.015)	0.462*** (0.024)	0.4497*** (0.0148)	0.4663*** (0.024)
Postgraduate degree	0.562*** (0.018)	0.583*** (0.028)	0.568*** (0.018)	0.591*** (0.028)
Maori	-0.058*** (0.012)	-0.012 (0.020)	-0.060*** (0.012)	-0.017 (0.020)
Pacific Islander	-0.148*** (0.013)	-0.051** (0.025)	-0.151 (0.013)	-0.055** (0.025)
Asian	-0.187*** (0.012)	-0.131*** (0.022)	-0.185*** (0.012)	-0.128*** (0.021)
MELAA	-0.116** (0.044)	-0.197** (0.096)	-0.122*** (0.043)	-0.205*** (0.096)
R ²	0.377	0.307	0.341	0.303
Observations	10,704	11,964	10,689	11,949

Note: Heteroskedasticity-consistent standard errors in parentheses

European, male, unmarried, non-union, no qualifications are the reference categories

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A1: ANZSCO categories, version 1.2.

Hierarchal level	Coding type	Number of categories	Example
Major group	One digit	8	Professionals (2)
Sub-major group	Two digit	43	Health professionals (25)
Minor group	Three digit	97	Health therapy individuals (252)
Unit group	Four digit	358	Dental practitioner (2523)
Occupation	Six digit	1,023	Dentist (252312)

Source: Australian Bureau of Statistics (2013). Retrieved from <http://www.abs.gov.au/ANZSCO>

Table A2: Descriptive Statistics from the SoWL

Sub-population	% regulated	% unregulated	% undetermined
Total population	13.6	56.1	30.3
Sex			
Male	23.1	49.3	27.6
Female	3.9	63.0	33.1
Ethnicity*			
European	13.9	55.1	31.0
Maori	12.4	59.9	27.7
Pacific Islander	0.4	70.8	28.8
Maori and Pacific Islander	81.3	14.6	4.2
Asian	12.5	56.1	31.4
MELAA**	16.7	61.1	22.2
Other	13.4	56.1	30.6
Age			
15-24 years	9.7	73.9	16.4
25-34 years	14.4	52.7	33.0
35-44 years	14.3	52.8	32.9
45-54 years	14.1	54.4	31.5
55-64 years	13.7	54.8	31.5
65+ years	13.3	56.9	29.8
Occupation			
Managers	0.00	58.0	42.0
Professionals	19.2	21.8	59.0
Technicians and trades workers	35.4	41.1	23.5
Community and personal service workers	6.7	68.0	25.3
Clerical and administrative workers	0.0	93.0	7.0
Sales workers	0.0	72.3	27.7
Machinery operators and drivers	64.3	15.3	20.4
Labourers	0.0	100.0	0.00
Highest qualification			
No qualification	20.0	58.2	21.8
Other school qualification/ includes overseas	6.8	72.9	20.3
NCEA level 1	8.8	71.9	19.3
NCEA level 2	7.2	71.8	21.0
NCEA level 3	7.2	71.6	21.2
Other post school qualification/ includes overseas	13.2	56.0	30.8
Certificate/ Diploma	17.6	51.7	30.7
Bachelor's degree	12.8	39.0	48.1
Post-graduate degree	13.4	35.6	51.1
Qualification missing	13.3	68.8	18.0
Employment status	13.6	56.1	30.3
Paid employee	13.5	56.7	29.8
Employer	13.5	56.4	30.1
Self-employed without employees	14.1	51.2	34.6
Unpaid family worker	20.0	40.0	40.0

Figures presented are based on frequencies which were randomly rounded to an adjacent base three number in order to preserve confidentiality.

* Respondents to the SoWL may identify with more than one ethnic group (up to six). In order to limit the number of categories, we define 'Europeans' as those individuals who choose only to identify as of New Zealand European or European ethnicity. The other categories of Maori, Pacific Islander, Asian and MELAA refer to individuals who identify as either solely of the relevant ethnicity or both of the relevant ethnicity and European. An individual who does not fit any of the above categories is included under 'Other'.

