

Immigration and Wage Growth: The Case of Australia

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Abstract: We discuss various ways in which an economy can adjust to immigration-induced labour supply shocks, and what the implications are for wages. We then describe the empirical approaches that aim at quantifying the wage effects of immigration, and point out the challenges for empirical work. Turning to Australia, we review the status of Australia's immigration program and migrant population, as well as recent developments in the labour market outcomes of Australian residents. We survey existing empirical evidence analysing the links between immigration and wages in Australia, which, while sparse, does not generally support adverse impacts on average wages or wages of low-skilled Australians. Finally, we discuss this Australian experience in the context of the adjustment mechanisms reviewed earlier and consider the implications of these findings.

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1. Introduction

A large literature exists that investigates the effect immigration has on wages and employment of the population in the receiving country (see Dustmann et al. 2016 and references therein). While recent years have seen advances both in terms of new methodological approaches as well as the type of data that is used for analysis, there remains a debate about the way immigration impacts host countries. Recent work by Dustmann and Preston (2019) argues that migrations that are driven by individuals' desire to improve the return they receive for their work will always lead to efficiency gains and induce increases in output. However, they also point out that while there are overall gains from migration, these may be unequally distributed, with the potential that some subgroups in the host country will lose out even as others benefit. The literature on the impact of migration on wages is largely concerned with identifying who are the potential winners and losers, and quantifying how much the winners win, and the losers lose.

In Section 2 of this paper, we will briefly review the most basic theoretical model linking immigration and the labour market, and discuss the predictions it makes about the potential impacts of immigration on wages and employment of native workers. However, changes to labour market conditions are not the only mechanism for an economy to adjust to migration flows, and it may well be the case that immigration-induced labour supply shocks have no effects on wages and employment at all. Instead, the additional labour provided by immigrants could be absorbed by the receiving economy through other mechanisms, such as adjustments to the output mix or production technologies used. While not the focus of the

extant literature that is concerned with immigration effects in Australia, we will also discuss these adjustment mechanisms in order to provide a more rounded view of immigration's potential impacts.

Following this, in Section 3 we consider the empirical challenges in studying immigration's effects. Various strategies have been devised and employed to carefully circumvent potential pitfalls, and we compare the underlying assumptions, methodologies, and interpretations of these approaches. In Section 4, we provide a brief overview of the magnitude of migration and the type of migrants Australia has accepted over the past few decades, and how this compares with migration to other Western countries. We also touch on Australians' views on immigration, before discussing the recent evolution of wages in Australia (again in comparison to other developed nations). In Section 5 we undertake a survey of the existing empirical literature that investigates the impact immigration has on Australian wages and employment, before finally providing some discussion and concluding remarks in Section 6.

2. Conceptual discussion

The literature on the effects of immigration on wages generally treats migration flows as labour supply shocks that trigger adjustments in the receiving economy. In the following discussion we will introduce simple models to examine some of the margins along which these potential adjustments might be expected. These models will typically be static in nature (imagining the economy shifting from one equilibrium to another as a result of a

shock), and are meant to illustrate the key mechanisms that may apply if economies respond to immigration.

Trade economists have emphasized the possibility that the economy adjusts through changes in the output mix (Hanson and Slaughter 1999). The idea is most easily illustrated by considering a small open economy with more traded goods than factors of production. Suppose we are interested in the effects of an immigration-induced labour supply shock consisting of skilled labour³, and that the economy uses a constant return to scale production technology to produce two traded goods using skilled and unskilled workers. These industries will generally be differently intensive in their use of skilled and unskilled workers; for concreteness let industry A be more intensive in the use of unskilled workers, and industry B more intensive in the use of skilled workers. Both industries are price takers, in the sense that output prices are set on international markets (the automobile industry could be a useful example).

If such an economy is exposed to a labour supply shock of skilled workers, then this will benefit mainly industry B, as it uses these workers more intensively. In the very short run, the shock will lead to wages of skilled workers decreasing, which industry B will take advantage of by increasing production (as the drop in labour cost will increase profits at constant world output prices). This production increase will continue until the additional demand for skilled workers has absorbed the entire immigration-induced labour supply

³ It is perhaps more typical to consider a shock of unskilled labour, but the Australian experience is more closely represented by an influx of skilled workers (as will be discussed in Section 4.a). In any case, the intuition and analysis proceed in much the same way.

shock. In the new equilibrium, as output prices are fixed, so too will be input prices - i.e. wages (recalling that we consider constant returns to scale). As such, we conclude that wages remain the same as they had been prior to the immigration shock, while output of industry B has increased relative to industry A. At constant prices for the output goods, the output of the high-skill intensive good will rise and the output of the low-skill intensive good will fall (Rybczynski 1955).

