Are Immigrant Workers Safer Workers? The Prevalence of Non-Fatal Workplace Injuries Among Foreign Born Workers in Australia*

Andrew Clarke†

July 27, 2015

Abstract

The prevalence of workplace injuries for foreign-born workers has important fiscal implications, shaping the net impact of immigration. Using individual level data on self-reported workplace injuries, the results provide no evidence that immigrants as a whole, experience a different probability of a workplace injury relative to the native born. However, for Asian immigrants, greater levels of occupational risk are more than offset by a lower injury probability within broad occupations so that overall they face a lower injury probability. The main contribution of the paper is to show that this result can be attributed to the interaction of two factors: (1) the greater likelihood that Asian immigrants will not report sufficiently minor accidents and (2) differences in the occupation-education distribution between Asian immigrants and the native born. Further, utilizing a secondary data source, the paper also provides evidence against the hypothesis that the lower probability of experiencing a workplace injury is driven by perceived threats from job loss associated with reporting workplace accidents. Rather, these results likely reflect more pervasive underlying differences between (Asian) immigrant workers and equivalent native-born workers.

Keywords: immigrant workers, workplace safety
JEL Classification: J15, J61, J81

*The paper was completed while the author was a visiting scholar in the Office of Population Research, Princeton University. Their hospitality is gratefully acknowledged. This paper has benefited from the detailed comments and suggestions of Alicia Adsera, Mick Coelli, Ana Ferrer, Marta Tienda and seminar participants at Melbourne University.

†Department of Economics, Faculty of Business and Economics Building 105, The University of Melbourne, 111 Barry Street Carlton VIC 3053 Victoria, Australia; andrew.clarke@unimelb.edu.au.

1 Introduction

Work-related injuries, illnesses, and deaths impose considerable costs on workers, employers, and the community. These include both direct costs (such as payments to injured or incapacitated workers from workers' compensation schemes) and indirect costs (such as loss of current and future earnings, lost potential output, and the cost of providing social welfare programs for injured or incapacitated workers). For the 2008-09 financial year, the total economic cost of work-related injuries, in terms of foregone output, was estimated to be $60.6 billion, representing 4.8 per cent of Australian GDP for the same period (Safe Work Australia, 2012). In the presence of these substantial costs, as well as the considerable associated health expenditures, the prevalence of workplace injuries for foreign-born workers has important fiscal implications, shaping the net impact of immigration.

There is a large empirical literature, focusing mostly on the United States, that examines whether foreign-born workers are disproportionately employed in risky jobs. Typically, in these studies, risk is measured by mean occupation (or industry) injury or fatality rates. While studies, such as Orrenius & Zavodny (2009), provide evidence that immigrants tend to work in occupations where the mean level of injury risk is larger, focusing only upon the between occupation differences between immigrant and native workers may lead to misleading conclusions about the immigrant-native differences in the probability of experiencing a workplace injury.

Consequently, this paper utilises recent individual level survey data (2005-06 and 2009-10), which allows an examination of both the between and within occupation differences, to investigate whether immigrant workers in Australia are more or less likely to experience a workplace injury compared to native-born Australians. In contrast to other available household surveys, collected both in Australia and internationally, this data provides not only individual level demographic and socioeconomic information but also provides information on the characteristics of the job where the injury actually occurred, mitigating the effects of measurement error for the estimated relationship between job characteristics and workplace injuries.

There are several cogent reasons that motivate the study of workplace injuries for immigrants in Australia. Interactions between several factors likely affect both the incentives to report workplace injuries and incentives for safety in the workplace. First, relative to other large immigrant receiving countries, such as Canada or the United States, labour markets in Australia are somewhat regulated and offer considerable employment protection with high minimum wages and a generous welfare safety net.[1] Second, Australia has a public health system that provides subsidised payments for medical services and for a high proportion of prescription medications, available to all permanent residents. While immigrant workers might utilise health services at different rates to native-born workers, the health institutions provide access to health services for those workers that wish to utilise them. All else equal, these institutional features might be expected to increase the incidence of reported workplace injuries for immigrant workers. Additionally, Australia operates a binding and tightly controlled immigration policy that generally selects immigrants on the basis of their skill. Despite a non-trivial inflow of family-based immigrants and refugees, the share of university educated immigrants is considerably larger than that for the native-born. All else equal, higher levels of immigrant skills might be expected to reduce the incidence of workplace injuries for immigrant workers.

Utilising data on (self) reported workplace injuries, all that is observed is the marginal probability of reporting a workplace injury which is not necessarily informative about the incidence of workplace injuries. This is because the marginal probability of not reporting an injury represents the sum of the (joint) probability that an injury occurred but was not reported and the probability that an injury did not occur. However, it is this latter joint probability that provides information on the incidence of workplace injuries. Moreover, in the absence of binding reporting standards, many of the factors that likely affect the probability of experiencing a workplace injury are also the same factors that affect the reporting of workplace injuries making it difficult to identify the 'true' incidence of workplace injuries.

In order to identify the incidence of workplace injuries, this paper exploits data on the reported severity of workplace accidents. By definition, severe injuries are those that most likely require medical attention and as a consequence they are also more likely to be recalled in survey data. For sufficiently severe workplace accidents, the joint probability, that an injury occurred but was not reported, will become sufficiently small such that the probability of experiencing a reported workplace injury will approach the 'true' probability of actually experiencing an injury. The identifying restriction is that these severe accidents are not random events but rather are avoidable and under the control of the individual so that there is useful information contained in the data on severe accidents.

The analysis presented in this paper leads to several key findings. First, the results

[1] For example, using 2006 OECD data, the ratio of the minimum wage to median wages for full-time workers was 0.54 in Australia, 0.40 in Canada, and 0.33 in the United States. Similarly, the OECD's index of the strictness of employment protection for individual and collective dismissals, was 1.42 for Australia, 0.92 for Canada, and 0.26 for the United States in 2006.

confirm the main findings from previous studies, such as Orrenius & Zavodny (2009, 2013), that immigrant workers are more likely to be employed in occupations that are characterised by higher mean injury rates. Second, the results presented in this paper provide no evidence that immigrants as a whole, experience a different probability of a workplace injury relative to the native born. There is also no evidence that immigrants from either English speaking countries of birth or immigrants from non-Asian, non-English speaking countries of birth, experience a different probability of a workplace injury relative to the native born. However, Asian immigrants face a significantly lower probability of a reporting a workplace accident. For Asian immigrants, greater levels of occupational risk are more than offset by a lower injury probability within broad occupations so that overall they face a lower injury probability.

This lower probability of a workplace injury for Asian immigrants is consistent with previous studies, such as Sinclair et al. (2006) and Zhang et al. (2009), based on U.S. data. This lower probability of a workplace injury for Asian immigrants is also large in magnitude—it is almost equivalent in magnitude to the additional higher probability faced by workers in technicians & trade occupations, relative to managers, or about 50% of the additional higher probability of injury faced by labourers, relative to managers, or about 50% of the additional higher probability of injury faced by shift workers.

One contribution of this paper is that it explores the sources of this lower injury probability for Asian immigrants. Restricting attention to injuries that involved at least five days absence from work, the results indicate that approximately 75% of the lower injury probability for Asian immigrants might be attributed to the non-reporting of minor injuries (involving less than 5 days absence). However, even for major injuries, Asian immigrants continue to exhibit a weakly statistically significant lower injury probability, providing weak evidence for greater workplace safety for Asian immigrants.

Further analysis reveals that most of this lower injury probability associated with major injuries can be explained by differences in the occupation-education distribution between Asian immigrants and native-born workers. Rather than reflecting an underlying greater latent safety for Asian immigrant workers, this lower injury probability is a function of domestic labour market institutions affecting the utilisation of immigrant skills where more educated immigrants, with a lower probability of reporting a workplace injury, tend to be employed in occupations with a higher mean injury rate. This has two important implications. First, a lower incidence of workplace injury might be an ignored consequence of the inefficiency in the utilisation of immigrant skill across broad occupation-education cells. Second, the lower probability of experiencing a workplace injury for Asian immigrants is largely explained by the interaction of two factors: a lower probability of reporting minor workplace accidents and immigrant-native differences in the broad occupation-education distribution.

Utilizing a secondary data source that contains information on the location of injuries, either while working or not-working, the paper presents evidence that Asian immigrants face a lower and similar probability of experiencing an injury both inside and outside work environments. Since this data is not entirely suitable for an analysis based upon the severity of injuries, it is difficult to determine whether these lower injury probabilities for Asian immigrants mainly reflect a greater safety of Asian immigrants, both at work and outside work environments, or a greater likelihood of not self-reporting relatively minor accidents in surveys. Nonetheless, the results provides suggestive evidence against the hypothesis that the lower probability of experiencing a workplace injury is driven by perceived threats from job loss associated with reporting workplace accidents. Rather, it suggests that the lower probability of workplace accidents likely reflects a more pervasive underlying difference between (Asian) immigrant workers and equivalent native-born workers.

The remainder of the paper is organised as follows. A review of the existing evidence for differences in the injury probabilities for immigrant and native workers as well as a discussion of the theoretical mechanisms that might produce these differences (Section 2) is followed by sections discussing the identification strategy (Section 3), the data used in the paper (Section 4), and the estimated empirical models (Section 5). Section 6 presents the results based upon the mean occupational injury rate, Section 7 presents results for the individual level injury rate, and Section 8 provides a discussion of the potential mechanisms that might be consistent with the empirical results. A final section provides a summary of the main findings and some concluding remarks.

2 Theoretical Considerations and Existing Evidence

A large empirical literature has examined whether foreign-born workers are more likely to be employed in occupations with greater mean levels of occupational risk for workplace accidents. Typically, in these studies, risk is measured by mean occupation (or industry) injury or fatality rates. For example, using data on non-fatal injuries for the United States between 2003-2005, estimates from Orrenius & Zavodny (2009) imply a difference of 10.69 injuries per 10,000 workers for the average immigrant worker, relative to an equivalent average native-born worker. Evidence presented in Orrenius & Zavodny (2009) and Dávila et al. (2011)

suggests that foreign-born workers with limited English language skills, particularly Hispanics, face greater levels of occupational risk. Corroborating this evidence, Marvasti (2010) presents evidence that U.S. states with a greater proportion of English deficient foreign-born workers tend to exhibit greater rates of workplace injury. Similarly, using data for Spain covering 2001-2010, results in Amuedo-Dorantes & Borra (2013) imply a difference of 123 injuries per 10,000 workers for the average immigrant worker, relative to an equivalent average native-born worker.

