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The Impacts of Immigration on Earnings and Employment: Accounting for Effective Immigrant Work Experience

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Abstract

A large segment of New Zealand's population is made up of foreign-born individuals. Despite the significant role that foreign-born individuals play in New Zealand society, little research has been done to address the impact of immigration on the labour market. In this paper we re-examine the impact of immigration in New Zealand using a panel of individual-level New Zealand Income Survey data and the national level methodology. We extend the model to include regional effects, and we incorporate measures of effective immigrant work experience, which reflect the values placed on immigrants' human capital (work experience) in the host country. We find that immigration has little impact on earnings and employment hours. The results further confirm that the effective-experience measure improves the precision of the immigration impact estimates.

Keywords: Immigrants, Earnings effects, Employment effects, Regions, Effective work experience
JEL Classification: J61, J62, J31, J3, J24

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1. Introduction

Almost a quarter of New Zealand's population are immigrants (born outside New Zealand).[1] The impact from the inflow of migrant workers on the labour market is of special interest. A key question is whether or not immigration affects wages and the labour market opportunities in the domestic labour market. Do they raise or drive down the wages and employment of pre-existing workers? If immigration raises income and productivity in the economy, then government policy should facilitate the economic gains by encouraging immigration. However, if immigration decreases income and productivity in the economy, then policy may be required to limit immigration or attract only migrants who will positively contribute to the economy.

Despite the large inflow of migrants in the last decade, little research has been done to address the impact of immigration on pre-existing labour market opportunities. The few studies that have examined this issue find small positive effects (see Maré and Stillman 2009; Maani and Chen 2012; Leem 2008). This paper re-examines the impact of immigration in New Zealand using the national-level methodology introduced by Borjas (2003). Individual-level data from the New Zealand Income Survey (2002 to 2007) are analysed at the national level. We define skill groups based on education and work experience, and examine the changes in the economic opportunities for these pre-existing skill groups that are due to the supply of immigrant workers. This approach is appealing because at the national level, any internal movements of pre-existing workers do not dilute the estimated results.

Economic theory tells us that the impact of immigration depends heavily on the degree of substitution between pre-existing and immigrant workers. If the degree of substitution is high, then pre-existing workers face greater competition from immigrants and this may lead to adverse outcomes. Using a congruence coefficient we explore the correlation between native-born and immigrant workers, defined by skill groups and their occupational distributions. The results from this analysis indicate workers with higher education have a higher occurrence of employment in the same occupations. However, complementarity may also be greater among high-skilled workers due to conglomeration and knowledge spill-overs. Therefore, the question is to be answered empirically.

Applying a panel analysis of skill groups, we estimate the effects of immigrant supply shocks on domestic earnings and employment. The basic results indicate immigration causes little impact on the economic opportunities of pre-existing workers.

We apply two extensions of the national-level model that make the results more precise. These extensions are spatial regional impacts and extended specifications to incorporate immigrant effective work experience. First, the distribution of migrant workers in New Zealand is asymmetric amongst the various regions. In 2007, approximately 40 percent of the immigrant population resided in Auckland. Since immigrant workers are unevenly distributed throughout the country, it is interesting to examine skill groups within geographic boundaries. By differentiating the analysis of skill groups by regions, we are able to isolate labour market outcomes due to immigrant supply shocks for regions where the supply shock is greater.

1 See, for example, New Zealand Census of Population and Dwellings, 2013 (Statistics New Zealand).

Second, the analysis in this paper approaches workers/immigrants from the point of view of their human capital. The standard approach of such analyses has ignored the market value of different types of human capital. However, employers value skills acquired in the domestic environment differently to skills acquired in a foreign setting. To capture the various market values of human capital, we introduce the concept of 'effective experience' as defined in Borjas (2003). In effect, we are using more realistic measures of human capital and this enables us to produce more accurate estimates of the impact of immigration. Using the effective human capital framework, the estimates of the impact of immigration become negative. However, even though the outcomes are adverse, the absolute sizes of the effects remain small. Overall, the results indicate the impact of immigration is small and close to zero.

The rest of the paper is as follows: Section 2 examines the literature on the impact of immigration on labour market outcomes. Section 3 examines the New Zealand labour market data and discusses trends in common economic measures. Section 4 introduces the methodology of the national-level approach, including the congruence framework and examines at the index of congruence between immigrant and native workers. Section 5 reports the estimates of the impact of immigration and the two extensions of the national-level model that make the results more precise.

2. A Review of the Literature

The impact of immigration on domestic labour market outcomes is a topic that receives much commentary in most developed countries. There have been many attempts in the literature to estimate the changes in labour market outcomes of pre-existing workers due to the inflow of immigrant workers, but there is no consensus on the impact of immigration. For example, Altonji and Card (1991), Card (1990, 2001), Dustmann *et al*. (2005), and Dustman *et al*. (2008) find little impact on native earnings from immigration; Borjas (2003, 2004, 2005) finds significant negative effects; and Mishra (2007) and Kifle (2009) find significant positive effects due to immigration. Unsurprisingly, the results differ across different countries, and it is of interest to see what results appear when this analysis is conducted on the New Zealand labour market.

The effect of immigration on labour market outcomes is not clear-cut. The inflow of immigrants may affect the earnings of existing workers in a negative or positive way. The direction of the impact is dependent on a number of factors: these include the substitutability between immigrants and natives, and the contribution of immigration towards aggregate supply and demand.

The elasticity of substitution is an important factor in determining of the impact of immigration on earnings. The basic textbook theory of demand and supply indicates that, holding all else constant, an increase in the supply of labour would decrease wages. Given that capital is held constant and there are constant returns to scale in production technology, this simple description is intuitively appealing – as a resource becomes less scarce, the value placed upon a unit of that resource becomes less. If immigrants and natives are substitutes, then the inflow of immigrants would reduce wages across groups (Borjas 2003; Orrenius and Zavodny 2007). The strength of the reduction to wages depends on the degree of substitution and it is most severe

when immigrants and natives are perfect substitutes. However, if there is imperfect substitution between immigrants and natives, then the magnitude of wage reductions is smaller. Further, if immigrants complement native workers, then we would expect positive changes to earnings from immigration (Ottaviano and Peri 2007; Borjas *et al.* 2008). A complementary relationship raises the marginal productivity of labour in the economy and leads to positive economic outcomes for workers.

It should be noted that the elasticity of substitution is not constant across the entire workforce. The substitutability between immigrants and pre-existing workers is expected to vary across a number of different dimensions (Orrenius and Zavodny 2007; Dustman *et al*. 2008). Considering the skill requirement specific to different industries, in industries that require less skill, immigrants and pre-existing workers are more likely to be substitutes. However, it is more difficult to interchange immigrant and native workers in industries that demand a considerable amount of industry-specific skill and technical knowledge. Such industries may require a high degree of language proficiency and relevant domestic knowledge. Foreign training is likely to be of lower value than comparable local training and thus it is more difficult to substitute existing workers with immigrant workers.