To see this more formally, we follow Dustmann and Glitz (2015) who assume an economy where each production unit produces a tradable output good whose price is set on international markets. Production follows a simple constant elasticity of substitution (CES) production function with two input factors, skilled and unskilled labor, so that firm j uses L_u unskilled and L_s skilled workers to produce an output given by

$$Y^j(L_u, L_s) = [\alpha_j L_u^\rho + (1 - \alpha_j) L_s^\rho]^\frac{1}{\rho} , \quad (1)$$

with firm-specific production technology captured by α_j and the elasticity of substitution between the two types of labour given by ρ .

Suppose for now that the production technologies α_j are fixed. That means that the unit value isoquants of each production unit are also fixed. In equilibrium, these determine relative wages and the factor intensities with which each production unit produces its output (see e.g. Gaston and Nelson 2000). Considering a supply shock of labor type $i \in \{u, s\}$ we have that, since unit value isoquants are fixed, so too are equilibrium wages (this is the Factor Price Insensitivity Theorem; see Leamer and Levinsohn 1995). As such, the intensities of each input factor are also fixed for each firm, and so all adjustment to the labor supply shock

must take place through changes in the aggregate output mix (with those production units that are more intensive in the use of the now more abundant labor input increasing in scale). This is the Rybczynski theorem (Rybczynski 1955), and the main channel through which many models of open economies anticipate adjustment to labour supply shocks.

To summarize, in this model when output prices and technology levels are fixed, after an immigration influx natives will continue to be paid the same wages as they had been before the labour supply shock had occurred. The industry that uses the more abundant factor more intensively will increase its production, and the additional output will be traded away on international markets at constant prices. While there are no wage changes due to migration, there is also no migration surplus. From the perspective of the native workers, migration simply has no effect on their living standards. This situation is one where the change in relative factor endowments has translated into a change in relative outputs, but where the fixed output prices keep factor prices constant.

Apart from adjustment of the industrial structure, a second possible response to an immigration shock could be adjustments in technology use. Potential economic mechanisms that would drive this technology change have been proposed, such as changes in skill mix inducing innovation activities (Acemoglu 1998, Acemoglu 2002) or producers selecting optimal production technologies from a pool of alternatives (Beaudry and Green 2003). At a formal level, a technological adjustment of this kind would not function dissimilarly to the industry composition adjustment just discussed. Considering the model captured by Equation (1), this scenario anticipates that firms' technology (α_j) will adjust in order to take

advantage of the change in available labour. Formally, this will rotate their unit value isoquants in production space along the (fixed) budget line (as factor price insensitivity continues to hold). The consequence of this will be that individual production units will change the relative intensity of skilled and unskilled labour they use until the labour supply shock is absorbed.

While in the previous mechanism we considered, the labour supply shock was absorbed by relative output changes, in the present situation, we anticipate that an increase in the number of workers of a particular skill level as a result of immigration will lead the host economy to implement technologies that allow absorption of these additional workers. As in the former case, this will be achieved without changing wages of natives. Such a possibility is discussed by Ethan Lewis (Lewis 2011), who provides evidence of its taking place using data for the US. Dustmann and Glitz (2015) assess the importance of adjustment to labour supply changes through adjustment of industrial structure and through technology for Germany, and find that the latter is more important.

A third way for a receiving economy to respond to a labour supply shock may be through changes in wages or employment of the native population. This mechanism, emphasized by labour economists, is the more intensely studied in the literature. The idea is best explained by considering an economy in which skilled and unskilled workers produce a single output good. If we first assume that labour supply is inelastic, then an immigration-induced labour supply shock of skilled workers will lead to an outward shift in the labour supply curve of the skilled, causing the equilibrium to slide down the demand curve and resulting in a drop

in skilled workers' wages (illustrated in Figure 1a). In contrast, the induced relative scarcity of unskilled workers will shift the demand curve for unskilled workers outwards, causing wages of unskilled workers to increase (Figure 1b). Thus, in this setting, the overall result of the high-skill immigration shock will be an increase in wages of unskilled workers while wages of skilled workers fall. On balance, there will be an "immigration surplus", which will be captured by unskilled workers. This surplus is generated through the last (marginal) migrant setting the new equilibrium wage in this economy, and this wage being lower than the prevailing wage prior to the shock.