Orrenius & Zavodny (2013) provide several theoretical foundations for this evidence that immigrants tend to work in riskier occupations. First, immigrant workers who generally have less human capital and wealth might be more willing to trade-off occupational risk in exchange for higher wages. Second, all else equal, immigrants may be more likely to work in riskier occupations because they have different perceptions or knowledge of injury risk, relative to native born workers. In this case, relative to native-born workers, immigrants might be more willing to take risky jobs because they do not perceive them as particularly risky.

While studies such as Orrenius & Zavodny (2009) provide evidence that immigrants tend to work in occupations where the mean level of injury risk is larger, only when immigrant and native-born workers face the same probability of experiencing an injury within occupations are these studies informative about immigrant-native differences in the injury probability. In the presence of within-occupation variation, the estimated probabilities of experiencing a workplace injury will reflect both between and within occupation variation. Consequently, immigrants might face an overall lower probability of experiencing a workplace injury despite their tendency to work in occupations with greater levels of occupational risk.

The existing literature provides mixed evidence that immigrants are less likely to experience work-related injuries, relative to an equivalent native-born worker. Using the National Health Interview Survey (NHIS) 2000-2003, Sinclair et al. (2006) find that immigrant workers face a lower probability of experiencing a non-fatal workplace injury, relative to an 'observationally equivalent' native born worker. Using the same data, Zhang et al. (2009) present evidence to support this conclusion. In contrast, Hao (2008), using survey data from the Survey of Income and Program Participation (SIPP) and adopting quite a different econometric methodology (survival analysis), concludes that immigrants have a 32% greater hazard of experiencing a workplace injury, relative to a native-born worker. Interestingly, Hao (2008) also finds that workers who identify their ethnicity as Asian (not necessarily foreign born) face a 54% lower hazard of experiencing a workplace injury. For Canada, Smith & Mustard

(2009) find that, after controlling for demographic and other socioeconomic characteristics, immigrant men were more likely to report experiencing a workplace injury that required medical attention. Orrenius & Zavodny (2013) provide references to the mixed evidence for European host countries.

The principal explanation for higher individual injury probabilities for immigrant workers is based upon the sorting of immigrant workers into risker occupations. Orrenius & Zavodny (2013) provide several theoretical foundations for this evidence that immigrants tend to work in riskier occupations. Further, Hao (2008) suggests that these higher injury probabilities are driven by lower levels of English language proficiency for immigrants. However, the existing literature is less forthcoming with explanations for a lower injury probability for immigrant workers.

A lower injury probability for immigrants might arise because workplace safety is a defining characteristic of immigrants. This might arise as a consequence of self-selection in the immigration decision. In the case that workers with a greater level of latent safety are also the most productive, positive selection of immigrants on unobserved productivity would imply immigrants are drawn from the top of the work safety distribution in source countries.

Alternatively, immigrants might be inherently safer than native born workers as a consequence of a higher level of risk aversion to fluctuations in labour market earnings. This might reflect either self selection of immigrants if preferences for income risk are correlated with unobserved productivity or a fundamental ethnic attribute of all individuals of a given ancestry, not just immigrants. There is some international evidence that seems to suggest that immigrants display a greater level of (income) risk aversion, relative to the native-born (Carroll et al., 1999, Bonin et al., 2009, Benjamin et al., 2010, Fang et al., 2013). In contrast, the Australian evidence on immigrant savings behaviour does not provide any convincing evidence supporting greater levels of immigrant risk aversion (Doiron & Guttmann, 2009, Islam et al., 2013). Moreover, Gallizi & Tempesti (2015) is one of the few studies to provide evidence on the relationship between risk tolerance and occupational injuries. Based upon a general measure, more risk tolerant individuals experience fewer injuries while more specific measures of risk tolerance, based upon observed risky behaviours, are related to higher injury probabilities. Their study does not explicitly study the relationship between risk tolerance and occupational injuries for immigrant workers.

Rather than relying upon the characteristics of immigrants, another explanation relies upon the differential sorting of immigrants into occupation-education cells. Immigrant workers would exhibit a lower relative injury probability if they tend to be employed in occupation-education cells where the probability of injury is considerably lower than the native born. This might arise where highly educated immigrant workers, with a lower injury probability, are sorted into riskier occupations as a result of labour market inefficiencies in matching immigrant skill to jobs.[2] This explanation would then imply no immigrant-native difference in the injury probability if immigrants and natives had the same occupation-education distribution.

Gallizi et al. (2010) provide evidence documenting the prevalence of considerable under-reporting of workplace injuries, with under-reporting rates up to 37%. Factors affecting the reporting of workplace injuries include time stress, concerns about reputation and career, and fears of income loss. In light of this evidence, there are several alternative explanations which imply that a lower injury probability for immigrant workers might arise from a differential pattern of reporting of workplace accidents between the native born and immigrants. One explanation attributes the lower reported injury probability for immigrants to a systematic under reporting of workplace injuries resulting from a perceived higher threat of job loss associated with reporting of workplace accidents. Another explanation attributes the lower injury probability for immigrants to a systematic under reporting of workplace injuries resulting from different valuations or perceptions of workplace risk. A further explanation might arise from a 'cultural norm' restricting the communication of private information about the state of one's health to survey interviewers.

In summary, the existing empirical literature provides, at best, mixed evidence regarding the relative incidence of workplace injuries for immigrant workers, relative to native-born workers. Additionally, there are many complex and interacting causal mechanisms that might produce either an overall higher relative injury probability or an overall lower relative injury probability for immigrant workers. Despite this, utilising an appropriate identification strategy, this paper will be able to provide evidence regarding the relative importance of explanations based upon a differential pattern of reporting of workplace accidents between the native born and immigrants, compared to explanations based upon differences in their levels of underlying workplace safety.

[2]In contrast, Premji & Smith (2013) provide some evidence for higher relative work injury rates for immigrant workers in Canada whose education exceeds that of their job requirements but only for very recently arrived male immigrants (no more than five years). Utilising only four occupational skill groups, the 95% confidence interval around the odds ratio of injury is considerably large, suggesting the estimate is somewhat imprecisely estimated. Additionally, there is a lack of consensus around the use of jobs analysis for the measurement of over-education (Leuven & Oosterbeek, 2011).

3 Identification Strategy

Consider a variable z_i^* representing latent worker safety such that levels of z_i^* above some threshold level $\bar{z}_i$ result in a workplace injury. Similarly, consider a variable y_i^* representing latent worker propensity to (self) report workplace injuries such that levels of y_i^* above some threshold level $\bar{y}_i$ result in the reporting of a workplace injury. Neither z_i^* nor y_i^* are observed. Rather only the binary indicators z_i (whether an injury occurred) and y_i (whether an injury was reported) are observed where:

$$z_i = \begin{cases} 1 & \text{if } z_i^* > \bar{z}_i \\ 0 & \text{if } z_i^* \leqslant \bar{z}_i \end{cases}$$

and

$$y_i = \begin{cases} 1 & \text{if } y_i^* > \bar{y}_i \\ 0 & \text{if } y_i^* \leqslant \bar{y}_i \end{cases}$$

With only data on (self) reported workplace injuries, all that is observed are the marginal probabilities $\Pr(y_i = 1)$ and $\Pr(y_i = 0)$. Under the assumption of no 'false positives' (no reporting of any injuries that did not occur), the joint probability $\Pr(z_i = 0, y_i = 1) = 0$. Consequently, the observed marginal probabilities may be written in terms of the joint probabilities:

$$\Pr(y_i = 1) = \Pr(z_i = 1, y_i = 1)$$
$$\Pr(y_i = 0) = \Pr(z_i = 1, y_i = 0) + \Pr(z_i = 0, y_i = 0)$$

where the marginal probability that an injury is not reported, $\Pr(y_i = 0)$, is composed of the sum of two joint probabilities. The first term, $\Pr(z_i = 1, y_i = 0)$, is the probability that an injury occurred but is not reported. Higher values for this joint probability would be associated with a greater probability of 'under-reporting' workplace injuries. The second term is the joint probability that an injury did not occur and is not reported. With no 'false positives', this second term, will be equivalent to the marginal probability $\Pr(z_i = 0)$. Higher values for this joint probability would be associated with greater safety at work, a lower probability of experiencing a workplace injury.

It is the marginal probability $\Pr(z_i = 0)$ that is informative about workplace safety, the probability of experiencing a workplace injury. However, all that is observed is the marginal probability $\Pr(y_i = 0)$ which only provides information on the reporting of workplace injuries but is not necessarily informative about the incidence of workplace injuries. Obviously if there is no under-reporting then the joint probability $\Pr(z_i = 1, y_i = 0) = 0$ such that $\Pr(z_i = 0) = \Pr(y_i = 0)$.

Moreover, in the absence of binding reporting standards at the individual level, many of the factors that are likely to affect the probability of experiencing a workplace injury are also the same factors that affect the reporting of workplace injuries making it difficult to identify the 'true' incidence of workplace injuries. For example, labour market institutions that provide employment protections and generous unemployment benefits might encourage the reporting of workplace injuries. However, at the same time, these labour market institutions might also create a moral hazard problem, inducing workers to engage in more risky behaviour. Alternatively, access to affordable health care might encourage the reporting of injuries yet at the same time engendering workers to engage in more risky workplace behaviour.

The identification strategy utilised in this paper exploits data on the reported severity of workplace accidents. For the purposes of this paper, these severe workplace injuries will be defined as those injuries requiring at least five days absence from work. These severe injuries are those that are most likely to be reported to employers because they required medical attention. In general, workers with an absence of at least five days would require some documentation from a health professional providing evidence to support the absence from work. Moreover, in self-reported survey data, these severe injuries are also more likely to recalled by survey respondents. In terms of the framework outlined above, for sufficiently severe workplace accidents, the joint probability, that an injury occurred but was not reported, will become small such that the probability of experiencing a reported workplace injury will approach the 'true' probability of an experiencing an injury. In summary, restricting attention to major injuries mitigates the 'under-reporting' problem so that major injuries are relatively more informative about the relative safety of immigrant workers, compared to minor injuries.

In order to ensure that there is useful information contained in the data on major accidents, the identifying restriction is that these major accidents are not random events but rather are somewhat avoidable and under the control of the individual.Otherwise, a finding of no significant difference in the incidence of severe workplace injuries between immigrant and native-born workers would simply reflect the stochastic nature of these severe injuries, rather than any similarities in underlying latent safety. Some suggestive evidence for this identifying restriction is provided by Occupational Safety and Health Administration (2012).

4 Data

The analysis in this paper utilises two main sources of data. The first source of a data are derived from the 2005-06 and 2009-10 cross sections of the Multi-purpose Household Survey (MPHS). The second source of data, which effectively is used as a replication sample, are derived from the 2004-05 National Health Survey (NHS).