Education and experience are also important factors in determining the degree of substitution between immigrants and pre-existing workers. It is well-documented that the value placed on education and experience acquired abroad is often less than the value placed on domestic education and experience (Lalonde and Topel 1991; Duleep and Regets 2002; Akresh 2006; Antecol *et al*. 2006).[2] As a result, it is more difficult to transfer foreign work experience to the domestic labour market. In particular, high-skilled immigrants suffer a larger earnings penalty compared to their lesser-skilled cohorts (Orrenius and Zavodny 2007). One of the implications of imperfect skill transferability for immigrants is that the pre-existing worker group that is impacted by immigration inflow may possess fewer years of work experience.

An equally important factor is the change to aggregate supply and aggregate demand due to immigration. Immigration adds to the supply of workers and this leads to greater aggregate supply in the economy. However, the inflow of immigrants also increases aggregate demand, as immigrants are consumers of both public and private goods (Addison and Worswick 2002). If aggregate supply increases more than aggregate demand, then we expect reduced earnings and lower employment in the labour market. However, when the addition to aggregate demand from immigration exceeds the change to aggregate supply, positive economic impacts are expected. It is only possible to identify whether the supply or demand effect is stronger through empirical means.

Increase in aggregate demand encourages firms to expand production and capture larger economic benefits. To expand production, firms utilise high levels of the factors of production in which labour is an important part. Immigrants contribute to higher levels of aggregate demand through greater consumption of household and government goods and services; these may include housing and infrastructure.

2 Many studies have also found that while immigrants suffer an initial earnings penalty for their less-than-relevant foreign education and experience, over time immigrants experience faster wage growth than do natives (see Chiswick (1978), Hu (2000), and Duleep and Regets (2002)).

Thus, the wage that prevails in the labour market depends on the size of the effect of immigration on labour supply and labour demand.

In general, there are two major approaches to the study of the impact of immigration. The first is the spatial approach, which incorporates geographic clustering and changes across local labour markets to determine the impact of immigration on wages (Altonji and Card 1991; Card 1990, 2001, 2005; Dustmann *et al*. 2005). This spatial approach assumes cities or regions within a particular country are discrete labour markets (Kifle 2009). The idea is that immigrant inflows change the wage structure within a labour market. Immigrant inflows that raise the number of workers in a particular group would depress wages in the labour market. By examining the changes across local labour markets, the empirical work of Card (1990, 2001, 2005) finds little impact from immigration on native earnings in the US labour market. Similarly, Dustmann *et al*. (2005) analyse British labour market data, Maré and Stillman (2009) analyse New Zealand Census data, and Maani and Chen (2012) use the Household Labour Force Survey (HLFS) data and they all find little evidence of negative effects on employment and earnings based on the spatial approach.[3]

The spatial approach is widely used, but there are a few weaknesses that should be considered. The main issue of spatial analysis is that it may ignore the movement of workers between local labour markets (Card 2001; Borjas 2003). The influx of immigrants may lower the wages in a particular local labour market and this encourages existing workers to internally migrate to other markets that have higher wages. If this situation prevails, then internal migration would equalise any reduction in earnings. There may also be a positive correlation between immigrants and wages (Borjas 2001, 2003). It may be the case that immigrants are attracted to cities or regions that have good economic progress. This would imply a positive bias from immigration in local labour markets where demand shocks raise wages and employment. This concern is addressed through the use of instrumental variables in local labour market analysis.

The second approach (which is used in this paper) analyses the impact of immigration using national-level data and defining groups along the skills dimension (Borjas 2003, 2004, 2005; Orrenius and Zavodny 2007). The classic work of Becker (1975) and Mincer (1974) on human capital and earnings shows that the skills of workers prior to entry to the labour market and post-entry are important factors in the determination of earnings. We can interpret their findings as implying both education and experience are important components in the labour market. Borjas (2003) defines immigrant and pre-existing groups by both education and experience to utilise the importance of both factors in wage determination. Borjas shows that immigration is not constant across all groups. This heterogeneous immigrant supply creates sufficient variation to estimate the impact of immigration inflows on the economic outcomes of pre-existing workers.

3 However, Maré and Stillman (2009) do find that the intermediate skill group is worse off, but this is offset by positive effects on the better-skilled group.

Using US Census and CPS[4] data, Borjas (2003) finds significant negative effects on earnings and employment due to immigration. Borjas (2004) also finds evidence that immigration causes earnings depression for pre-existing workers, regardless of including both the legal and illegal immigrants in the analysis, or only immigrants with legal status. Focusing on doctoral recipients, Borjas (2005) continues to find adverse effects from immigration. Evidence from the US suggests immigration causes serious negative effects on the existing working population by as much as a three percent decrease in wages of competing workers for a 10 percent increase in the number of immigrant workers.

However, a review of studies that utilise similar methodology yields a wider range of results. D'Amuri *et al*. (2010) study German data and estimate the impact of immigration on the German labour market. According to the authors Germany is the European country that has the greatest immigrant population.[5] The authors also estimate the elasticity of substitution between immigrants and natives; the resulting estimate suggests less-than-perfect substitution between natives and immigrants.[6] Breaking down the analysis with respect to groups by education, D'Amuri *et al*. estimate immigration causes a negative impact of around 1 percent on the highly-educated group. For the less-educated, the authors estimate a positive impact of a similar magnitude. Thus, the average impact of immigration is zero.

Ottoviano and Peri (2007) allow for imperfect substitution between immigrants and natives. After relaxing the typical assumption of perfect substitution, their results show positive wage effects from immigration. These results differ from earlier analyses that find significant negative effects on earnings (e.g. Borjas *et al*. 1996; Jaeger 2007).

Analysing four different data sources from Spain, Carrasco *et al*. (2008) do not find significant negative effects of immigration on native employment or earnings.[7] However, Kifle (2009) examines the Australian labour market and finds a positive impact from immigration. The only negative results are found in low-skill occupations, but the author suggests they are the result of a mismatch rather than a negative effect. Immigrants in low-skill occupations tend to be overeducated and as a result earn more than their native co-workers. Similarly, Mishra (2007) finds significant positive effects in the Mexican market.

There is no consensus as to the impact of immigration on pre-existing workers' economic outcomes. It appears the results are both country and time dependent. This conclusion is confirmed by a review of international meta-analyses (Longhi et al. 2010; Okkerse 2008), which finds that the impact of immigration on the earnings and employment of the existing population is small and that it varies across countries.

4 Decennial Censuses from 1960 to 1990 and Current Population Surveys from 1998 to 2001.
5 D'Amuri et al (2010) find no effect on the native-born but significant adverse effects on the earnings of existing immigrants from new immigration.
6 D'Amuri et al. also estimate the elasticity of substitution between old immigrants and new immigrants; they find the degree of substitution to be almost perfect.
7 Carrasco et al. (2008) use the Census for 1991 and 2001, data on work permits from 1993 to 1999, the labour force survey, and the wage structure survey 2002.