** MELAA refers to Middle Eastern/Latin American/African.

Table A3: Estimates of the impact of regulation on wages: full set of controls

Dependent variable	<i>Binary measure of regulatory status</i>						<i>Continuous measure of regulatory status</i>					
	Log hourly wage			Log weekly earnings			Log hourly wage			Log weekly earnings		
	Coef.	Robust std. error	P> t	Coef.	Robust std. error	P> t	Coef.	Robust std. error	P> t	Coef.	Robust std. error	P> t
Regulated	0.077	0.014	0.000	0.166	0.021	0.000	0.045	0.012	0.000	0.126	0.019	0.000
Regulation missing	-0.002	0.010	0.865	0.082	0.016	0.000	--	--	--	--	--	--
Female	-0.007	0.034	0.828	-0.130	0.056	0.020	-0.009	0.034	0.793	-0.129	0.056	0.021
Married	0.132	0.011	0.000	0.142	0.018	0.000	0.133	0.011	0.000	0.142	0.018	0.000
Female*married	-0.141	0.034	0.000	-0.224	0.057	0.000	-0.144	0.034	0.000	-0.231	0.057	0.000
Female*single	-0.019	0.033	0.554	-0.045	0.055	0.422	-0.022	0.033	0.512	-0.053	0.055	0.336
Age	0.023	0.002	0.000	0.065	0.003	0.000	0.024	0.002	0.000	0.065	0.003	0.000
Age²/1,000	-0.2477	0.020	0.000	-0.7348	0.037	0.000	-0.245	0.020	0.000	-0.743	0.037	0.000
Tenure/1,000	0.243	0.032	0.000	0.3775	0.04	0.000	0.243	0.032	0.000	0.382	0.040	0.000
Tenure²/10,000	-0.001	0.000	0.017	-0.001	0.000	0.000	-0.001	0.000	0.017	-0.001	0.000	0.000
Union	0.009	0.008	0.270	0.074	0.014	0.000	0.006	0.008	0.439	0.073	0.014	0.000
NCEA 1	0.051	0.014	0.000	0.026	0.027	0.327	0.052	0.014	0.000	0.027	0.027	0.314
NCEA 2	0.060	0.015	0.000	0.006	0.030	0.854	0.061	0.015	0.000	0.007	0.030	0.810
NCEA 3	0.070	0.015	0.000	0.025	0.031	0.432	0.070	0.015	0.000	0.025	0.031	0.432
Level 4 or 5 certificate	0.073	0.010	0.000	0.088	0.018	0.000	0.074	0.010	0.000	0.091	0.018	0.000
Bachelor's degree/other Level 7 qualification	0.233	0.015	0.000	0.246	0.024	0.000	0.231	0.015	0.000	0.244	0.024	0.000
Post-graduate degree	0.317	0.018	0.000	0.342	0.028	0.000	0.318	0.018	0.000	0.345	0.028	0.000
Other post-school qualification	0.116	0.019	0.000	0.074	0.034	0.033	-0.039	0.011	0.000	0.078	0.034	0.023
Maori	-0.038	0.011	0.001	0.014	0.018	0.436	0.117	0.019	0.000	0.013	0.018	0.485
Pacific Islander	-0.156	0.014	0.000	-0.064	0.027	0.016	-0.159	0.014	0.000	-0.065	0.027	0.015
Asian	-0.129	0.017	0.000	-0.046	0.033	0.160	-0.130	0.017	0.000	-0.048	0.033	0.147
MELAA	-0.132	0.050	0.008	-0.185	0.102	0.070	-0.132	0.050	0.008	-0.189	0.102	0.064
Northland	-0.094	0.023	0.000	-0.191	0.032	0.000	-0.094	0.023	0.000	-0.193	0.032	0.000
Waikato	-0.094	0.014	0.000	-0.137	0.024	0.000	-0.094	0.014	0.000	-0.133	0.024	0.000
Hawke's Bay	-0.100	0.017	0.000	-0.151	0.029	0.000	-0.101	0.018	0.000	-0.152	0.029	0.000
Gisborne	-0.122	0.016	0.000	-0.159	0.029	0.000	-0.122	0.016	0.000	-0.159	0.029	0.000
Tauranga	-0.078	0.017	0.000	-0.149	0.029	0.000	-0.078	0.017	0.000	-0.149	0.029	0.000