The MPHS is conducted annually in Australia from June to July as a supplement to the (Australian) Labour Force Survey (LFS). Each month, one-eighth of the dwellings selected for inclusion in the LFS sample are rotated out of the survey. One third of this outgoing rotation group are selected as the sampling frame for the MPHS. For these dwellings, one person aged 15 years and over is randomly selected and administered the MPHS survey instrument (Australian Bureau of Statistics (2007) and Australian Bureau of Statistics (2011)). For the purposes of this paper, both the 2005-06 and the 2009-10 cross sections collected detailed information on work related injuries for a sample of individuals aged 15 years and over who worked some time in the previous twelve months. For the 2005-06 data, an additional one-third of dwellings in the outgoing rotation group were selected for a 'top-up' sample providing information on work related injuries. Since this 'top-up' sample does not provide any information on the educational attainment of respondents, it will not be used in the analysis. In contrast to other household surveys, the injury data available in the MPHS is not only able to be matched to both individual level demographic information but also matched to the characteristics of the job where the injury occurred, mitigating the effects of measurement error for the estimated relationship between job characteristics and workplace injuries.

The MPHS defines a work related injury as:

> *"Any injury or illness or disease which first occurred in the last 12 months, where a person suffers either physically or mentally from a condition that has arisen out of, or in the course of, employment.*

Following Australian Bureau of Statistics (2007, 2011), the injury or illness is considered to be in scope if the respondent first became aware of it in the last 12 months, even though the cause of the injury or illness may have occurred outside the 12 month reference period. Included are injuries or illnesses that occurred while commuting to and from work, outside the place of work but while on work duty, or during work breaks. Information was collected about the respondent's most recent work-related injury or illness if there was more than one work-related injury or illness in the reference period.

The MPHS data provide a moderate level of detail on the type of injury. As this paper concentrates on physical workplace injuries, any injuries identified as being primarily caused by stress or other mental conditions are excluded. As a result of the inability to consistently code injury types in the two MPHS samples, injuries caused primarily by burns are also excluded. There is considerable variation in the severity of the type of workplace injuries in the data, ranging from abrasions and grazes through to bone fractures, crushing injuries, and injuries involving amputations.

The second data source is the sixth National Health Survey (NHS) with data collection taking place between August 2004 and July 2005. Within each selected household, a random sub-sample of one adult aged 18 years and over and one children aged less than 18 years usually resident in the household is selected ((Australian Bureau of Statistics, 2006). Only the 2004-05 version of the NHS collected information on recent injuries which are defined as:

> *"An accident, harmful incident, exposure to harmful factors or other incident which resulted in an injury. The injury must have occurred in the four weeks prior to the survey and have resulted in one or more of the following actions being taken:*
>
> – *consulting a health professional;*
> – *seeking medical advice;*
> – *receiving medical treatment;*
> – *reduced usual activities; and*
> – *other treatment of injury (i.e. taking medications, using a bandage/bandaid, or heat or ice pack).*

The NHS sample allows the identification of injuries that occurred while an individual is engaged in duties required by their employment contract and those injuries that occurred outside employment. While the particular workplace injuries cannot be matched to job characteristics where the injury occurred, the NHS sample facilitates an investigation of the incidence of workplace injuries relative to non-workplace injuries.

Although the NHS data provide a 'replication' sample for the MPHS data, the two samples represent different populations. Despite this, an examination of Table A.1 in the

Appendix reveals the samples are moderately similar with respect to selected sample characteristics. The exception is the education distribution in the sense that the NHS sample has a greater share of individuals with certificate & diplomas and a lower share of individuals with university qualifications. However, the shares of individuals with any post-secondary qualifications are relatively similar between the two samples. With respect to the injury data, the two samples are not directly comparable for several reasons. First, the reference period for injuries in the NHS data is only four weeks while the reference period for injuries in the MPHS is the previous 12 months. Second, the NHS only collects information on current labour market status so it is not possible to relate injuries to the job where it occurred. In order to use current job information restricts the analysis to individuals currently employed. However, this misses severe injuries that might result in non-employment or misclassification of occupation if the injury resulted in an occupational change. Third, the NHS sample includes poisoning events in the definition of injuries where the MPS sample does not. Finally, workplace injuries can only be identified in the NHS sample for events that required medical attention.

Both data sources contain a population sampling weight, representing the inverse of the probability of inclusion in the sample, which is used to estimate all means and regression coefficients. For the MPHS samples, the sampling weights are adjusted such that that the population estimates are representative for the population at the midpoint of the 2004-05 population and the 2009-10 population. In addition, a set of 30 replicate weights for the MPHS sample and 60 replicate weights for the NHS sample are used to apply a jackknife variance estimator that takes account of the respective complex survey designs.

Consistent with the recall period for workplace injuries in the MPHS data, the MPHS sample is restricted to individuals who were employed some tine in the previous 12 months. This implies that workers reporting an injury in the MPHS sample might be currently unemployed or out of the labour force. In contrast, the NHS sample is restricted to individuals currently employed in the reference week.

Both samples are restricted to individuals aged 25-59 years old in order to mitigate potential bias resulting from non-random sample selection associated with participation in education.[3] Second, in order to avoid spurious correlations in the sample between age at migration and years since migration, arising as a consequence of the overall age restriction, all immigrants who immigrated before the age of 15 are excluded from the analysis. Additionally, immigrants arriving before 1955 are excluded as it is not possible to measure age at immigration for this arrival cohort.

Descriptive Statistics

Table 1 presents sample mean (self-reported) injury rates across selected sample characteristics. Males, older workers, in particular those aged over 35 years of age, and those employed in jobs requiring shift work are more likely to report a workplace injury. Generally, mean injury rates are lower for university educated workers. Consistent with previous research, the occupations where the risks of injury are larger are the traditional 'blue-collar' occupations (technicians & trades, machinery operators & drivers, and labourers). Probably reflecting their reduced job security which affects incentives for workplace safety and reporting, and consistent with the evidence in Gaudalupe (2003), employees on fixed term contracts are less likely to experience a workplace injury. Interestingly, there does not appear to be any difference in the mean injury rates for workers with and those without paid leave entitlements, such as annual leave and sick leave. Self-employed workers are also less likely to report a workplace injury. An examination of Table 1 reveals some evidence for a reduction in the mean reported injury rate between 2005-06 and 2009-10. With only two cross sections, it is not possible to determine whether this reflects cyclicality in the injury rate or a secular trend in the injury rate.

Importantly, the evidence presented in Table 1 reveals considerable heterogeneity in the mean injury rates across broad immigrant groups. While immigrants from English speaking countries of birth, have a slightly higher mean injury rate, immigrants from Asian countries of birth have a lower mean injury rate. There is no evidence of a difference in the (unconditional) mean injury rate for immigrants from non-Asian, non-English countries of birth. The (unconditional) mean injury rate for immigrants from Asian countries of birth is

[3]While it is possible to identify 15-24 year olds who are currently studying there are several reasons for excluding these individuals. First, the sample of individuals aged 15-24 who are not currently studying, are likely to differ systematically from the sample of 15-24 year olds who are currently studying in terms of their unobservable characteristics which are likely correlated with participation in education and potentially the probability of experiencing a workplace injury. Second, there are immigrant-native differences in latent probabilities of inclusion in the labour force survey associated with participation in education. Immigrants on temporary visas, including students, are in scope for the Labour Force Survey provided they are resident in Australia for 12 months during a 16 month reference period. Since many international students, who return to their source countries each year, would not satisfy this residency test, the LFS sample, and subsequently the MPHS sample, is likely to contain a non-random sample of immigrants who are currently studying.

approximately 0.24 probability points lower than that for the native born. This difference in the unconditional mean injury rate between native-born workers and Asian immigrants is similar to that obtained for the conditional mean injury rate from the estimated models, reported in Table 4. This unconditional effect is quite large in magnitude and is broadly equivalent to the difference in the injury rate between high school dropouts and university educated workers, or approximately half of the difference in mean injury rates between shift and non-shift workers.

An examination of Table 2 reveals some differences in the sample characteristics between immigrant, particularly Asian immigrants, and native born workers that might account for the lower mean injury rate for Asian immigrants reported in Table 1. Immigrants from Asian countries of birth are generally younger than both Australian born workers and immigrants from other source countries, with almost half of all immigrant workers from these other, non Asian source countries aged over 45 years. More importantly, there are large differences in the relative educational attainment of immigrant workers across source countries. While the share of university educated workers exceeds that for Australian born workers for all immigrants, over 50% of all Asian immigrants have a university-level education (compared to just over 25% of native-born workers). This primarily reflects the emphasis of recent Australian immigrant selection policy on post-secondary qualifications.

Further examination of Table 2 reveals that the job characteristics (occupation, contract type, availability of leave entitlements, shift work, and self-employment) for immigrants from English speaking countries is remarkably similar to the native-born. In contrast, the occupation distribution of non-English immigrants, both Asian and non-Asian, is quite different to the native-born with a greater share of workers employed in the least skilled and riskier occupations (labourers) and a smaller share of workers employed in the most skilled occupations (managers). Relative to the native born, immigrants from non-English countries of birth, particularly Asian immigrants, are more likely to be employed as shift workers. Overall, combining the evidence in Tables 1 and 2, Asian immigrants tend to exhibit sample characteristics consistent with a lower risk of injury (higher educational attainment, lower mean age) and at the same time exhibit sample characteristics associated with a greater risk of injury (more likely employed in riskier occupations, more likely employed in jobs requiring shift work, and less likely to be self-employed).

As a prelude to the analysis which follows, it is feasible to decompose the unconditional raw immigrant-native difference in mean injury rates $(\overline{\text{inj}}_M - \overline{\text{inj}}_N)$ into two terms:

$$(\overline{\text{inj}}_M - \overline{\text{inj}}_N) = \sum_{j=1}^{J} s_{Nj}\,(\overline{\text{inj}}_{Mj} - \overline{\text{inj}}_{Nj}) + \sum_{j=1}^{J} \overline{\text{inj}}_{Mj}\,(s_{Mj} - s_{Nj})$$

where s_{Mj} and s_{Nj} refer to the shares of immigrant and native-born workers in occupation j respectively. Similarly, $\overline{\text{inj}}_{Mj}$ and $\overline{\text{inj}}_{Nj}$ refer to the mean injury rate for immigrant and native-born workers in occupation j respectively. The first term represents the difference in the mean injury rate associated with intra-occupation variation. If, within occupation mean injury rates are identical for immigrant and native-born workers then this term would be zero. The second term represents the difference in mean earnings associated with inter-occupation variation. If the share of immigrant and native-born workers in each occupation are identical so there is no occupational segregation, this second term would be zero. For English speaking immigrants and Asian immigrants, the inter-occupation term is approximately zero so that the raw difference in mean injury rates, 0.010 and -0.024 respectively, mainly reflects within occupation differences in the mean injury rate. In contrast, for non-Asian workers, the intra-occupation term is essentially zero so that the small raw difference of 0.004 mainly reflects differences in the occupation distribution between native-born and non-Asian immigrant workers.