Little work has been done with New Zealand labour market data on the effect of immigration on the labour market, despite New Zealand being a major immigrant-receiving country. This paper follows the national-level framework (Borjas 2003) because it is intuitively appealing. However, the analysis is also extended to incorporate (1) regional impacts and (2) better measures of skill.

3. Data and Descriptive Analysis

This research utilises data from the 2002 to 2007 New Zealand Income Survey (NZIS). These are individual-level data released under the Confidentialised Unit Record File (CURF) format. The NZIS is run as an annual supplement to the Household Labour Force Survey (HLFS). The HLFS is a quarterly survey of approximately 15,000 households (29,000 individuals) that represent urban and rural New Zealand. The focus of the NZIS is to collect information on actual and usual earnings, employment, and various components of income.

The analysis in this paper is restricted to employed men. Individuals are defined as natives if they are born in New Zealand and immigrants if otherwise. The focal point in this analysis is to examine education-experience groups over time rather than individuals. The time period of the data corresponds with a period of normal to buoyant economic and labour market conditions. The time period also signifies a period of stable prices (low inflation). Although the choice of the years of data is determined by data availability, the time period 2002-2007 is fortuitously outside of unusual occurrences, such as the global financial crisis.

Workers are classified into four distinct groups: those without a high school degree; school qualifications (high school degree); post-school qualifications; and bachelor or higher degree. In the NZIS, individuals record their highest level of qualification rather than their years of completed schooling. This classification of education groups is similar to other studies, which also use comparable numbers of education categories – Borjas (2003) and Carrasco et al. (2008) use four education groups and D'Amuri et al. (2010) use three education groups.

We first use the conventional method of organising individuals into experience groups based on potential years of experience. Each of the eight experience groups include five years of experience. Past literature has shown that workers with similar experience are more likely to influence the economic outcomes of each other (Welch 1979). So, by combining workers with similar years of experience it is possible to capture similarities (Borjas 2003).

The New Zealand Income Survey provides information for deriving the conventional measures of potential years of experience At this stage we use the simple conventional definition: experience is $Age - A_T$, where Age is the age of the individual and A_T is the age of entry into the labour market. The entry age of a worker depends on his/her level of education. Those with no school qualifications (without high school degree) have entry at 16 years of age; at 18 years for those with school qualifications; at 20 years for those with a post-school qualification; and at 22 years for workers with a bachelor or higher degree. The focus is on workers with experience between 1 and 40 years. Observations that include work experience of more than 40 years are

dropped from the analysis to keep the results in this paper comparable to other major studies. This results in a pooled sample of 38,315 employed males, of whom 7,692 are immigrants (foreign born).

Supply Shock

Table 1 shows the percentage of the New Zealand population that is foreign born across the time period of the study and regions of New Zealand. It is readily apparent that immigrants comprise a significant proportion of New Zealand population; that the growth in the immigrant share of the population is significant on an annual basis; and that while all regions of New Zealand have experienced increases in their immigrant proportion of the population, this change has varied across regions. As such, the data lends itself particularly well to national level analyses that also allow for regional impacts.

As Table 1 shows, the concentration of immigrants is highest in the Auckland region. In 2002, 37 percent of immigrants lived in Auckland and this proportion continued to rise in the following years. By 2007, 44 percent of the population residing in Auckland were immigrants. The region with the next biggest immigrant population is Wellington, with 29 percent in 2007.

There are numerous reasons to explain this observation. Immigrants tend to reside in areas that have higher numbers of fellow immigrants with similar ethnicity (Eden et al. 2003; Wang and Maani 2014a, 2014b). Also, they may be attracted to areas with good economic opportunities. Since Auckland is regarded as the economic powerhouse of New Zealand, it makes sense for immigrants to reside in Auckland. While Auckland has the greatest number of immigrants, from 2002 to 2007 there was a general upward trend in the immigrant population in all regions.

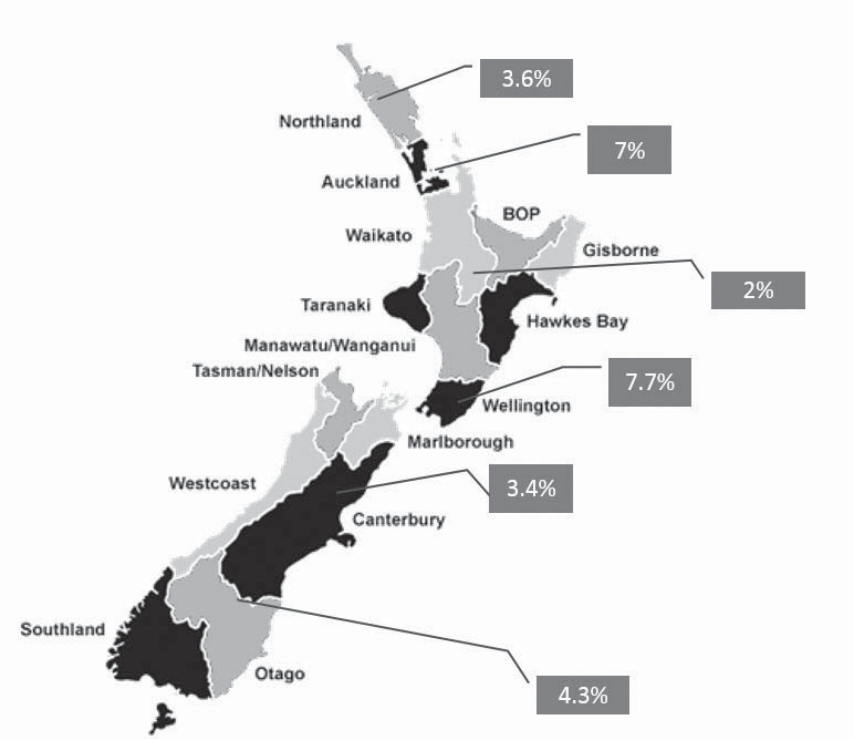
Table 1 - Immigrant Proportion in each Region (Percentage of regional population)

	2002	*2003*	*2004*	*2005*	*2006*	*2007*
Regions						
North North Island	12.0	12.2	13.7	13.4	16.0	15.6
Auckland	36.9	36.5	39.7	42.7	43.4	43.9
Central North Island	10.8	10.4	12.0	12.1	11.5	12.8
Wellington	21.0	22.3	21.2	23.4	24.2	28.7
South Island	9.0	8.1	10.8	11.0	13.0	13.3
Canterbury	14.7	15.9	16.5	19.4	18.7	18.1

Note: Based on Household Labour Force Survey (HLFS)/Income Survey (IS), 2002-2007.