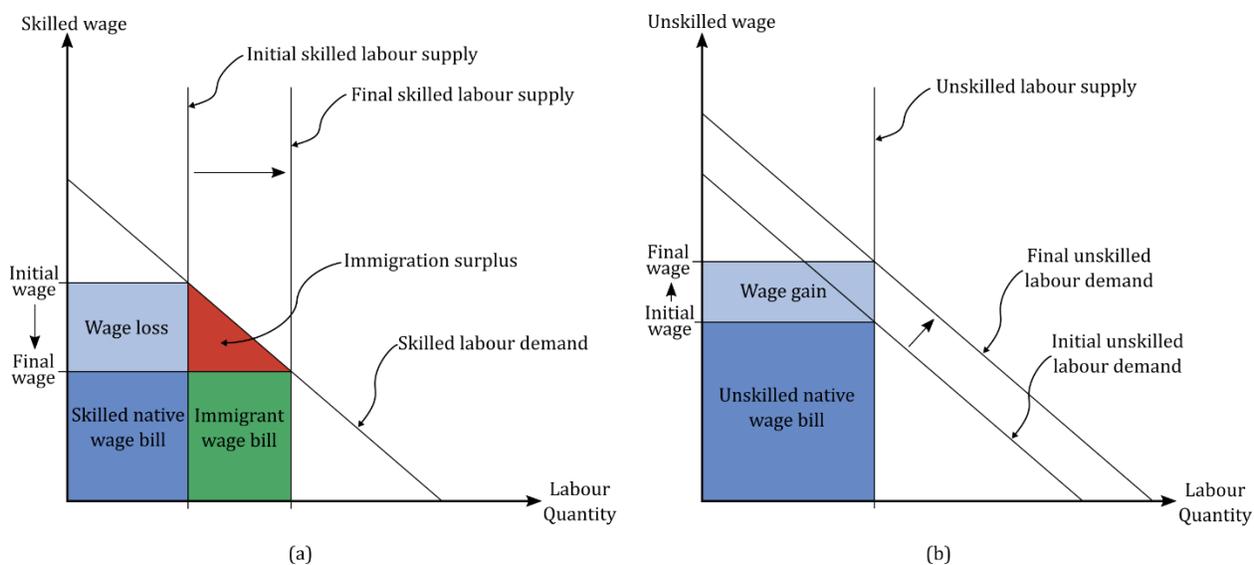


Figure 1: Labour market adjustments to a skilled migration shock. a) Skilled workers experience wage loss as the supply curve shifts outwards. b) Unskilled workers experience a wage increase as the demand curve moves outwards

To summarize, under this labour market adjustment mechanism a labour supply shock of skilled workers will have led to:

- 1) a migration induced surplus, i.e. a gain in GDP of the native population;

- 2) this surplus going to workers who are production complements to migrants, in our case unskilled workers; and
- 3) distributional effects for native workers, with those who must compete directly with migrants (i.e. skilled workers) experiencing lower wages, and having re-distributed part of their share of GDP to those who are complements to migrants (i.e. unskilled workers).

If the workers who must compete with migrants are those with the highest wages (as would be expected if migrants are disproportionately skilled), then this mechanism predicts immigration causing a decrease in wage inequality, as high-wage workers experience lower wages while low-skill, low-wage workers receive wage increases.

If we relax the assumption that labour supply of natives is inelastic, then there will be employment responses in addition to these wage effects, with some skilled workers leaving the workforce as wages fall, and some unskilled workers entering as their wages rise. In the extreme case where labour supply of natives is completely elastic, the entire effect of immigration will be absorbed by labour supply responses, with wages remaining at the pre-migration level. This makes clear that wage effects and employment effects of migration ought to be studied in conjunction, as emphasized by Dustmann, Schoenberg and Stuhler (Dustmann et al. 2016, Dustmann et al. 2017).

If capital is included in such models, then the overall effect of migration on wages will depend on assumptions about how elastic its supply is (see Dustmann et al. 2016 or Dustmann et al.

2013 for details). In the limit that capital supply is infinitely elastic, the introduction of capital will have essentially no effect on the outcomes of workers.