5 Empirical Model

The analysis begins by estimating an econometric model, utilised in existing research such as Orrenius & Zavodny (2009), for identifying the immigrant-native differences in occupational risk for workplace injuries of the form:

$$\text{injury}_{jst} = \beta_0 + \sum_{s=2}^{S} \beta_s\,\text{STATE}_{ijst} + \beta_t\,\text{YEAR2009}_{ijst} + \mathbf{Z}_{ijst}^{T}\,\gamma + \beta_M\,\text{M}_{ijst} + \varepsilon_{ijst} \qquad (1)$$

where the dependent variable injury_{jst} refers to the mean injury rate per 10,000 workers in occupation j, in state s, in year t, calculated from the individual level data, weighted using the provided person level weights. The dependent variable is defined across 60 groups defined by six occupational categories (Managers, Professionals, Technicians & Trades, Sales, Service & Administration, Plant Operators, and Labourers), five state of residence categories (New South Wales, Victoria, Queensland, South Australia & Western Australia, and Tasmania, Northern Territory & Australian Capital Territory), and two year categories (2005-06 sample and 2009-10 sample).

The variable M is a dummy variable indicating whether individual i is foreign born. The vector of characteristics $\mathbf{Z}$ includes a basic set of controls (a quartic in age, an indicator for urban/rural area of residence, an indicator for gender, an indicator for immigrants that arrived prior to 1996, and an indicator for the 2009-10 sample), a set of extended controls that includes controls for the characteristics of the main job (hours of work per week, duration of job, type of contract, paid entitlements) and household characteristics (family type, indicators for the presence of children under the age of 15, marital status), and a set of education controls for highest educational attainment (high school dropout, high school graduate, certificates & diplomas, university). Observations are weighted using the provided sample weights and the standard errors are clustered by occupation, state, and year.

The disadvantage of econometric model (1), based upon the mean occupational injury rate, is that it only utilizes the between occupation variation in injury rates. Although the estimated model provides information about the immigrant-native differences in levels of mean occupation risk, it is relatively uninformative about immigrant-native differences in the individual level probability of experiencing a workplace injury. Only when immigrant and native-born workers face the *same* probability of experiencing an injury within occupations is model (1) informative about immigrant-native differences in the injury probability. The availability of individual level data permits the estimation of an econometric model that utilises both the between and within occupation variation which potentially provides information about immigrant-native differences in the probability of experiencing an injury. Consider the following individual level model:

$$\text{injury}_i = \beta_0 + \sum_{s=2}^{S} \beta_s \, \text{STATE}_{is} + \beta_t \, \text{YEAR2009}_i + \mathbf{Z}_i^T \, \gamma + \beta_m \, \text{M}_{ij} + \varepsilon_i \qquad (2)$$

where the dependent variable injury_i is an indicator variable identifying whether individual i experienced a workplace injury in the previous 12 months. The variable STATE_{is} is an indicator variable identifying individual i's residence in state s and the variable M_{ij} is a dummy variable indicating whether individual i is foreign born and a member of immigrant group j. The vector of controls $\mathbf{Z}_i$ is identical to that included in model (1) above.

Including earnings as a control variable might be justified to the extent that higher earnings increase the opportunity cost of being injured at work and would tend to be associated with a lower injury probability. However, the estimating equation (2) does not include hourly wages as a control variable. This may be motivated in several ways. First, the MPHS data only provide earnings for the current job rather than the job where the injury occurred, confounding the estimated relationship between earnings and workplace injuries. Second, earnings are likely to be endogenous in the sense that unobserved variables, such as ability, that are correlated with both earnings and the probability of injury will generate an omitted variable bias. Furthermore, in the presence of compensating wage differentials the direction of causality might be expected to run from injury probabilities to wages. Consistent estimates of the parameters in model (2) would require a valid instrumental variable that is correlated with earnings but not correlated with the unobservable determinants of workplace injuries, which would generally be unavailable in the survey data used in this paper. Third, Clarke & Skuterud (2013) provide evidence of only modest differences in earnings, even across education groups, between immigrant and native-born workers in Australia, suggesting that, after controlling for individual job and demographic characteristics, immigrant-native differences in earnings would be unlikely to be a major factor driving differences in workplace injuries.

The estimating equation (2) does not include controls for (immigrant) years of residence in Australia. Since the data essentially represent a cross-section, years of residence and arrival cohort are not separately identified. The paper is not particularly focused on the assimilation in rates of workplace injury for immigrant workers so controls for arrival cohort (or years of residence) would simply be used to control for the variation in workplace injuries arising from a differing composition of the immigrant groups (English speaking, Asian, and non-Asian) by years of residence. Including controls for years of residence in model (2) provides effects which are generally small in magnitude and imprecisely estimated, mainly because the data provide for relatively few workplace injuries for Asian and non-Asian immigrants by broad arrival cohort such that the interaction effect (source region and years of residence) is not well identified. Overall, years of residence effects are unable to quantitatively account for much of the variation in injury rates across immigrant groups.

In order to more directly measure the extent to which immigrant-native differences in the occupation-education distribution, as opposed to other differences such as job or household characteristics, can account for the observed differences in the probability of a workplace injury, it is instructive to calculate a counter-factual predicted relative injury probability if immigrant and native-born workers had the same occupation-education distribution. Consider the following linear version of econometric model (2) which can be used to investigate how differences in the occupation-education distribution affect the predicted relative probability of a workplace injury:

$$\left\{\text{injury}_i - \mathbf{W}_i^T\,\phi\right\} = \text{M}_i\,\left\{\sum_{j=1}^{3}\sum_{k=1}^{4}\beta_{jk}^m\,\text{EDUC}_{ij} * \text{OCCUP}_{ik}\right\} + \varepsilon_i \tag{3}$$

where injury_i is an indicator variable for whether individual i reported a workplace injury, EDUC_{ij} is a indicator variable for three levels of education attainment (high school or less, certificate & diploma, university) and OCCUP_{ik} is a indicator variable for four occupations of employment (managers & professionals, technicians & trades, sales, service & administration, and plant operators & labourers), and:

$$\mathbf{W}_i^T\,\phi = \beta_0 + \sum_{s=2}^{S}\beta_s\,\text{STATE}_{is} + \beta_t\,\text{YEAR2009}_i + \mathbf{Z}_i^T\,\gamma + \beta_m\,\text{M}_i$$

where the vector $\mathbf{Z}$ includes controls for occupation of employment, educational attainment, occupation-education interactions, and controls for job and household characteristics. In the presence of differences in the occupation-education distribution between immigrants and the native-born, the estimated immigrant effect $\hat{\beta}_m$ in the econometric model (2) represents the weighted mean immigrant effect across occupation-education categories, which is equivalent to $\hat{\beta}_m = \sum_{j=1}^{3}\sum_{k=1}^{4} s_{jk}\,\hat{\beta}_{jk}^m$ where $\hat{\beta}_{jk}^m$ is estimated from model (3) and s_{jk} is the share of immigrants in education group j in occupation k. A counter-factual immigrant effect can then be constructed based upon a counter-factual occupation-education distribution as $\tilde{\beta}_m = \sum_{j=1}^{3}\sum_{k=1}^{4} \tilde{s}_{jk}\,\hat{\beta}_{jk}^m$ where $\tilde{s}_{jk}$ is the counter-factual (e.g. native-born) occupation-education distribution and $\hat{\beta}_{jk}^m$ is estimated from model (3). The counter-factual immigrant effect $\tilde{\beta}_m$ provides the predicted (relative) injury probability if immigrants and natives had the same occupation-education distribution.[4]

[4] Following Clarke & Skuterud (2013), since each of the occupation-education groups are mutually exclusive, the standard errors for the counter-factual predictions $\tilde{\beta}^m$ are given by:

$$\text{se}(\tilde{\beta}_j^m) = \sqrt{\sum_{j=1}^{3}\sum_{k=1}^{4}\tilde{s}_{jk}^2\;\text{VAR}(\hat{\beta}_{jk}^m)}$$

where the variances $\text{VAR}(\hat{\beta}_{jk}^m)$ are estimated from model (3).

6 Immigrant-Native Differences in Occupational Risk for Workplace Injuries

Table 3 presents results from estimating the econometric model (1), relating the mean workplace injury rate to observable individual level characteristics. Without controls for education (columns 1 and 2), the results in Table 3 suggest that, relative to the native born, immigrants are not more likely to be employed in occupations with a higher mean injury rate. Further examination of the results in columns 1 and 2 reveals considerable heterogeneity in the immigrant population—immigrants from English speaking countries of birth are much less likely to be employed in occupations with a higher mean injury rate while there is no significant difference for immigrants from non-English speaking countries of birth.

However, the results in column (3) indicate the importance of controls for education. Since the mean level of educational attainment is greater for all immigrants, relative to the native born, and higher levels of educational attainment are associated with a lower occupational risk for injury, estimates from a model that exclude education controls will under-estimate levels of occupational risk for immigrants. Consequently, after including controls for educational attainment, the evidence suggests that, relative to an equivalent native-born worker, an immigrant from English-speaking countries of birth does not face significantly different levels of occupational risk. In contrast, the results for immigrants from non-English speaking countries indicate that, relative to the native born, these immigrants face significantly higher levels of occupational risk, consistent with a different occupation-education distribution for immigrants from non-English countries of birth.

Overall, the results for all immigrants presented in column (3) in Table 3 indicate the immigrants face only slightly greater levels of occupational risk (14.27 injuries per 10,000 workers). This is remarkably similar to the estimates provided by Orrenius & Zavodny (2009) for the United States (10.69 injuries per 10,000 workers). However, given the large differences in the source country composition of the immigrant populations in the two countries, care must be exercised when comparing the results. The results in Table 3 indicate that, compared to a native-born worker with the same level of education, Asian immigrants face higher levels of occupational risk, restricted to be constant across education groups (44.37 injuries per 10,000 workers). Similarly, immigrants from non-Asian countries of birth also face levels of occupational risk, relative to native born workers (30.82 injuries per 10,000 workers).