In addition, Figure 1 shows the *change* in the immigrant proportion of the population across New Zealand regions between 2002 and 2007. All regions of New Zealand show significant immigrant supply shocks during the time period. The Auckland and Wellington regions experience increased immigrant population changes of over seven percent over the five-year period.

Figure 1 - Change in Immigrant Share of Population across Regions (2002-2007)



Note: The percentages illustrate the increases in immigrants' share by region in New Zealand during 2002 to 2007. Immigrants are defined as foreign born.

Statistics for Education-Experience Groups

It is interesting to examine how immigrants and natives are distributed along different qualification and experience levels. Table 2 shows the percentage of immigrants and natives in various categories of education and experience. The different population shares are calculated for 2002 and 2007. In general, most workers hold some sort of post-school qualifications; these include vocational training and trade qualifications. From 2002 to 2007 there was a 1 percentage point decrease in the number of immigrant workers in the post-school qualification category. However, the bachelor or higher degree group saw almost a doubling of immigrant workers – from 17 percent in 2002 to 32 percent in 2007. This increase in skilled immigration reflects the intention of New Zealand's immigration system. Looking at the native and immigrant shares in experience groups, there is a remarkably even and stable distribution of workers across years of experience.

Table 2 - Education And Experience Of Natives And Immigrants (Percentage of group)

	2002		*2007*	
	Natives	*Immigrants*	*Natives*	*Immigrants*
Education				
Less than High School	20.32	14.97	19.36	14.00
High School Qualification	19.03	23.49	20.00	16.99
Post School Qualification	48.58	37.84	44.14	36.97
Bachelor or Higher Degree	12.08	23.7	16.5	32.13
Experience				
1 - 5	11.56	7.97	10.7	9.85
6 - 10	11.08	9.08	10.34	11.65
11 - 15	13.40	13.44	11.82	12.04
16 - 20	14.67	18.57	12.55	14.8
21 - 25	15.46	14.07	14.56	17.11
26 - 30	13.26	13.31	14.87	14.18
31 - 35	11.16	13.58	13.84	11.42
36 – 40	9.42	9.98	11.32	8.95

Note: Figures are in percentage terms e.g. 20.32 means 20.32%.

Given the distribution of immigrants across experience and education groups, Figure 2 is useful in showing the immigrant supply shocks for different education-experience groups for the years 2002 and 2007. The supply shock fluctuates between 10 percent and 20 percent across different experience levels. However, for the highly skilled groups (those with bachelor or higher degree), immigrants count for up to 40 percent of the group population. In particular, the largest immigrant supply in the highly skilled groups is those with 20 to 25 years of experience. This observation is not overly surprising, because New Zealand operates a skilled-immigrant filtering system. Preference is given to foreign workers who are highly skilled, so we expect immigrants to form a larger portion of the highly skilled workforce compared to the lesser skilled groups. Comparing 2002 and 2007, there is a noticeable increase in the share of immigrants in each education group. The exception is for those with less than high school qualifications, where the proportion of immigrants actually fell in 2007 relative to 2002.

One interesting question is whether or not native workers move out of regions where there is a large immigrant inflow. To examine this, we computed the percentage change in native population in each region for each year. We found that from 2002 to 2006, in contrast to the significant inflow of immigrants, there are minor changes in cross-region movements of the native population, and there are no distinct trends in these results. Therefore, the data do not support the concern that working age native workers change regions away from where there is an influx of immigrants.[8]

8 Also, a general comparison of weekly earnings and the hourly wage for the native-born in all four groups of education shows growth rates of at least 10% in real terms during the time period.

Figure 2 - Immigrant Labour Market Share (2002 and 2007)
(Immigrants as fraction of the labour force in educational categories)

4. Methodology

The analytical approach in this study follows the framework conceived by Borjas (2003) to examine the impact of labour supply shocks due to immigration on the labour market outcomes of pre-existing workers. The analysis employs national-level data from six years of the New Zealand Income Survey (2002 to 2007). Workers are classified into skill groups based on two aspects of human capital: education and experience.[9] This grouping of workers relies on the implicit assumption that even if workers have the same education, they are not perfect substitutes if they have different levels of experience. Similarly, workers with the same years of experience are not perfect substitutes if they have different levels of educational attainment.

Individuals are sorted into education-experience groups. There are four different categories of educational attainment: below high school qualification, high school, post-school (includes vocational and trade) qualifications, and bachelor or higher degree. In addition, we also define eight groups of experience levels.[10] This classification gives us 32 groups over 6 years – this is 192 cells in total (based on a pooled sample of 38,315 individual-level employed observations).

9 In the form of the Confidentialised Unit Record File.
10 1-5 years, 6-10 years, 11-15 years, 16-20 years, 21-25 years, 26-30 years, 31-35 years, and 36-40 years of experience.

The main component of this model is an immigrant supply shock variable (Borjas 2003). For notation purposes, the cell (*i, j, t*) defines the educational attainment or qualification *i*, experience group *j*, and year *t*. The immigrant supply shock for a particular education-experience group in a particular period is defined as follows:

$$p_{ijt} = \frac{M_{ijt}}{M_{ijt}+N_{ijt}} \quad (1)$$

M_{ijt} is the number of immigrants in a given education-experience time cell, N_{ijt} is the number of native workers in the same cell. Eq. 1 shows the proportion of immigrants that make up a particular skill group at time t. In other words, the above fraction gives us p_{ijt}, the immigrant supply shock variable.

This leads us to the basic empirical model in this paper. We want to analyse the impact of immigrant supply on domestic labour market outcomes. The general approach is to regress the immigrant supply shock on pre-existing economic measures such as earnings and employment. More specifically, this paper uses the following model as seen in Borjas (2003):

$$y_{ijt} = \beta p_{ijt} + a_i + b_j + c_t + (a_i \times b_j) + (a_i \times c_t) + (b_j \times c_t) + u_{ijt} \quad (2)$$

The model includes the immigrant supply shock variable, p_{ijt}. It also includes a number of fixed effects and interactions of these fixed effects. a_i is the vector of fixed effects for education, b_j indicates the work experience group, and c_t is a vector for time periods. These fixed effects are important because they control for any differences across the various education groups, experience groups, and also over time. It is also useful to control for changes in education and experience over time. ($a_i \times b_j$) is the interaction term between education and experience. It controls for the different experience levels across the various education groups. ($a_i \times c_t$) and ($b_j \times c_t$) are interaction terms that control for education and experience changes over time.

y_{ijt} is the dependent variable. Three measures are used in this analysis: mean of log usual hourly earnings, mean of log usual weekly earnings, and mean of the fraction of hours worked in a week. Usual hourly and weekly earnings are deflated to 2002 levels.11 The fraction of hours worked in a week is calculated as usual hours worked in a week divided by 40 hours.12 The inclusion of the above fixed and interaction terms implies the variation in earnings and employment for a particular cell over time can be attributed to the impact from the immigrant supply shock variable.