As well as those informing the models we have thus far considered, there are of course numerous other considerations that could influence the effects immigration has on a receiving country. One typical reason offered in support of policies that promote immigration is the existence of severe labor shortages that are viewed as holding back growth (for instance in the agricultural sector, the health sector, or the trades), and the presence of frictions that make such shortages more salient. If workers of some type are not sufficiently available in the economy, then immigration may lead to additional benefits through complementarities between native workers and migrants (by providing key workers in an industry), or by improving the international competitiveness of particular industries (for instance in the agricultural sector). Similarly, particular technologies may only be implementable when combined with a suitable complementary workforce. If this workforce cannot be found in the native population, then immigration, by helping fill this gap, may allow firms to take advantage of these opportunities which would otherwise be left unexploited. Finally, immigrants may create demand effects in the local economy, thus benefitting non-traded industries (Iranzo and Peri 2009)

A further important benefit of immigration (and in particular, highly skilled immigration) is its potential to boost innovation in the host country. A small literature has recently emerged that discusses the channels through which this may occur, and provides some empirical

evidence for these effects (particularly Hunt and Gauthier-Loiselle 2010 and Kerr and Lincoln 2010, see also Fairlie and Lofstrom 2015 and references therein).

When assessing the empirical evidence regarding the impact of immigration on wages, the models described in this section will certainly be very helpful in interpreting the results. However, it is important to remember that additional channels such as those discussed in the last few paragraphs may well be underlying the observed data, and so may be necessary to explain the empirical findings.

3. Empirical strategies and challenges

The objective of the empirical literature that assesses the impact of migration on wages is to estimate the *causal* effect of immigration on wages of residents (either including prior immigrants, or more often exclusively the native-born). This is challenging: all we are able to observe are the wages received by natives before and after migrants arrive in the country. What we are unable to observe are the wages that would have been paid to natives *if immigration had not taken place*. This situation is called a “missing counterfactual”. The counterfactual scenario where immigration never took place is needed to compute the causal effect of the migration flow on wages, which would be simply the difference between the factual and counterfactual wage. The construction of this counterfactual requires *identifying assumptions*, and this is at the core of applied academic research. The credibility of the ensuing estimates depends fundamentally on the plausibility of the identifying assumptions made.

There are two main avenues for achieving identification of such estimation models: through structural assumptions, or through exogenous variation that allows the researcher to credibly reconstruct the counterfactual situation using observational data.

The structural approach has first been illustrated in a series of papers by Borjas, Freeman and Katz (Borjas et al. 1992, Borjas et al. 1996, Borjas et al. 1997). It has more recently received attention through papers by Ottaviano and Peri (2012) and Manacorda, Manning and Wadsworth (2012). The idea can be illustrated by assuming a simple economy, where output y is produced in period t by supplies of skilled and unskilled workers, L_{st} and L_{ut} , being paid wages w_{st} and w_{ut} respectively. Supposing production follows a simple CES function, then the equilibrium conditions for the economy imply that

$$\log\left(\frac{w_{st}}{w_{ut}}\right) = D_t - \frac{1}{\sigma} \log\left(\frac{L_{st}}{L_{ut}}\right), \quad (2)$$

where D_t is a function of technology parameters, and σ is the elasticity of substitution between skilled and unskilled workers. D_t is commonly assumed to follow some time trend, which allows σ to be estimated from knowledge of the relative wages paid to and labour supplied by skilled and unskilled workers. Knowing σ allows the researcher to predict changes in relative wages when relative labour supply changes, e.g. through an immigration-induced labour supply shock consisting of skilled workers. The counterfactual is thus constructed by assuming a particular functional form for the economy, estimating the parameters that characterise this model, and then using the model itself to predict economic outcomes in factual and counterfactual situations.

In recent years this kind of structural approach has gained renewed interest. Ottaviano and Peri (2012) extended the simple model above by allowing for multiple education and experience groups, and assuming that within each of these experience-education cells, immigrants and natives are imperfect substitutes. The model is then characterised by three elasticities of substitution (representing substitutability between workers of different education levels, different experience levels, and between immigrants and natives). It is clear that in such a setting, an immigration-induced labour supply shock will have a small impact on native wages when the elasticity of substitution between natives and immigrants is small, and vice versa. In the extreme case that this elasticity is zero (i.e. immigrants and natives are perfect complements), the impact of any new immigrants will be entirely felt by the existing stock of immigrants.