Manawatu-Wanganui	-0.140	0.014	0.000	-0.182	0.026	0.000	-0.141	0.014	0.000	-0.183	0.026	0.000
Wellington	-0.061	0.013	0.000	-0.048	0.021	0.025	-0.061	0.013	0.000	-0.048	0.021	0.024
Nelson	-0.104	0.015	0.000	-0.180	0.030	0.000	-0.105	0.015	0.000	-0.180	0.030	0.000
Canterbury	-0.089	0.012	0.000	-0.104	0.021	0.000	-0.090	0.012	0.000	-0.104	0.021	0.000
Otago	-0.125	0.015	0.000	-0.156	0.026	0.000	-0.124	0.015	0.000	-0.154	0.027	0.000
Southland	-0.138	0.018	0.000	-0.158	0.029	0.000	-0.137	0.018	0.000	-0.156	0.030	0.000
Manager	0.006	0.016	0.695	0.092	0.023	0.000	0.009	0.017	0.600	0.105	0.024	0.000
Technician or trades worker	-0.232	0.016	0.000	-0.174	0.024	0.000	-0.218	0.015	0.000	-0.164	0.024	0.000
Community and personal service worker	-0.343	0.014	0.000	-0.412	0.025	0.000	-0.327	0.015	0.000	-0.394	0.026	0.000
Clerical and administrative worker	-0.208	0.015	0.000	-0.152	0.024	0.000	-0.197	0.015	0.000	-0.153	0.025	0.000
Sales worker	-0.260	0.017	0.000	-0.269	0.030	0.000	-0.252	0.018	0.000	-0.259	0.031	0.000
Machinery operator and driver	-0.397	0.019	0.000	-0.340	0.030	0.000	-0.375	0.017	0.000	-0.329	0.029	0.000
Labourer	-0.325	0.017	0.000	-0.407	0.031	0.000	-0.314	0.017	0.000	-0.409	0.031	0.000
Agriculture, forestry and fishing	-0.097	0.027	0.000	0.152	0.055	0.006	-0.094	0.027	0.001	0.137	0.055	0.013
Mining	0.387	0.105	0.000	0.488	0.092	0.000	0.394	0.106	0.000	0.491	0.093	0.000
Manufacturing	0.097	0.022	0.000	0.269	0.048	0.000	0.098	0.022	0.000	0.266	0.048	0.000
Electricity, gas, water and waste services	0.197	0.045	0.000	0.355	0.073	0.000	0.209	0.044	0.000	0.364	0.073	0.000
Construction	0.062	0.025	0.012	0.267	0.051	0.000	0.061	0.025	0.014	0.248	0.052	0.000
Wholesale trade	0.092	0.026	0.000	0.235	0.053	0.000	0.097	0.026	0.000	0.238	0.053	0.000
Retail trade	-0.121	0.024	0.000	-0.094	0.051	0.065	-0.116	0.023	0.000	-0.094	0.051	0.065
Accommodation	-0.081	0.023	0.000	-0.140	0.054	0.009	-0.080	0.023	0.001	-0.140	0.054	0.009
Transport, postal and warehousing	0.012	0.027	0.644	0.091	0.056	0.105	0.022	0.026	0.412	0.101	0.056	0.074
Information media and telecommunications	0.049	0.034	0.150	0.129	0.067	0.055	0.053	0.034	0.117	0.136	0.067	0.043
Financial and insurance services	0.267	0.030	0.000	0.422	0.054	0.000	0.272	0.030	0.000	0.429	0.054	0.000
Rental, hiring and real estate services	0.055	0.046	0.226	0.377	0.076	0.000	0.051	0.045	0.258	0.370	0.076	0.000
Professional, scientific and technical services	0.134	0.025	0.000	0.233	0.052	0.000	0.137	0.025	0.000	0.233	0.052	0.000
Administrative and support services	0.159	0.025	0.000	0.258	0.050	0.000	0.157	0.025	0.000	0.259	0.050	0.000
Public administration and safety	-0.011	0.024	0.645	-0.035	0.051	0.484	-0.024	0.024	0.335	-0.062	0.051	0.223
Education and training	0.017	0.022	0.459	0.011	0.050	0.827	0.009	0.022	0.698	-0.006	0.050	0.907
Health care and social assistance	-0.005	0.041	0.907	-0.208	0.074	0.005	-0.004	0.041	0.927	-0.208	0.075	0.005
Arts and recreation services	-0.061	0.027	0.025	-0.037	0.058	0.520	-0.057	0.027	0.037	-0.031	0.058	0.598