However, immigrants are not randomly sorted into occupations across education groups. The least educated Asian immigrants face higher levels of relative occupational risk arising from the joint effect of their occupation-education match (145.95 injuries per 10,000 workers) since the least educated Asian immigrants are more likely to be employed in riskier occupations. These estimates come from a version of model (1) where immigrant status has been fully interacted with educational attainment and are available from the author upon request. Similarly, the most educated Asian immigrants face lower levels of relative occupational risk arising from the joint effect of their occupation-education match (only 11.36 injuries per 10,000 workers) since the most educated Asian immigrants are more likely to be employed in less riskier, professional and sales & service occupations. Similar patterns of heterogeneity in relative occupational risk across education groups for non-Asian immigrants is also evident.

Unfortunately, the MPHS data do not provide any information on the (English) language ability of immigrants. To the extent that immigrants from non-English speaking countries of birth have inferior language skills relative to the native born, and individuals with better language skills sort into less risky occupations, the estimates in Table 3 will tend to over-estimate the occupational risk experienced by immigrants from non-English speaking countries of birth. A portion of the greater occupational risk for injury experienced by these immigrants will reflect their lower language ability which itself is associated with greater occupational risk. In order to investigate this omitted variable bias, the econometric model (1) was also estimated using the same dependent variable but with individual level characteristics from the 5% sample of the 2006 census, which provides a measure of self-reported proficiency in spoken English. The disadvantage of the census data is that it contains no controls for job characteristics and attention must be restricted to individuals currently employed in the reference week which neglects individuals who experience a work place injury but do not return to work. While the sample constructed from the census data is not directly comparable to the sample constructed from the MPHS work injury data, the results are nonetheless broadly consistent with those reported in Table 3. These results, available from the author, also indicate that language skills can account for approximately 30% of the greater occupational risk faced by immigrants from non-English speaking countries of birth. These results based on the census data provide suggestive evidence that, even with controls for language skills, Asian immigrants would continue to exhibit greater levels of occupational risk, relative to observationally equivalent native born workers.

7 Immigrant-Native Differences in the Incidence of Workplace Injuries

The results presented in Table 3 confirm that immigrants from non-English speaking countries of birth, particularly Asian countries, are more likely to be employed in occupations with a higher mean injury rate. While this result provides some information on the occupational risk of injury faced by immigrants, it does not provide any information about the individual level probability of experiencing a workplace injury. The principal advantage of the MPHS data is that it permits estimation of the individual level econometric model (2), utilising relative rich information on household and employment characteristics.

Table 4 presents results from estimating model (2) using the MPHS data. Examining column (1) in Table 4 for the set of basic controls only, reveals considerable heterogeneity in the relative probability of a workplace injury across different immigrant groups. While there is no evidence that immigrants as a whole, experience a different probability of a workplace injury relative to the native born, Asian immigrants face a significantly lower probability of a workplace accident. There is no evidence that immigrants from either English speaking countries of birth or immigrants from non-Asian, non-English speaking countries of birth, experience a different probability of a workplace injury relative to the native born.

Since immigrants tend to be employed in jobs and occupations that have a greater (individual) probability of a workplace accident, including the extended controls (job characteristics and household characteristics) and controls for occupation implies a lower predicted probability of a workplace accident, particularly for Asian immigrants. Since immigrant workers tend to have higher educational attainment, relative to native-born workers, the omitted variable bias from neglected controls for educational attainment implies the conditional immigrant-native difference in the predicted injury probability will generally be under-estimated. Nonetheless, a comparison of columns (4) and (5) indicates that the critical variation in reported workplace injuries between immigrants and the native born is largely captured by variation in occupation, job characteristics, and household characteristics with only a negligible marginal contribution of additional controls for educational attainment.

The results in column (5) imply, all else equal, the predicted mean injury probability of experiencing a workplace injury for Asian immigrants is 0.029 probability points lower, relative to an observationally equivalent native born worker. This lower probability of a workplace injury for Asian immigrants is quite large in magnitude—it is almost equivalent in magnitude to the additional higher probability faced by workers in technicians & trade, relative to managers & professionals, about 50% of the additional higher probability of injury faced by labourers, relative to managers & professionals, or about 50% of the additional higher probability of injury faced by shift workers. While the existing international empirical evidence is mixed, these results, providing a lower injury probability for Asian immigrants, are qualitatively consistent with the results in Sinclair et al. (2006), Hao (2008), and Zhang et al. (2009) for the United States.

The results in Table 4 clearly highlight the advantage of using individual level data. Based upon the mean occupational injury rate (Table 3), which utilizes the between occupation variation in injury rates, one would conclude that immigrants, particularly Asian immigrants, face greater levels of occupational risk. However, the results based upon the individual level model, which utilises both the between and within occupation variation, imply that, relative to native born workers, Asian immigrants face a *lower* individual probability of experiencing a workplace injury and non-Asian immigrants face an injury probability that is statistically equivalent to that of native-born workers. For Asian immigrants, the greater levels of occupational risk are more than offset by a lower injury probability within broad occupations so that overall they face a lower injury probability. In contrast, for non-Asian immigrants, the greater levels of occupational risk are largely offset by a lower injury probability within broad occupations.

8 What Explains Immigrant-Native Differences in the Incidence of Reported Workplace Injuries?

Under-reporting of Minor Injuries

The results presented in Table 4, providing a lower injury probability for immigrant workers from Asian countries of birth, could be consistent with either greater workplace safety exhibited by Asian immigrants and/or a greater propensity to not report workplace injuries. As noted above, restricting attention to severe injuries is potentially informative about immigrant workplace safety provided these severe injuries are not random events but rather are avoidable and under the control of the individual. For sufficiently severe workplace accidents, the joint probability, that an injury occurred but was not reported, will become small such that the probability of experiencing a reported workplace injury will approach the 'true' probability of an experiencing an injury.

Table 5 presents results from estimating model (2) with differing dependent variables. The first column is identical to column 5 in Table 4, for all workplace injuries. Column 3 in Table 5 uses a dependent variable that takes on a value of one if the injury requires at least one days absence from work and zero if no injury was experienced. Similarly column 5 uses a dependent variable that takes on a value of one if the injury requires at least five days absence from work and zero if no injury was experienced. In light of the identifying restriction discussed above, a comparison of column 1 with column 3 suggests that approximately 55%

of the lower overall injury probability for Asian immigrants in column 1 may be attributed to the non-reporting of very minor accidents, involving less than a days absence from work. Comparing column 1 with column 5 provides even stronger suggestive evidence that almost 75% of the lower overall injury probability for Asian immigrants may be attributed to the non-reporting of minor accidents, involving less than five days absence from work. However, even for very major injuries (involving absences of at least five days) Asian immigrants still exhibit a weakly statistically significant lower probability of reporting an injury (p-value of 0.068). To the extent that these very major injuries are sufficiently severe and likely to be reported, the results in Table 5 provide weak suggestive evidence supporting greater safety for Asian immigrants.

While the evidence presented in Table 5, is consistent with a greater likelihood that Asian immigrants will not report sufficiently minor accidents, the MPHS data are not particularly informative about the likely mechanism driving this result. Despite this, there is one explanation for the non-reporting of workplace injuries that may be investigated using the NHS sample—the lower reported injury probability for immigrants arises from a perceived higher threat of job loss associated with reporting of workplace accidents. The identifying restriction is that this explanation might account for a lower injury probability for workplace injuries yet it is unlikely to account for the probability of injuries that occur outside the workplace. Fortunately, as discussed above, the NHS sample provides data on injuries sustained at both workplaces and other locations that can be used to examine this hypothesis.

Table 6 provides estimates from a linear probability model with two different dependent variables— (1) an indicator variable identifying whether individual i experienced a workplace injury that resulted in medical action or (2) an indicator variable identifying whether individual i experienced an injury that did not take place at a workplace but resulted in medical action. There are also two different samples, defined according to the definition of the 'zeros' for these dependent variables. The first sample treats injuries that did not result in medical action as equivalent to not sustaining an injury. A second sample explores the implications of this assumption by excluding injuries that did not result in medical action from the analysis. As a consequence, the second sample is smaller because it contains fewer 'zeros' (non-positive) outcomes than the first sample but the same number of 'ones' (positive outcomes).

The NHS sample provides considerably fewer workplace injuries than the larger MPHS sample. Proceeding with due caution, the results in the left-hand section of Table 6 indicate that, for the NHS sample, Asian and non-Asian immigrants have a statistically significant lower probability of experiencing a workplace injury. The point estimate for Asian immigrants (0.025 probability points) is remarkably similar to that reported in Table 4 for the MPHS sample. In contrast, with respect to workplace injuries, the results in Table 6 provide starkly different results for the residual non-Asian immigrant group when compared to the MPHS sample.[5]

Interestingly, the results in Table 6 indicate that Asian immigrants exhibit an even lower statistically significant probability of experiencing a 'non-workplace' injury. There is no evidence that Asian immigrants exhibit a lower injury probability for workplace injuries only. The right-hand section of Table 6 provides results based upon the second sample. Qualitatively, these results are similar to those from the first sample (left-hand section), suggesting that the results presented in the left hand panel are not driven by the treatment of injuries that do not result in medical action.

Taken as a whole, the results presented in Table 6 based on the NHS sample indicate that a lower reported workplace injury probability for Asian immigrants is unlikely to reflect a perceived higher threat of job loss associated with reporting of workplace accidents, but rather arises from more systematic and fundamental influences that affect all aspects of their life and not just the time spent in employment activities. These same pervasive systematic influences appear not to play a considerable role in determining the injury probabilities for non-Asian immigrants. Since the NHS sample is not entirely suitable for an analysis based upon the severity of injuries, it is difficult to determine whether the lower injury probabilities for Asian immigrants reported in Table 6 mainly reflect a greater safety of Asian immigrants, both at work and outside work environments, or a greater likelihood of not self-reporting relatively minor accidents in surveys.

[5]Compared to the Asian group, the non-Asian group is a much more heterogenous group. Since this group represents the residual category of immigrants from non-English speaking, non-Asian countries of birth, the results for this group are harder to interpret. While the source country composition of the non-Asian group in the two samples is broadly similar, he main difference between the predicted injury probability for non-Asian immigrants in the NHS sample (Table 6), compared to those for the MPHS sample (Table 4) may be attributed to the remarkably low injury rates for immigrants from South & Eastern Europe and North Africa & the Middle East in the NHS sample.