The reliability of this approach depends crucially on the correct estimation of the various elasticities of substitution. Dustmann and Preston (2012) show that with observational data, it is usually the case that immigrants can be found in occupations that are below their observed qualifications (so-called “downgrading”). Downgrading can lead to a serious downward bias in the estimation of the elasticity of substitution between immigrants and natives, and therefore to an underestimate of the effect immigrants have on native wages.

The structural approach as described by Equation (2) only imposed a very coarse structure on the economy. In other contexts, researchers will use a much more detailed model of the macro-economy in order to simulate the effects of various parameters and policy choices on economic outcomes. While this gives a set of potentially powerful tools to study the impacts

of changes to one factor across the entire economy with limited data, or to predict effects into the future, such predictions rely often on very strong, and not always plausible assumptions about the underlying structure (see e.g. Blanchard 2018, McKibbin and Stoeckel 2018, and other references in the same volume for recent discussion).

In contrast to those analyses using structural approaches, a second class of studies are more directly estimation-based. Here, counterfactual situations are constructed by slicing the aggregate labour market into sub-markets that are differently exposed to immigration, and comparing wage changes to migration flows across these submarkets. These submarkets might, for example, be defined by workers of particular skill levels, or by distinct geographic regions. One problem with this kind of approach is that immigrants do not allocate themselves across such submarkets in a random way, but instead will disproportionately join those markets that will yield the greatest return (for example if they have experienced a positive wage shock). To deal with this endogeneity, the literature provides two solutions: quasi-random allocation of immigrants to labour markets, and instrumental variables.

A prime example of the quasi-random strategy is a paper by David Card (Card 1990), which exploits the 1980 Mariel boatlift in which 125,000 Cubans migrated to the US within a matter of months. Most of these “Marielitos” settled in Miami, leading to a sudden 7% increase in the number of available workers in the metropolitan area. Card’s strategy was to compare wage changes in Miami before and after the boatlift with wage changes in other metropolitan areas in the US over the same time period. The “counterfactual” is here provided by other metropolitan areas that had not been exposed to the migration shock.

Unfortunately, finding events that lead to quasi-random allocation of immigrants is not especially common. An alternative approach is needed, and this is to use instrumental variables. The kind of instrument typically used is a shift-share instrument, which allocates overall migration flows to cells on the basis of past migrant stocks, assuming that these are uncorrelated with shocks that directly affect both the immigration rates and wages of the cell. A first paper that used this approach was Altonji and Card (1991).

Dustmann et al. (2016) categorises the literature that uses estimation-based approaches to study the labour market impacts of migration into three groups. In the first group fall studies that use the national skill-cell approach, first introduced by Borjas (2003). Here the submarkets considered consist of workers in distinct skill groups, represented by experience-education cells. Borjas uses differential migrant inflows into these cells to provide the identification needed for his study. The second group of studies use a purely spatial approach, as exemplified by Altonji and Card (1991) or Dustmann et al. (2013). This approach uses geographic regions as the relevant submarkets, and regresses wage changes of particular native groups (e.g. unskilled workers) on the inflows of migrants into the corresponding regions. Finally, a third approach is to use a mixture of these methods, with submarkets defined by workers of a particular skill group (typically classified by education only) within a given region. This hybrid approach regresses group-specific wages of natives on group-specific inflows of immigrants, and has been used by e.g. Card (2009) and Dustmann and Glitz (2015).

Dustmann et al. (2016) point out that the estimates obtained by studies using different approaches are not immediately comparable as they measure different quantities. For instance, analyses using a skill-cell approach identify the effect of skill-group specific migrant inflows on skill-group specific native wages, which is a very partial effect that ignores the complementarities that exist between skill groups. The spatial approach, on the other hand, identifies the overall effect of immigration on wages of a particular native skill group, taking into account any cross-group complementarity that might exist. For this reasons, one should be careful in interpreting and contrasting empirical studies of immigration on wage levels.

4. The Australian experience

a. Immigration

Australia's per-capita migration intake and foreign-born population share are among the highest in the developed world. The UN estimated that in 2017 (UN 2017), fully 28.8% of the Australian population was born outside the country, placing it only behind much smaller Switzerland (29.6%) and Luxembourg (45.3%) in the OECD (see Figure 2). The sheer size of Australia's migration intake means that population growth per se is one of the primary impacts of the immigration program — net overseas migration in 2017 was around 1% of Australia's population (ABS 2018).