Later in the paper we will use a more sophisticated definition of experience – effective experience, and there are other variations of Eq. 2 in later sections. These models incorporate additional variables and restrictions to ensure the variation in the dependent variables can be correctly attributed to the variation from immigrant supply.

11 Since we have six consecutive years of data, inflation plays a very minor role.
12 The typical number of hours worked for a full-time worker is 40 hours.

Index of Congruence

An important assumption of the model is that immigrants and natives who have similar education but different levels of experience are not perfect substitutes (Borjas 2003). Using an index of congruence (Welch 1979), it is possible to examine the degree of similarity between native and immigrant groups across the various occupations in the data. Suppose there are two skill groups, *a* for natives and *b* for immigrants; the following is the definition of the congruence coefficient:

$$G_{ab} = \frac{\sum_c (q_{ac} - \bar{q}_c)(q_{bc} - \bar{q}_c)/\bar{q}_c}{\sqrt{\left(\sum_c \frac{(q_{ac} - \bar{q}_c)^2}{\bar{q}_c}\right)\left(\sum_c \frac{(q_{bc} - \bar{q}_c)^2}{\bar{q}_c}\right)}} \tag{3}$$

q_{ac} represents a particular skill group of natives in a particular occupation c and q_{bc} gives a different immigrant skill group in the same occupation. q_c is the fraction of the entire working population that is employed in occupation c. G_{ab} is the congruence index and can be interpreted as a correlation coefficient between two groups a and b. When the coefficient is one, the two groups have equal occupation distribution, and negative one means the two groups have completely different occupation distributions.

Using the 2007 NZIS, Table 3 illustrates the various congruence indices on male workers.

Table 3 - Index of Congruence in Occupation Distribution, 2007

	Experience of corresponding immigrant group			
Education - experience of native groups:	*1 - 10 years*	*11 - 20 years*	*21 - 30 years*	*31 - 40 years*
Less-than High School				
1 - 10 years	-0.372	-0.160	-0.121	-0.240
11 - 20 years	-0.339	-0.134	-0.101	-0.290
21 - 30 years	-0.292	-0.190	-0.134	-0.258
31 - 40 years	-0.280	-0.154	-0.129	-0.256
School Qualification				
1 - 10 years	-0.085	-0.444	-0.404	-0.536
11 - 20 years	-0.551	-0.627	-0.540	-0.577
21 - 30 years	-0.470	-0.659	-0.564	-0.664
31 - 40 years	-0.556	-0.551	-0.460	-0.509
Post School Qualification				
1 - 10 years	-0.424	-0.448	-0.541	-0.585
11 - 20 years	-0.615	-0.536	-0.619	-0.606
21 - 30 years	-0.827	-0.725	-0.767	-0.721
31 - 40 years	-0.842	-0.759	-0.805	-0.763
Bachelor or Higher Degree				
1 - 10 years	0.756	0.808	0.726	0.490
11 - 20 years	0.719	0.815	0.857	0.632
21 - 30 years	0.682	0.804	0.830	0.598
31 - 40 years	0.609	0.745	0.774	0.519

The NZIS provides two-digit codes to classify individuals into different occupations. The results from the table of congruence values show a distinct break between the highly skilled group and the other education groups. [13]

Notably, experience groups with a bachelor or higher degree all have positive congruence values. For instance, consider workers with bachelor or higher degree and 11 to 20 years of experience. The congruence coefficient is 0.815; this is close to 1 and suggests workers in this education-experience group are found in very similar occupations. Thus, it is reasonable to conclude the degree of substitution may be high for these workers.

For all other education-experience groups, the results confirm a negative congruence coefficient between immigrants, implying that native workers and immigrant workers are in different occupations. While the index of congruence is by no means a complete measure of the degree of substitution between two groups of individuals, it offers a good indication of the groups that the analysis should focus on. In this case, the large positive coefficients for workers with bachelor or higher degrees, suggests that it is worth examining these workers in greater detail.

13 In this particular analysis, experience groups are defined by ten-year intervals rather than the five-year intervals employed earlier. This is to reduce the number of cells with few observations due to further classifications by two-digit-level occupation categories.

5. Results

Eq. 2 is estimated using the education-experience cells over the six years of the NZIS. Recall Eq. 2 is as follows:

$$y_{ijt} = \beta p_{ijt} + a_i + b_j + c_t + (a_i \times b_j) + (a_i \times c_t) + (b_j \times c_t) + u_{ijt}$$

Table 4 shows the results from this estimation, based on the basic model where the estimation is completed based on the data for working men who have 1 to 40 years of experience. The three dependent variables are log weekly earnings, log hourly earnings, and fraction of time spent working. The table shows the coefficient β on the immigrant supply shock variable, and cluster robust standard errors. The standard errors on many of the coefficients in Table 4 are very large and this implies the coefficients are insignificant. These initial results suggest immigrant supply shocks have little effect on the earnings of pre-existing workers.

Table 4 - Impact of Immigrant Supply on Labour Market Outcomes
Conventional Experience Skill Groups

Coefficients (elasticities)
(cluster robust standard errors)

	Dependent Variables		
Specification:	*Log Weekly Earnings*	*Log Hourly Earnings*	*Fraction of Hours Worked*
Basic model	0.058 [0.03] (0.149)	0.005 [0.003] (0.159)	0.187* [0.11] (0.096)

Notes: The figures in the table report the coefficient on the immigrant share variable;
Elasticity [in brackets];
Auxiliary estimation results are in italics;
*p<.10,**p<.05,***p<.01.

It is easier to interpret the values in Table 4 if they are converted to elasticity figures, as also reported in the table [in brackets]. Looking at the impact of supply shock on working hours, the elasticity of 0.11 indicates that a 10 percent increase in immigrant workers raises the fraction of hours worked in a week by 1.1 percent. However, the confidence interval includes zero and we cannot reject the hypothesis that the supply shocks have no impact on the hours of work.[14]

14 One concern may be that the effect on employment is imprecise since the sample includes both full-time and part-time workers. When we restrict the estimation to full-time workers the coefficients remain positive and small, suggesting that the initial results do not include imprecision from the inclusion of part-time workers.

Model Specification: Is Fixed Effects Correct?

It is important to test the appropriate model is employed in this paper. Generally, we expect the fixed effects model to be correct since most studies utilise this approach. First we examine the fixed effects and random effects models. Using the Hausman test, the null hypothesis tested is that the coefficients in the random effects and fixed effects models are the same. The p-value of 0.02 suggests we can reject the null hypothesis that the coefficients are the same, at the 5 percent level of significance. That is, the fixed effects model is more appropriate.