Neglected Controls for Immigrant Language Skills

The MPHS data do not provide any information on the (English) language ability of immigrants. It is instructive to consider whether neglected controls for language skills could account for the lower injury probability for Asian immigrants, presented in Table 4. Language skills will likely have two offsetting effects on the probability of reporting an injury. First, individuals with inferior language skills might face a higher probability of experiencing a workplace injury. Corvalan et al. (1994) provide evidence for Australia that immigrant workers from non-English countries have higher work-related fatality rates. Additionally, Orrenius & Zavodny (2013) provide several convincing reasons why inferior language skills might be associated with compromised workplace safety. Second, individuals with inferior language skills might be less likely to report workplace injuries, mainly associated with their vulnerable labor market position in their host society. It is relatively easy to establish that immigrants from non-English speaking countries of birth have inferior language skills relative to the native born. To the extent that the first effect dominates the second such that overall individuals with inferior language skills report a higher probability of experiencing a workplace injury, the estimates in Table 4 will tend to over-estimate the relative probability of a workplace injury for immigrants from non-English speaking countries of birth. This implies that, with controls for English language ability, the estimated probability of a workplace injury would be even *lower* for immigrants from Asian countries of birth. However, to the extent that the second effect dominates the first such that overall individuals with inferior language skills report a lower probability of experiencing a workplace injury, the estimates in Table 4 will tend to *under-estimate* the relative probability of a workplace injury for immigrants from non-English speaking countries of birth. In this case, with controls for English language ability, the estimated probability of a workplace injury would be less negative for immigrants from Asian countries of birth.

The NHS sample contains a crude four-point measure of proficiency in spoken English that facilitates an examination of the effect of language skills on the probability of reporting an injury. This is used to classify immigrants as English deficient if they report being able to speak English not well or not at all. Excluding controls for English deficiency, the results in Table 6 provide a predicted injury probability for Asian immigrants of 0.025 probability points below an equivalent native born worker which represents the weighted average across Asian immigrants with differing (English) language skills. Results available from the author for a specification that includes an indicator variable for English language deficiency, provides an estimated relative injury probability of 0.040 probability points below an English proficient native born worker. These results provide suggestive evidence that neglected controls for language skills cannot account for the lower injury probability for Asian immigrants presented in Table 4. On the contrary, English deficient Asian immigrants would exhibit an even lower predicted relative injury probability.

Immigrant-Native Differences in the Occupation-Education Distribution

The results in Table 5 indicate that even for very major injuries (involving absences of at least five days) Asian immigrants exhibit a weakly statistically significant lower probability of reporting an injury, providing weak suggestive evidence supporting greater safety for Asian immigrants. However, immigrants, and in particular Asian immigrants, also have a different occupation-education distribution to the native-born.

An index of occupational segregation is calculated as:

$$\mathrm{ID}_k = \frac{1}{2}\left|\sum_{j=1}^{12} \mathrm{OE}_j^N - \mathrm{OE}_j^k\right|$$

where the index ID is calculated for the k immigrants groups, OE_j^N is the share of native-born workers in occupation-education cell j, and OE_j^k is the share of foreign born workers in immigrant group k in occupation-education cell j. For each group k, this index provides the proportion of immigrant workers who would have to change occupation-education cells in order to make the immigrant occupation-education distribution the same as the native born distribution. The index equals zero if there is no immigrant-native difference in the occupation-education distribution and equals one if there is complete occupation-education segregation. Across occupation-education groups, the index of dissimilarity for English speaking countries of birth is 0.113, for Asian countries of birth is 0.314, and for non-Asian countries of birth it is 0.159. Clearly, the occupation-education distribution for Asian immigrants is considerably different to that of the native born, which might be important in explaining any differences in their relative injury probabilities.

In order to more directly measure the extent to which immigrant-native differences in the occupation-education distribution can account for the observed differences in the probability of a workplace injury, as opposed to other differences such as job or household characteristics, Table 7 presents results for the predicted relative injury probability if immigrant and native-born workers had the same occupation-education distribution. Since the estimated models in Table 7 include (1) education-immigrant group interactions, (2) occupation-immigrant group interactions, or (3) occupation-education-immigrant group interactions, the results in the first section (actual shares) will not perfectly match those in column (5) in Table 4.

The results in Table 7 indicate that differences in the education distribution alone or differences in the occupation distribution alone are unable to account for the observed immigrant-native differences in the probability of a workplace injury. However, comparing section (1) with section (2) in Table 7, over 40% of the observed Asian immigrant-native differences in the probability of a workplace injury can be accounted for through immigrant-native differences in the broad occupation-education distribution. Of course, it is feasible that more than 40% of the observed Asian immigrant-native differences in the probability of a workplace injury might be accounted for through immigrant-native differences in the narrow occupation-education distribution. However, this cannot be confirmed since sample size considerations prevent analysis at finer level classifications of education and occupation.

Why do differences in the occupation-education distribution matter? While the share of the least educated Asian immigrants in the 'riskiest occupations (technicians & trades and plant operators & labourers) are broadly similar to those for the native-born, there is a much larger share of the most-educated Asian immigrants in these riskier occupations, relative to the native-born. At the same time, results from an interacted version of econometric model (2), available from the author, that allows for an injury probability that varies across occupation, education, and immigrant groups indicates that the lower relative injury probability for Asian immigrants mainly arises from a lower injury probability in the these 'riskier' occupations. Together, the relative occupation shares and these (interacted) results provide suggestive evidence for an explanation for a lower injury probability based upon an inefficient utilisation of immigrant skill where more educated immigrants, with a lower probability of reporting a workplace injury, are employed in occupations with a higher mean injury rate. Interestingly, these results are not consistent with the higher injury rates for 'over-educated' workers identified by Premji & Smith (2013).

The final panel of Table 7 examines only those injuries that required at least five days absence from work (very major injuries). Consistent with the result for all injuries, differences in the education distribution alone or differences in the occupation distribution alone are unable to account for the observed immigrant-native differences in the probability of a workplace injury. However, virtually all of the lower injury probability of experiencing a very major accident (0.008 probability points) can be explained by differences in the occupation-education distribution—if Asian immigrants faced the same occupation-education distribution as the native born there would be no evidence that Asian immigrants are inherently safer at work. Rather than reflecting an underlying greater latent safety for Asian immigrant workers, the lower injury probability for major injuries, reported in Table 5, arises as a result of domestic labour market institutions affecting the utilisation of immigrant skills where more educated immigrants, with a lower probability of reporting a workplace injury, tend to be employed in occupations with a higher mean injury rate.

A comparison of the two parts of Table 7 indicates that the overall lower injury probability for Asian immigrants (0.029 probability points) can be explained by the combination of two factors: (1) the greater likelihood that Asian immigrants, will not report sufficiently minor accidents and (2) differences in the occupation-education distribution between Asian immigrants and the native born.

9 Conclusion

Based upon the mean occupational injury rate, which utilizes the between occupation variation in injury rates, the results presented in this paper indicate that immigrants, particularly Asian immigrants, face greater levels of occupational risk. Alternatively, based upon the individual level model which utilises both the between and within occupation variation, there is no evidence that immigrants as a whole, experience a different probability of a workplace injury relative to the native born. There is also no evidence that immigrants from either English speaking countries of birth or immigrants from non-Asian, non-English speaking countries of birth, experience a different probability of a workplace injury relative to the native born. However, Asian immigrants face a significantly lower probability of a reporting a workplace accident. For Asian immigrants, greater levels of occupational risk are more than offset by a lower injury probability within broad occupations so that overall they face a lower injury probability.

The principal difficulty with using self-reported injury data to understand differences in workplace safety between immigrant and native-born workers, is that a lower injury probability could reflect either greater underlying levels of safety for immigrant workers or a greater propensity not to report workplace injuries. Based on an assumption that even major injuries are under the control of the individual worker, comparing the relative incidence of sufficiently major injuries with that for all injuries is informative about the 'true' relative probability of experiencing an injury. Based upon data on injuries that required at least five days absence from work, the results indicate that approximately 75% of the overall lower relative injury probability for Asian immigrants can be attributed to a greater probability of not-reporting minor injuries.

Additionally, most of this lower injury probability associated with major injuries can be explained by differences in the occupation-education distribution between Asian immigrants and native-born workers. Rather than reflecting greater safety for Asian immigrant workers, this lower injury probability mainly reflects the inefficient utilisation of immigrant skills. Consequently, the overall lower injury probability for Asian immigrants (0.029 probability points) can be explained by the combination of two factors: (1) differences in the occupation-education distribution between Asian immigrants and the native born, mainly the greater share of the most educated Asian immigrants in the riskier occupations, and (2) the greater likelihood that Asian immigrants will not report sufficiently minor accidents.

Utilizing a secondary data source that contains information on the location of injuries, either while working or not-working, the paper presents evidence that Asian immigrants also face a lower and similar probability of experiencing an injury outside work environments. This provides suggestive evidence against the hypothesis that the lower probability of reporting workplace injuries is driven by perceived threats from job loss associated with reporting workplace accidents. Moreover, it suggests that the lower probability of reporting minor workplace accidents likely reflects more pervasive underlying difference between (Asian) immigrant workers and equivalent native-born workers.

These main results have important implications for future research. In Australia there is no evidence to suggest that immigrant workers have a different probability of actually experiencing a workplace injury, relative to an equivalent native-born worker. Instead, the observed differences in the reporting probability reflect the differential reporting patterns of immigrant workers. The results are positive in the sense that it does not appear that immigrant workers within the same occupation are exposed to greater individual levels of risk in the workplace. However, the results suggest that inference based upon survey data might lead to misleading conclusions about the individual injury risk faced by immigrant workers within the same occupation. Without considering the reporting behaviour, the results indicate a lower injury probability for immigrant workers from Asian source countries. This implies that the provision of reliable data on workplace injuries needs to address the considerable degree of non-reporting of injuries and decision makers need to design mechanisms that create incentives for workers, particularly immigrant workers, to report these workplace injuries.

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Table 1: Mean Injury Rates by Selected Sample Characteristics

	Mean	Std. Deviation
Nativity		
Native Born	0.052	0.225
Immigrants		
English Speaking	0.062	0.241
Asian	0.028	0.146
Non Asian	0.056	0.214
Gender		
Male	0.059	0.230
Female	0.042	0.206
Age		
25-34	0.046	0.206
35-44	0.053	0.234
45-59	0.053	0.221
Education		
Less than High School	0.056	0.228
High School Graduate	0.046	0.206
Certificate & Diploma	0.064	0.247
University	0.036	0.188
Occupation		
Managers	0.044	0.207
Professionals	0.033	0.183
Technicians & Trades	0.071	0.254
Sales, Service, & Admin.	0.040	0.193
Operators & Drivers	0.087	0.274
Labourers	0.094	0.292
Contract Type		
Fixed Term Contract	0.029	0.174
Not Fixed Term Contract	0.056	0.231
Not Employee	0.039	0.186
Employment Type		
Paid Entitlements	0.054	0.228
No Paid Entitlements	0.054	0.230
Not Employee	0.039	0.186
Shift Worker		
Shift Worker	0.044	0.205
Not Shift Worker	0.092	0.289
Period		
2005-06 Sample	0.054	0.186
2009-10 Sample	0.049	0.246
Number of Observations: Injuries	915	
Number of Observations: No Injuries	17,199	

Source: *Multi-purpose Household Survey* 2005-06 and *Work Related Injuries* 2009-10, Australian Bureau of Statistics

Notes: English speaking countries of birth are Canada, Republic of Ireland, New Zealand, South Africa, United Kingdom, and the United States of America. Sample means are weighted utilising the available population weights (FINWTPF). Standard errors are estimated using 30 jackknife replicate weights.