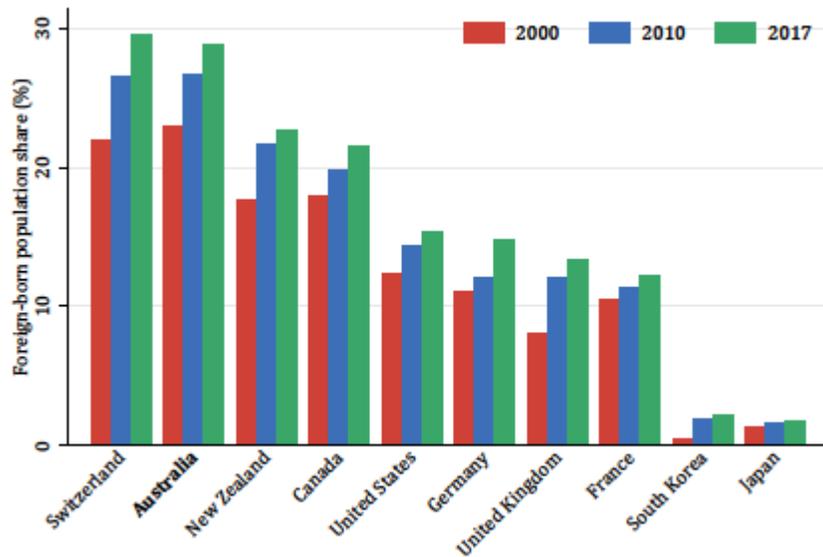


Figure 2: Proportion of population born abroad of selected OECD countries (based on UN data)

Australia’s migrants are quite well-educated, with the OECD estimating (OECD 2018a) that in 2017, 56.7% of foreign-born Australian residents between the ages of 25-64 had a tertiary education and only 14% did not have an upper-secondary education. In comparison, the rate of tertiary education in the analogous native-born population was only 39.3%, and 21.5% of native-born Australians in this age bracket did not have an upper-secondary education. This highly educated migrant population is a result of an Australian immigration policy that focuses on skilled immigration (Spinks 2010).

The emphasis on skilled migration has been especially prominent in recent years. Australia’s permanent migration program has two main streams: family and skill. Since the turn of the century Australia has consistently granted more permanent visas based on skill than on family status (for instance, in 2017 there were around 60% more skill visas than family visas; ABS 2018). This was not the case in the past, with more than 4 times as many family visas as

skill visas granted in 1984-85 for example (Spinks 2010). Indeed, while Australia’s migrant working-age population appears to have been more educated than the native-born population for at least the last few decades (Figure 3a), the share of migrants with university degrees has grown extremely rapidly this century, far outpacing even the significant growth seen in tertiary qualifications of the Australian-born.