Education Groups

We also restrict the estimates by schooling groups to identify if the results are stronger for certain groups. Table 5 shows the results when the estimation is restricted to workers with similar educational attainment: those with no schooling (less than a high school degree); at least high school qualifications; and higher education. Elasticities are also reported for coefficients that are statistically significant (at least at the 10 percent level of significance). We find insignificant results for earnings and the hourly wage for all groups, but statistically significant results for employment outcomes.

The last column of Table 5 illustrates the results for the highly-educated group. It is important to focus on this group because New Zealand operates a skilled immigration filter system. Immigrants account for a larger share of the skilled workforce than is the case for the lesser skilled workforce.

The NZIS provides two-digit codes to classify individuals into different occupations.[15] The results from the table of congruence values show a distinct break between the highly skilled group and the other education groups.[16]

15 This results in 25 occupation categories. The categories are then combined into 9 distinct one digit occupation categories by Statistics New Zealand, as applied in our estimation of the Index of Congruence in this section.

16 In this particular analysis, experience groups are defined by ten-year intervals rather than the five-year intervals employed earlier. This is to reduce the number of cells with few observations due to further classifications by two-digit-level occupation categories.

Table 5 - Impact of Immigrant Supply on Labour Market Outcomes by Education Group

Coefficients (elasticities)
(cluster robust standard errors)

Dependent variable	*Below high school degree*	*At least school qualification*	*Bachelor or higher degree*
Log Weekly Earnings	0.163	0.044	0.347
	(0.515)	(0.233)	(0.275)
Log Hourly Earnings	0.160	0.010	0.100
	(0.248)	(0.214)	(0.157)
Fraction of Hours Worked	-0.311	0.207*	0.535*
		[0.11]	[0.30]
	(0.319)	(0.115)	(0.286)
--sub-sample of full-time employed	-0.231	0.266**	0.519**
		[0.15]	[0.22]
	(0.189)	(0.116)	(0.225)

Notes: The figures in the table report the coefficient on the immigrant share variable;
Elasticity [in brackets] for statistically significant coefficients;
Auxiliary estimation results are in italics;
*p<.10,**p<.05,***p<.01.

The estimated coefficients are positive and larger when we restrict the analysis to workers with higher educational attainment. Nevertheless, the absolute size of the elasticity of supply remains small and the large standard errors indicate the impact of immigration is not significant. The results for the highly educated groups are not what we expect, since the index of congruence suggests that highly educated immigrants and natives are potentially more competitive than are other education groups. It may be the case that immigrant workers are not as readily substitutable to pre-existing workers in the highly educated groups, and this leads to small but positive effects from immigration. One explanation for these results is that immigrants lack characteristics that natives have. These may be proficiency in the domestic language, and less familiarity with local customs and experiences, or complementarities among workers. We find generally similar results for the sub-sample of full-time men (last row of Table 5).

The following sections estimate the effect of immigrant supply shocks using different and more rigorous frameworks. It would be useful to see how the results change and create a more robust illustration of how immigration may affect the economic outcomes of pre-existing workers.

Spatial Correlation

The first extension we apply is to combine the typical spatial approach with the education-experience groups approach (Borjas 2003). The spatial approach literature finds little impact from immigration (Dustmann et al. 2005) and the results presented so far also suggest immigration plays a minor role in the labour market outcomes of pre-existing workers. It would be useful to see how the results change when skill groups are defined within each local labour market (regions) – does the impact on earnings become more positive? More negative? Or is there still no significant change?

To conduct this analysis, each cell is now defined as *(r, i, j, t)*. That is, each cell is determined by a specific region, education level, experience group, and year. The NZIS lists six local government regions in New Zealand: North North Island (Northland, Waikato, and Bay of Plenty); Auckland; Central North Island (Gisborne, Hawkes Bay, Manawatu, Wanganui, and Taranaki); Wellington; South Island (excluding Canterbury); and Canterbury. We know that immigrants account for approximately 10 percent to 20 percent of the working population in each region except in Auckland and Wellington. From 2002 to 2007, the immigrant share has risen from 21 percent to 29 percent in Wellington, and from 37 percent to 44 percent in Auckland (see Table1).

Table 6 reports the results from region-education-experience-year analysis. Column (1) shows the base specification where only fixed effects are included – there are fixed effects for region, education level, experience, and year. The base specification shows the impact of immigration on skill groups within each region. The coefficients for the impact on earnings are both negative and significant.

The second column of Table 6 reports the results when two-way interaction effects are included. This is useful as it controls for any changes in education, experience, and regions over time. Further, there are controls for interactions between region and education, region and experience, and education and experience. These controls serve to improve the accuracy of the estimate of the impact of immigration on pre-existing workers' outcomes. Again the effect on earnings is negative. Weekly earnings fall by 1.4 percent for a 10 percent increase in the supply of immigrant workers and this coefficient is highly significant. When we consider the impact on hourly earnings, a 10 percent rise in supply reduces hourly earnings by 0.5 percent. Immigration also causes a negative effect on the working hours of pre-existing workers. Similar to before, the impact on employment is small and becomes insignificant.

The last column in Table 6 shows the estimates when three-way interaction terms are also included in the regressions.[17] We can isolate the variation in the shock from immigrant supply to the region-education-experience-year level through the inclusion of fixed effects and interaction terms. In other words, the impact of immigration on labour market outcomes is very specific. This specification

17 Interactions between region and education; region and experience; region and year; education and experience; education and year; experience and year; region, education, and experience; region, education, and year; region, experience, and year; and education, experience, and year.

should return even more accurate results than the first and second specifications. Surprisingly the wage elasticity of supply remains similar to the previous results in column (1) and (2). The impact on weekly and hourly earnings is minus 1.3 percent and minus 0.5 percent for a 10 percent increase in immigration. The impact on working hours is small and insignificant.

Table 6 - Impact of Immigrant Supply on Labour Market Outcomes by Region-Skill Groups

Coefficients (elasticities)
(cluster robust standard errors)

Dependent variable	*(1)*	*(2)*	*(3)*
Log Weekly Earnings	-0.252*** [- 0.14] (0.061)	-0.242*** [- 0.14] (0.062)	-0.227*** [- 0.13] (0.064)
Log Hourly Earnings	-0.086** [- 0.05] (0.043)	-0.083** [- 0.05] (0.039)	-0.090* [- 0.05] (0.051)
Fraction of Hours Worked	-0.086* [- 0.04] (0.051)	-0.063 (0.055)	-0.045 (0.057)
Controls for:			
Fixed effects	Yes	Yes	Yes
Interaction effects	No	Yes	Yes
Three way Interactions	No	No	Yes

Notes: The figures in the table report the coefficient on the immigrant share variable; Elasticity [in brackets] for statistically significant coefficients;
*p<.10,**p<.05,***p<.01.