Table 2: Selected Sample Characteristics

	Native Born		Immigrant Country of Birth					
			English Speaking		Asian		Non-Asian	
	N	Mean	N	Mean	N	Mean	N	Mean
Female	7,045	0.451	674	0.446	549	0.471	352	0.415
Age		41.089		43.585		40.406		43.354
25-34	4,303	0.304	279	0.213	364	0.319	177	0.215
35-44	4,818	0.301	476	0.305	368	0.311	258	0.304
45-59	5,679	0.394	675	0.482	370	0.370	347	0.482
Education								
Less than High School	3,821	0.265	212	0.152	123	0.126	137	0.189
High School Graduate	2,179	0.152	226	0.168	170	0.160	125	0.193
Certificate & Diploma	4,881	0.326	488	0.338	178	0.159	206	0.265
University	3,919	0.257	504	0.342	631	0.555	314	0.353
Occupation								
Managers	2,091	0.140	182	0.129	102	0.080	82	0.090
Professionals	3,462	0.226	434	0.295	313	0.262	199	0.225
Technicians & Trades	2,051	0.144	206	0.145	129	0.113	115	0.163
Sales, Service, & Admin.	4,935	0.338	447	0.316	346	0.336	231	0.306
Operators & Drivers	1,046	0.075	83	0.060	62	0.063	56	0.076
Labourers	1,215	0.079	78	0.055	150	0.146	99	0.140
Contract Type								
Fixed Term Contract	611	0.039	75	0.043	63	0.048	47	0.057
Not Fixed Term Contract	11,383	0.757	1,087	0.756	880	0.791	560	0.707
Employment Type								
Paid Entitlements	9,960	0.663	985	0.685	750	0.668	470	0.608
No Paid Entitlements	2,034	0.133	177	0.114	193	0.171	137	0.156
Not Employee	2,806	0.204	268	0.201	159	0.161	175	0.236
Shift Worker	2,118	0.141	209	0.148	227	0.210	132	0.177
Immigrants								
$<$ 10 years residence		—	576	0.402	512	0.427	283	0.345
$\geqslant$ 10 years residence		—	854	0.598	590	0.573	499	0.655
Number of Observations	14,800		1,430		1,102		782	

Source: *Multi-purpose Household Survey* 2005-06 and *Work Related Injuries* 2009-10, Australian Bureau of Statistics

Notes: English speaking countries of birth are Canada, Republic of Ireland, New Zealand, South Africa, United Kingdom, and the United States of America. English speaking countries of birth are Canada, Republic of Ireland, New Zealand, South Africa, United Kingdom, and the United States of America. Sample means are weighted utilising the available population weights (FINWTPF).

Table 3: OLS: Mean Occupational Injury Rates and Immigrant Characteristics

	(1)	(2)	(3)
All Immigrants			
Immigrant	-18.530	-32.431^{b}	14.266
	(12.370)	(12.499)	(9.010)
R^2	0.156	0.193	0.295
English Speaking/Non-English Speaking Countries of Birth			
English Speaking	-51.515^{a}	-57.156^{a}	-19.068
	(17.773)	(18.541)	(11.912)
Non English Speaking	5.082	-14.457	39.230^{a}
	(13.707)	(12.272)	(11.631)
R^2	0.159	0.195	0.298
English Speaking, Asian and Non-Asian Countries of Birth			
English Speaking	-51.124^{a}	-56.693^{a}	-19.490
	(17.843)	(18.639)	(11.948)
Asian	1.091	-19.210	44.363^{a}
	(17.707)	(15.538)	(15.045)
Non-Asian	11.924	-6.380	30.818^{a}
	(12.703)	(12.990)	(10.523)
	0.159	0.195	0.298
Extended Controls	No	Yes	Yes
Education Controls	No	No	Yes
Number of Observations	18,114	18,114	18,114

Source: *Multi-purpose Household Survey* 2005-06 and *Work Related Injuries* 2009-10, Australian Bureau of Statistics

Notes: The dependent variable is the population weighted mean injury rate per 10,000 workers by occupation, state of residence, and year of observation. All observations are weighted using the available population weights (FINWTPF). Standard errors, shown in parentheses, are clustered at this group level (occupation, state, and year), a, b, c denote statistical significance in a two-tailed test at the 1%, 5%, and 10% levels respectively. The sample is restricted to individuals 25-59 who were employed in the previous 12 months and for immigrants those that arrived after 1955 and beyond the age of 15. All regressions include a quartic in age, controls for geographical region of residence, urban/rural area of residence, an indicator for gender, controls for immigrant years of residence in Australia, and an indicator for the 2009-10 sample. The extended controls include controls for the characteristics of the main job (hours of work per week, duration, type of contract) and household characteristics (family type, indicators for the presence of children under the age of 15, marital status). The education controls consist of indicator variables for highest educational attainment (less than high school, high school, certificate & diploma, and university).

Table 4: Linear Probability Model: Immigrant Probability of a Workplace Accident

	(1)	(2)	(3)	(4)	(5)
All Immigrants					
Immigrant	−0.002	−0.005	−0.002	−0.006	−0.005
	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
	[0.705]	[0.385]	[0.749]	[0.313]	[0.378]
English Speaking/Non-English Speaking Countries of Birth					
English Speaking	0.011	0.011	0.012	0.012	0.012
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
	[0.186]	[0.207]	[0.166]	[0.145]	[0.164]
Non English Speaking	−0.011	-0.015^b	−0.011	-0.018^b	-0.017^b
	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
	[0.102]	[0.036]	[0.120]	[0.017]	[0.024]
English Speaking, Asian and Non-Asian Countries of Birth					
English Speaking	0.011	0.011	0.012	0.012	0.012
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
	[0.183]	[0.203]	[0.165]	[0.142]	[0.163]
Asian	-0.022^a	-0.027^a	-0.022^a	-0.030^a	-0.029^a
	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)
	[0.001]	[0.000]	[0.002]	[0.000]	[0.000]
Non Asian	0.006	0.003	0.005	0.000	0.000
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
	[0.645]	[0.816]	[0.700]	[0.982]	[0.997]
Extended Controls	No	Yes	Yes	Yes	Yes
Occupation Controls	No	No	No	Yes	Yes
Education Controls	No	No	Yes	No	Yes
Number of Observations: Injuries	915	915	915	915	915
Number of Observations: No Injuries	17,199	17,199	17,199	17,199	17,199

Source: *Multi-purpose Household Survey* 2005-06, *Work Related Injuries* 2009-10, Australian Bureau of Statistics

Notes: All models are estimated utilising the available population weights (FINWTPF). The standard errors, which are shown in parentheses, are estimated using 30 jackknife replicate weights, a, b, c denote statistical significance in a two-tailed test at the 1%, 5%, and 10% levels respectively, p values for this two-tailed test around zero are reported in square brackets. The sample is restricted to individuals aged 25-59 who were employed in the previous 12 months and for immigrants those that arrived after 1955 and beyond the age of 15. All regressions include a quartic in age, controls for geographical region of residence, urban/rural area of residence, an indicator for gender, and an indicator for the 2009-10 sample. The extended controls include controls for the characteristics of the main job (hours of work per week, duration, type of contract) and household characteristics (family type, indicators for the presence of children under the age of 15, marital status). The occupation controls consist of indicator variables for occupation of main job (Managers, Professionals, Technicians & Trades, Sales, Service & Administration, Machinery Operators & Drivers, and Labourers and the education controls consist of indicator variables for final educational attainment (less than high school, high school, certificate & diploma, and university).

Table 5: Linear Probability Model: Immigrant Probability of a Workplace Accident, by severity

	All	**Minor/Major**		**Minor/Very Major**	
		Absence Less than 1 day	Absence At least 1 day	Absence Less than 5 days	Absence At least 5 days
	(1)	(2)	(3)	(4)	(5)
All Immigrants					
Immigrant	-0.005	-0.007^{c}	0.001	-0.007	0.002
	(0.006)	(0.004)	(0.004)	(0.005)	(0.004)
	[0.378]	[0.098]	[0.853]	[0.110]	[0.626]
English Speaking/Non-English Speaking Countries of Birth					
English Speaking	0.012	0.005	0.008	0.009	0.004
	(0.008)	(0.006)	(0.007)	(0.008)	(0.005)
	[0.164]	[0.424]	[0.286]	[0.249]	[0.464]
Non English Speaking	-0.017^{b}	-0.015^{a}	-0.004	-0.019^{a}	0.001
	(0.007)	(0.004)	(0.006)	(0.005)	(0.006)
	[0.024]	[0.002]	[0.484]	[0.001]	[0.917]
English Speaking, Asian and Non-Asian Countries of Birth					
English Speaking	0.012	0.005	0.008	0.009	0.004
	(0.008)	(0.006)	(0.007)	(0.008)	(0.005)
	[0.163]	[0.423]	[0.284]	[0.249]	[0.460]
Asian	-0.029^{a}	-0.018^{a}	-0.013^{b}	-0.023^{a}	-0.008^{c}
	(0.007)	(0.005)	(0.005)	(0.006)	(0.004)
	[0.000]	[0.002]	[0.024]	[0.001]	[0.068]
Non Asian	0.000	-0.010	0.009	-0.013	0.013
	(0.013)	(0.006)	(0.011)	(0.008)	(0.011)
	[0.997]	[0.141]	[0.429]	[0.103]	[0.273]
Extended Controls	Yes	Yes	Yes	Yes	Yes
Education Controls	Yes	Yes	Yes	Yes	Yes
Occupation Controls	Yes	Yes	Yes	Yes	Yes
Number of Observations: Injuries	915	480	435	676	239
Number of Observations: No Injuries	17,199	17,199	17,199	17,199	17,199

Source: *Multi-purpose Household Survey* 2005-06, *Work Related Injuries* 2009-10, Australian Bureau of Statistics

Notes: The dependent variable is an indicator variable that has a value of one if individual i experienced an injury of a particular type (for each column) and zero otherwise. All models are estimated utilising the available population weights (FINWTPF). The standard errors, which are shown in parentheses, are estimated using 30 jackknife replicate weights, a, b, c denote statistical significance in a two-tailed test at the 1%, 5%, and 10% levels respectively, p values for this two-tailed test around zero are reported in square brackets. The sample restrictions and explanatory variables are identical to those for Table 4.