Temporary worker	-0.065	0.042	0.122	-0.101	0.087	0.246	-0.063	0.043	0.138	-0.106	0.089	0.231
Casual worker	-0.034	0.017	0.042	-0.534	0.039	0.000	-0.035	0.017	0.036	-0.534	0.039	0.000
Fixed term full time worker	0.002	0.026	0.938	-0.057	0.038	0.138	0.005	0.026	0.843	-0.054	0.038	0.160
Seasonal worker	0.003	0.025	0.891	-0.161	0.056	0.004	0.003	0.025	0.913	-0.162	0.056	0.004
Self-employed	0.061	0.047	0.198	-0.148	0.132	0.264	0.062	0.051	0.230	-0.148	0.133	0.264
Rural	-0.016	0.012	0.190	-0.018	0.021	0.385	-0.015	0.012	0.201	-0.017	0.021	0.407
European born	-0.009	0.064	0.893	0.007	0.087	0.934	-0.010	0.064	0.879	0.006	0.087	0.948
Australian born	-0.026	0.068	0.706	0.058	0.098	0.553	-0.025	0.068	0.715	0.054	0.099	0.585
Asian born	-0.126	0.066	0.056	-0.105	0.095	0.268	-0.128	0.066	0.051	-0.106	0.095	0.264
Oceania (excludes NZ) born	-0.046	0.064	0.472	0.013	0.085	0.883	-0.048	0.064	0.451	0.009	0.085	0.912
Born elsewhere	-0.040	0.064	0.528	0.049	0.089	0.582	-0.043	0.064	0.503	0.048	0.089	0.590
Stress	0.022	0.007	0.004	0.171	0.013	0.000	0.022	0.008	0.004	0.171	0.013	0.000
Harassment	-0.018	0.010	0.079	0.038	0.017	0.023	-0.020	0.010	0.048	0.036	0.017	0.034
Lose job	-0.026	0.009	0.002	-0.065	0.015	0.000	-0.026	0.009	0.002	-0.065	0.015	0.000
Satisfaction	0.038	0.009	0.000	0.097	0.017	0.000	0.038	0.009	0.000	0.098	0.017	0.000
Morning	0.018	0.010	0.069	0.147	0.016	0.000	0.017	0.010	0.099	0.147	0.016	0.000
Evening	0.094	0.009	0.000	0.096	0.015	0.000	0.094	0.009	0.000	0.095	0.015	0.000
Night	0.005	0.013	0.688	0.039	0.021	0.069	0.006	0.014	0.636	0.038	0.021	0.077
Weekend	0.001	0.008	0.873	0.060	0.014	0.000	0.001	0.008	0.934	0.059	0.014	0.000
Constant	2.658	0.076	0.000	5.057	0.121	0.000	2.647	0.076	0.000	5.054	0.121	0.000
R²		0.486			0.445			0.484			0.444	
Observations		10,266			11,514			10,251			11,496	