Overall, when we define skill groups by region as well, the earnings results become negative and mostly significant, at least at the five percent level of significance. When the size of the labour market is restricted by regional boundaries, the results are more definite. One explanation of this result is that Auckland and Wellington region have disproportionately more immigrants. Thus, by including regional labour markets in the analysis, the estimated effects are more representative of the uneven distribution of immigrants in New Zealand. This outcome is quite different to what Borjas (2003) finds in his analysis. In his paper, Borjas suggests the inclusion of local labour markets conceal much of the impact from immigration. However, we are examining a different country and it is likely there are fundamental differences in the structure of immigration between New Zealand and the US.

The impact of immigration changes in a number of ways when skill groups are distributed across local labour markets. At the national level, we find that immigrant supply shocks cause little effect on the economic outcomes. However, when skill groups are defined by regions, the estimated impact of immigration on earnings and employment becomes significant and negative.

We restrict the spatial approach to specific regions to identify if any specific local labour markets are driving the results. As suspected, when we restrict the analysis to Auckland, the sizes of the estimated coefficients become larger.[18]

We can draw a number of interesting conclusions from the results in this section, and the regional statistics in the earlier sections. First, there is little indication of movement of native workers across different regions in New Zealand. This suggests that the inclusion of regions does not dilute the estimates of the effects from supply shocks. In fact, more precise results may be derived when we examine skill groups by regions compared to the national level. Second, the negative coefficients indicate the inflow of immigrant workers are associated with small negative effects on wages and employment. Finally, because Auckland has the largest immigrant population, pre-existing immigrant workers in this region may suffer more adverse effects from immigration, compared to other regions in New Zealand.

However, when, in auxiliary estimates, we restrict the estimation to effects for the native-born sub-sample of the workforce, the coefficients for wage effects become significantly smaller in size, and they become insignificant for the native-born group. This result is consistent with the expectation that the wage effect observed in Auckland pertains to immigrant groups, including earlier immigrant groups for whom new immigrants are closer substitutes.

Defining Effective Experience

The analysis so far has the conventional measure of work experience as simply the age of an individual minus the age at which the individual enters the labour market. This is a very simple definition and is unlikely to be an accurate measure of experience. This approximation is reasonable for native men since it reflects their years of schooling and of workforce entry. However, this framework for experience is simplified because it assigns the same value to local and foreign experience. Employers in host countries are likely to place more value on domestic experience than foreign experience. We address this problem as below.

Using US data, Chiswick (1978) finds that employers assign different values to foreign experience and local experience. It seems appropriate to redefine labour market experience as "effective experience" (Borjas 2003). The objective is to define effective experience such that a year of foreign labour market experience is not the same as a year of domestic experience. Let X be the effective experience of an immigrant worker:

18 Looking at the impact on weekly earnings in Auckland, a 10 percent rise in the number of immigrants reduces earnings for workers in Auckland by almost 2.5 percent.

$$X = \begin{cases} \alpha(A_m - A_T) + \mu(A - A_m), & if\ A_m > A_T \\ \tau(A - A_T), & if\ A_m \leq A_T \end{cases} \quad (5)$$

A_m is the age of entry into New Zealand, A_T is the age of entry into the labour market, and A is the age of the individual. So, if an individual migrated as an adult then $A_m > A_T$ and their experience would comprise of two components: experience acquired abroad ($A_m - A_T$) and experience acquired since migration to New Zealand ($A - A_m$). The coefficient α measures the value that New Zealand firms place on foreign experience and μ values local labour market experience. However, if an immigrant migrated as a child then $A_m \leq A_T$. Child migrants would acquire only domestic experience $A - A_T$. The coefficient τ measures the value of experience acquired by immigrant children.

The three coefficients above (α, μ, τ) can be estimated easily. Using all six years of the NZIS we can run a standard immigrant assimilation regression of the form19;

$$w = s_i + \theta_c \boldsymbol{I^c} + \theta_d \boldsymbol{I^d} + \varphi_n \boldsymbol{N}(A - A_T) + \varphi_c \boldsymbol{I^c}(A - A_T) + \varphi_{d0} \boldsymbol{I^d}(A_m - A_T) + \varphi_{d1} \boldsymbol{I^d}(A - A_m) + \rho Y + u \quad (6)$$

The dependent variable w is the log of weekly wage. s_i is the fixed effects for education. $\boldsymbol{I^c}$=1 if an immigrant entered as a child, $\boldsymbol{I^d}$=1 if entry as adult an $\boldsymbol{N}$ is the indicator for native-born individuals. The term Y indicates the year of entry into New Zealand. Notice that the square of each of the three experience terms is also included in the regression. In effect, there are three sets of regressions being performed. Table 7 reports the results from this estimation of the relevant parameters20.

The parameters of interest are the φ's. φ_n is the value employers place on a year of experience that a native worker acquires or, put differently, it is the market value of a year of native experience. φ_c gives the market value of a year of experience acquired by an immigrant who entered as a child. φ_{d0} is the value of a year of foreign experience and φ_{d1} is the value assigned to a year of domestic experience acquired by immigrant workers. These values allow us to define the effective experience coefficients:

$$\alpha = \frac{\varphi_{d0}}{\varphi_n}, \quad \mu = \frac{\varphi_{d1}}{\varphi_n}, \quad \tau = \frac{\varphi_c}{\varphi_n} \quad (7)$$

Using the estimated values reported in Table 7 we can compute the effective experience coefficients.

19 See Borjas (2003).

20 The confidentialised NZIS does not identify the exact number of years since migration for each immigrant. Instead the years since migration variable in the NZIS is reported in intervals. This is not appropriate for the estimation of Eq. 5. To overcome this problem, immigrants in each interval are randomly assigned (with a uniform distribution) to a year since migration value inside that particular interval. Following Borjas (2003) we use this method rather than the midpoints of each interval, where the distribution of assigned years in New Zealand reflects that of the actual data, but smooths out the ends of the distribution.

Table 7 - Wage Rewards for Different Types of Labour Market Experience

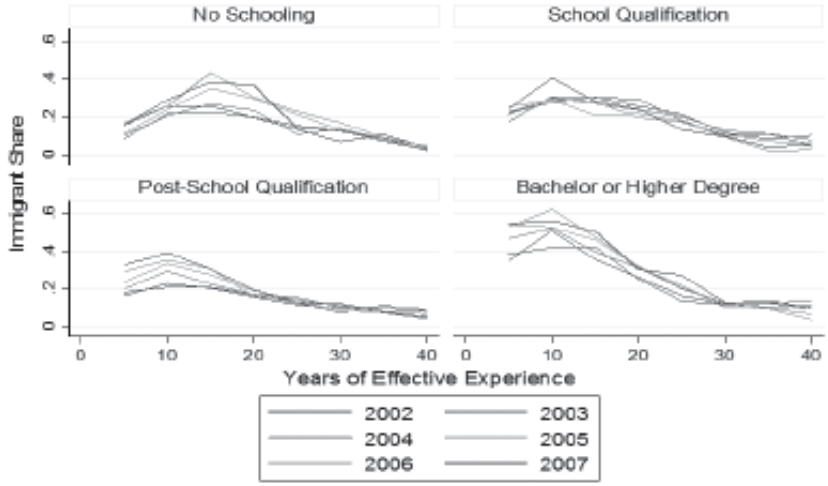
	Dependent variable: Logarithm of weekly wage in host country		
	Group		
Coefficient on:	*Natives*	*Immigrant entry as child*	*Immigrant entry as adult*
Foreign experience	–	–	0.0347***
			(0.010)
Foreign experience squared	–	–	-0.0009***
			(0.000)
Local experience	0.0788***	0.0882***	0.0555***
	(0.001)	(0.005)	(0.004)
Local experience squared	-0.0015***	-0.0017***	-0.0011***
	(0.000)	(0.000)	(0.000)

Notes: The figures in the table report the coefficient on the immigrant share variable; Robust standard errors are reported in brackets; *p<.10,**p<.05,***p<.01, – not applicable.