Table 6: Linear Probability Model (NHS Sample): Immigrant Probability of a Workplace Accident

	Full Sample				Restricted Sample			
	Work Injury		Non-Work Injury		Work Injury		Non-Work Injury	
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
All Immigrants								
Immigrant	-0.017^a	-0.018^a	-0.003	0.001	-0.026^a	-0.030^a	-0.015	-0.008
	(0.006)	(0.007)	(0.011)	(0.011)	(0.007)	(0.008)	(0.014)	(0.014)
	[0.009]	[0.009]	[0.754]	[0.954]	[0.001]	[0.000]	[0.289]	[0.557]
English Speaking & Non-English Speaking Countries of Birth								
English Speaking	0.014	0.010	0.020	0.021	0.021	0.013	0.029	0.031
	(0.013)	(0.012)	(0.019)	(0.019)	(0.016)	(0.015)	(0.025)	(0.024)
	[0.282]	[0.400]	[0.306]	[0.284]	[0.187]	[0.396]	[0.248]	[0.215]
Non English Speaking	-0.033^a	-0.034^a	-0.016	-0.011	-0.048^a	-0.052^a	-0.035^b	-0.028^c
	(0.007)	(0.008)	(0.012)	(0.013)	(0.009)	(0.010)	(0.014)	(0.015)
	[0.000]	[0.000]	[0.193]	[0.400]	[0.000]	[0.000]	[0.019]	[0.071]
English Speaking, Asian and Non-Asian Countries of Birth								
English Speaking	0.014	0.010	0.020	0.021	0.021	0.013	0.029	0.031
	(0.013)	(0.012)	(0.019)	(0.019)	(0.016)	(0.015)	(0.025)	(0.024)
	[0.286]	[0.404]	[0.301]	[0.280]	[0.190]	[0.401]	[0.242]	[0.209]
Asian	-0.026^b	-0.025^c	-0.034^b	-0.032^b	-0.041^a	-0.042^a	-0.058^a	-0.055^a
	(0.013)	(0.013)	(0.016)	(0.016)	(0.014)	(0.015)	(0.018)	(0.019)
	[0.047]	[0.065]	[0.033]	[0.049]	[0.007]	[0.008]	[0.002]	[0.004]
Non Asian	-0.042^a	-0.044^a	0.004	0.011	-0.056^a	-0.063^a	-0.008	0.002
	(0.007)	(0.007)	(0.019)	(0.020)	(0.009)	(0.010)	(0.022)	(0.023)
	[0.000]	[0.000]	[0.836]	[0.592]	[0.000]	[0.000]	[0.724]	[0.932]
Extended Controls	No	Yes	No	Yes	No	Yes	No	Yes
Education Controls	No	Yes	No	Yes	No	Yes	No	Yes
Occupation Controls	No	Yes	No	Yes	No	Yes	No	Yes
Number of Observations: Injuries	516	516	925	925	516	516	925	925
Number of Observations: No Injuries	7,963	7,963	7,554	7,554	5,913	5,913	5,504	5,504

Source: *National Health Survey* 2004-05, Australian Bureau of Statistics

Notes: All models are estimated utilising the available population weight (NHSFINWT). The standard errors, which are shown in parentheses, are estimated using 60 jackknife replicate weights, a, b, c denote statistical significance in a two-tailed test at the 1%, 5%, and 10% levels respectively, p values for this two-tailed test around zero are reported in square brackets. The sample is restricted to individuals aged 25-59 who were employed in the reference week and for immigrants those that arrived after 1955 and beyond the age of 15. For the full sample, injuries not requiring medical attention are classified as non-injuries while the restricted sample excludes entirely these injuries not requiring medical attention. All regressions include. a quartic in age, controls for geographical region of residence, urban/rural area of residence, and an indicator for gender. The extended controls include controls for the characteristics of the main job (hours of work per week, duration, type of contract) and household characteristics (family type, indicators for the presence of children under the age of 18, marital status). The education controls consist of indicator variables for highest educational attainment while the occupation controls consist of indicator variables for occupation of main job.

Table 7: Counterfactual Predicted Injury Rates for Immigrants

	Actual Shares (1)			Counterfactual (2) Native-Born Shares		
	coeff.	Std. Err	p. val	coeff.	Std. Err	p. val
	All Injuries					
Education Interactions Only						
English Speaking	0.012	(0.008)	[0.163]	0.011	(0.008)	[0.172]
Asian	-0.028^{a}	(0.007)	[0.000]	-0.028^{a}	(0.008)	[0.000]
Non-Asian	0.000	(0.013)	[0.972]	−0.002	(0.012)	[0.885]
Occupation Interactions Only						
English Speaking	0.012	(0.008)	[0.163]	0.011	(0.008)	[0.175]
Asian	-0.028^{a}	(0.007)	[0.000]	-0.026^{a}	(0.005)	[0.000]
Non-Asian	0.000	(0.013)	[0.972]	0.000	(0.011)	[0.991]
Education*Occupation Interactions						
English Speaking	0.012	(0.008)	[0.161]	0.010	(0.008)	[0.232]
Asian	-0.029^{a}	(0.007)	[0.000]	−0.017	(0.011)	[0.115]
Non-Asian	0.000	(0.014)	[0.984]	−0.002	(0.012)	[0.887]
Number of Observations: Injuries		915			915	
Number of Observations: No Injuries		17,199			17,199	
	Very Major Injuries: Absence At Least 5 Days					
Education Interactions Only						
English Speaking	0.003	(0.005)	[0.522]	0.003	(0.006)	[0.560]
Asian	-0.008^{c}	(0.004)	[0.061]	-0.010^{b}	(0.004)	[0.021]
Non-Asian	0.012	(0.011)	[0.288]	0.011	(0.010)	[0.249]
Occupation Interactions Only						
English Speaking	0.003	(0.005)	[0.522]	0.003	(0.006)	[0.580]
Asian	-0.008^{c}	(0.004)	[0.061]	-0.006^{b}	(0.003)	[0.034]
Non-Asian	0.012	(0.011)	[0.288]	0.011	(0.010)	[0.250]
Education*Occupation Interactions						
English Speaking	0.003	(0.005)	[0.541]	0.003	(0.006)	[0.611]
Asian	-0.008^{c}	(0.004)	[0.065]	−0.002	(0.008)	[0.748]
Non-Asian	0.012	(0.011)	[0.299]	0.010	(0.011)	[0.334]
Number of Observations: Injuries		239			239	
Number of Observations: No Injuries		17,199			17,199	
Extended Controls		Yes			Yes	
Education Controls		Yes			Yes	
Occupation Controls		Yes			Yes	

Source: *Multi-purpose Household Survey* 2005-06, *Work Related Injuries* 2009-10, Australian Bureau of Statistics

Notes: All models are estimated utilising the available population weights (FINWTPF). The standard errors for the actual shares, which are shown in parentheses, are estimated using 30 jackknife replicate weights, a, b, c denote statistical significance in a two-tailed test at the 1%, 5%, and 10% levels respectively, p values for this two-tailed test around zero are reported in square brackets. The method for obtaining the standard errors for the counter-factual shares, which requires the variance-covariance matrix of the estimated parameters, is explained in the paper. The sample restrictions and explanatory variables are identical to those for Table 4.

Table A.1: Selected Sample Characteristics

	Native Born				Immigrant Country of Birth											
					English Speaking				Asian				Non-Asian			
	MPHS		NHS		MPHS		NHS		MPHS		NHS		MPHS		NHS	
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
Female	7,045	0.452	3,423	0.455	674	0.451	241	0.401	549	0.464	209	0.441	352	0.422	199	0.403
Age		41.107		40.578		43.372		44.756		39.975		40.933		43.331		43.843
25-34	4,303	0.303	2,142	0.326	279	0.217	64	0.146	364	0.343	92	0.272	177	0.219	88	0.203
35-44	4,818	0.302	2,320	0.303	476	0.310	187	0.354	368	0.306	155	0.356	258	0.300	137	0.313
45-59	5,679	0.395	2,631	0.371	675	0.473	282	0.500	370	0.351	165	0.371	347	0.480	216	0.485
Education																
Less than High School	3,821	0.254	1,805	0.253	212	0.142	108	0.234	123	0.112	46	0.132	137	0.173	54	0.170
High School Graduate	2,179	0.150	825	0.117	226	0.163	61	0.103	170	0.161	54	0.134	125	0.177	66	0.138
Certificate & Diploma	4,881	0.335	2,777	0.401	488	0.339	240	0.441	178	0.167	102	0.245	206	0.281	156	0.347
University	3,919	0.261	1,686	0.229	504	0.357	124	0.222	631	0.559	210	0.489	314	0.369	165	0.344
Occupation																
Managers	2,091	0.149	764	0.119	182	0.135	64	0.110	102	0.089	33	0.073	82	0.105	37	0.097
Professionals	3,462	0.229	1,481	0.207	434	0.297	118	0.234	313	0.264	105	0.220	199	0.231	115	0.217
Technicians & Trades	2,051	0.141	1,011	0.149	206	0.145	85	0.183	129	0.128	43	0.105	115	0.152	65	0.148
Sales, Service, & Admin	4,935	0.328	2,728	0.375	447	0.307	191	0.333	346	0.317	146	0.352	231	0.306	134	0.286
Operators & Drivers	1,046	0.072	580	0.084	83	0.058	36	0.073	62	0.058	36	0.105	56	0.073	34	0.092
Labourers	1,215	0.081	529	0.066	78	0.057	39	0.067	150	0.144	49	0.145	99	0.132	56	0.160
Not Employee	2,806	0.202	1,003	0.148	286	0.194	85	0.146	159	0.151	49	0.115	175	0.232	73	0.171
Shift Worker	2,118	0.142	1,105	0.147	209	0.147	90	0.159	227	0.211	72	0.190	132	0.173	81	0.178
Immigrants																
$<$ 10 years of residence					576	0.424	134	0.272	512	0.458	145	0.387	283	0.354	151	0.315
$\geqslant$ years of residence					854	0.576	399	0.728	590	0.542	267	0.613	499	0.646	290	0.685
Sample Size	14,800		7,093		1,430		533		1,102		412		782		441	

Source: *Multi-purpose Household Survey* 2005-06, *Work Related Injuries* 2009-10, and *National Health Survey* 2004-05, Australian Bureau of Statistics
Notes: English speaking countries of birth are Canada, Republic of Ireland, New Zealand, South Africa, United Kingdom, and the United States of America. Sample means are weighted using the available population weights—The MPHS sample uses the population weight FINWTPF while the NHS sample uses the population weight NHSFINWT.