The first thing to note is that the market value for experience acquired by natives and for experience acquired by child immigrants are similar. In fact, slightly more value is placed on the experience acquired by child immigrants than comparable natives. This implies the coefficient τ=1.1. As expected, the value assigned to local experience acquired by adult immigrants is less than that assigned to native or child immigrant experience. Further, foreign experience has the lowest market value of 0.035. Thus, the coefficients in question are α=0.4 and μ=0.7.

With these estimated coefficients, it is possible to calculate the effective experience for each worker in the sample. Instead of assigning workers to experience groups, we now assign workers to effective experience groups. Figure3 shows the immigrant supply shock for each education group and effective experience level. The distribution of immigrant share in each education-experience group is quite different from before (Figure1).

Figure 3 - Immigrant Supply Shock
(Skill Groups Based on Effective Experience)



There are now obvious trends in the supply shock. In the bachelor or higher degree group, immigrants account for almost 60 percent of workers with 10 years of experience. As the years of experience increase, the immigrant share falls. In the group of workers with school qualifications or post-school training, immigrants account for 40 percent of the workers with 10 years of experience and this falls as experience increases. Defining skill groups with effective experience has increased the size of the immigrant supply shock in general and there are obvious 'peaks' in the distribution.

Table 8 reports the results of running Eq. 2 again but with effective experience groups rather than groups established under the standard definition of experience. The first obvious difference is that the impact of immigration on weekly earnings and working hours is now negative. The coefficient, when weekly earnings is the dependent variable, is – 0.281 and this is highly significant. Translating this coefficient into an elasticity of supply interpretation we have a 1.6 percent fall in earnings when the supply of immigrants increases by 10 percent. Notice that the other coefficients are very small in value and mostly insignificant. Overall, when defining skill groups by effective experience, the impact of immigration is small but it tends towards a negative outcome. This is different to the results found when using the base specification, where the impact of immigration is minor but tends towards a positive outcome.

Table 8 - Impact of Immigrant Supply on Labour Market Outcomes
(Effective Experience Skill Groups)

Coefficients (elasticities)
(cluster robust standard errors)

	Dependent Variables		
Specification:	*Log Weekly Earnings*	*Log Hourly Earnings*	*Fraction of Hours Worked*
Extended model	-0.281*** [- 0.16] (0.091)	0.006 (0.006)	-0.073 (0.090)

Notes: The figures in the table report the coefficient on the immigrant share variable;
Elasticity [in brackets] for statistically significant coefficients;
*p<.10,**p<.05,***p<.01.

The standard definition of labour market experience is too simple and does not reflect the value employers place on different types of experience. Thus, it makes sense to create a framework that allows domestic and foreign experience to be valued differently. Utilising this effective experience framework, while the sizes of the coefficients are small, the standard errors indicate the effects on weekly earnings are significant.

Again, when in auxiliary analyses we restrict the estimation to wage and employment effects for the native-born sub-sample of the workforce, the coefficients for wage effects become significantly smaller in size and they become insignificant, indicating that the wage effect observed reflects results for the group of earlier immigrants, for whom new immigrants are closer substitutes.

6. Summary

In this paper we examine the impact of immigration on labour market outcomes in New Zealand. With so much interest in the impact of immigration, and given that workers form a substantial segment of the New Zealand workforce, this topic is worthy of special attention. We have employed the methodology proposed by Borjas (2003), which analyses individual-level data at the national level. Education-experience groups are first defined and each group is assigned an immigrant supply shock variable. By regressing the supply shock against various measures of labour market outcomes, it is possible to derive the elasticity of supply of immigrants.

The estimated supply elasticities suggest the earnings of pre-existing workers increase by less than one percent for a ten percent increase in the supply of immigrants. The size of these coefficients together with the large standard errors provides evidence for the hypothesis that immigration has little impact on earnings. As New Zealand operates a skilled immigration system, it is worth restricting the analysis to the various levels of education. In particular, when we restrict the analysis to highly skilled workers (bachelor or higher degree) we continue to find no substantial change in the impact of immigration on the earnings or employment of pre-existing workers.

We extend the standard national-level approach to incorporate local government regions in the analysis. This is an interesting extension because it illustrates the geographic distribution of immigration and the effect of this distribution in each region. For New Zealand this is important as a large proportion of immigrants reside in a particular region (the Auckland region). When groups are defined by region-education-experience the results change. In fact the estimates report negative effects on labour market outcomes. However, even though results are statistically significant, the size of the negative impact from immigration is still small – an approximately 1.5 percent reduction in earnings from a ten percent rise in immigrant inflow.

It is common for firms to value experience acquired in the domestic market differently from experience acquired abroad. To take into account these different values placed on labour market experience, we define 'effective experience' for each worker. Depending on the type and level of experience of each worker, experience is rescaled to reflect estimated market value. However, human capital comprises multiple dimensions and it is not practical to rescale every dimension of skill. Instead we assign individuals into various segments of the earnings distribution with the assumption that similarly skilled workers fall in the same region of the earnings distribution. Based on this skill framework the estimates of elasticity of supply continue to be small. In summary, it seems to be the case that immigration in New Zealand causes unsubstantial changes to the economic outcomes of pre-existing workers.

The effects of immigration on wages and employment hours per worker reported in this paper suggest they are minor, but there is evidence that the effects tend towards the negative direction. Further analysis shows that effects for the sub-sample of native-born men remains insignificant, indicating the effects observed reflect outcomes for earlier immigrants for whom recent immigrants are closer substitutes. These results fall between the findings of Borjas (2003), who finds significant negative effects, and those of Dustmann et al. (2005), who find no significant effects.

However, the picture is not complete. It would be useful to also evaluate the long-term adjustments to the factors of production due to immigration; account for potential changes in the productivity factor of the economy; and also create a framework that captures the potential benefits (and consequences) of immigration and the resulting spill-over effects.

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