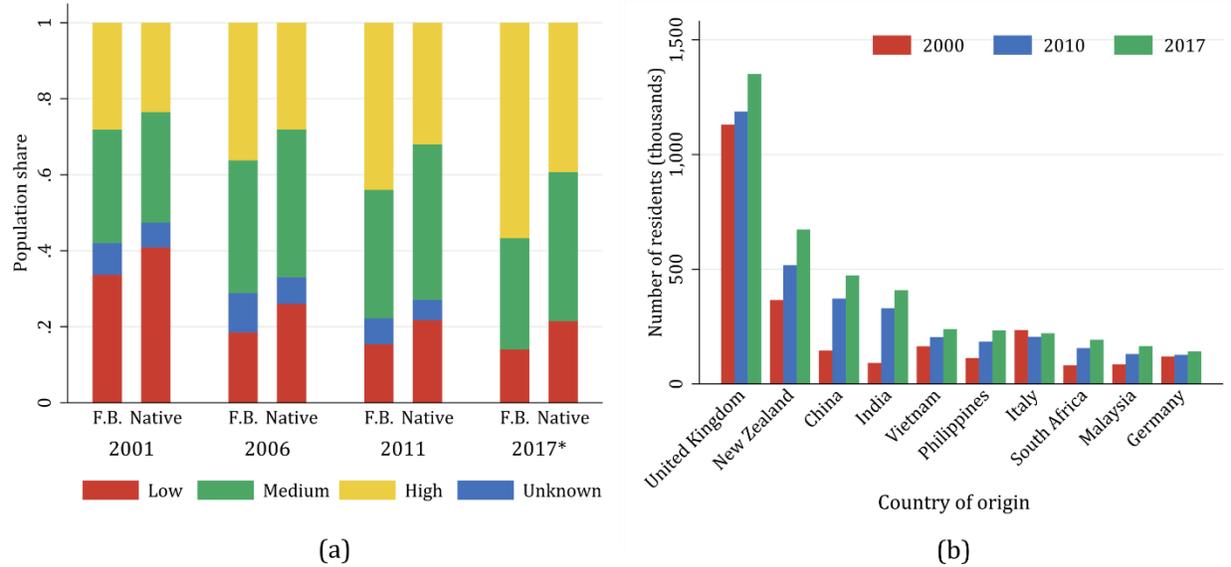


Figure 3: The composition of Australia’s migrant population. a) Education levels of foreign-born (F.B.) and native-born (Native) Australians aged 25-64 over time (2001-2011 own calculations based on census data, 2017 based on OECD data; 2001-2011 data include many observations with missing country of birth, as well as missing education, and so should be treated with caution. The asterisk denotes that the 2017 data comes from a different source than the other years, and so comparisons should also be made with caution). Those in the low education group do not hold an upper-secondary qualification, while those in the high group hold a university degree. b) Number of foreign-born residents in Australia from the 10 most common countries of origin as at 2017 (UN data).

The shift towards skilled migration is not the only significant change to Australia’s immigration system in the last few decades. While the number of immigrants arriving on permanent visas has remained relatively stable in recent years, the overall immigration rate has grown dramatically (from 350,000 arrivals in 2004 to 530,000 in 2017; ABS 2018). This has been driven in large part by an increase in temporary visas granted. In 2017, 76% of

immigrants⁴ arrived on temporary visas, compared to 63% in 2004 (ABS 2018). The major streams of temporary visas in Australia are for students, working holidaymakers, skilled workers, and visitors. Student visas in particular have often provided a pathway to longer-term settlement after studies are complete, and Australia's permanent migration programme is increasingly a two-step system, where candidates for permanent residence are often previous holders of temporary work or study visas (Hawthorne 2010, Gregory 2015). An important consideration with respect to the shift from permanent to temporary admission is that many of the temporary visa classes are not primarily geared towards labour-market participants, but do still allow holders to undertake paid work with few restrictions (the student and working holiday visa classes are prime examples of this).

Along with these shifts in immigration policy, Australia's migrant population has also been changing. Owing to its history and location, Australia's immigrants disproportionately originate from European, Asian, and Oceanic countries (see Figure 3b). By far the largest migrant group in Australia is from the United Kingdom (19.2% of foreign-born residents in 2017), with New Zealanders composing the second largest group (at 9.6%), followed by China, which accounts for 6.7% of Australia's immigrants, and India, which accounts for a further 5.8% (UN 2017). In the past, the immigrant population was more heavily skewed towards those with European backgrounds. For example, in the year 2000, UK-born immigrants made up more than a quarter of all foreign-born residents, but between 2000 and 2017 this group grew in size by only 20%, while the population of Chinese immigrants grew by 227% and the population of Indian immigrants grew 351%.

⁴ Excluding Australian and New Zealand citizens

b. Attitudes to immigration

Overall, Australians are quite positive about immigration and its effects on the economy (Markus 2016). A Gallup World Poll conducted between 2012 and 2014 compared attitudes towards immigration across many countries (Esipova et al. 2015), and found that despite its high immigration rate, Australians were quite happy for these levels to remain as they are or even increase, with 70% of respondents giving these answers compared to 56% in the US, 46% in France, and 29% in the UK. Another cross-country survey was carried out by Pew in 2018 (Pew 2018), in which Australians still appeared relatively happy with immigration levels, with 60% responding that immigration levels should either stay as they are or increase; however this was lower relative to other countries' responses, with 68% in the US, 58% in France, and 59% in the UK agreeing with these sentiments.

In terms of their views of the economic impacts of immigration, Australians are similarly optimistic. In 2016 the Lowy Institute found that 73% agreed that "Overall, immigration has a positive impact on the economy of Australia", and 62% disagreed that "immigrants take away jobs from other Australians" (Oliver 2016). Similarly in 2018, the Scanlon Foundation found 80% agreeing that immigrants are generally good for the economy and only 31% agreeing that immigrants take jobs away (Markus 2018).

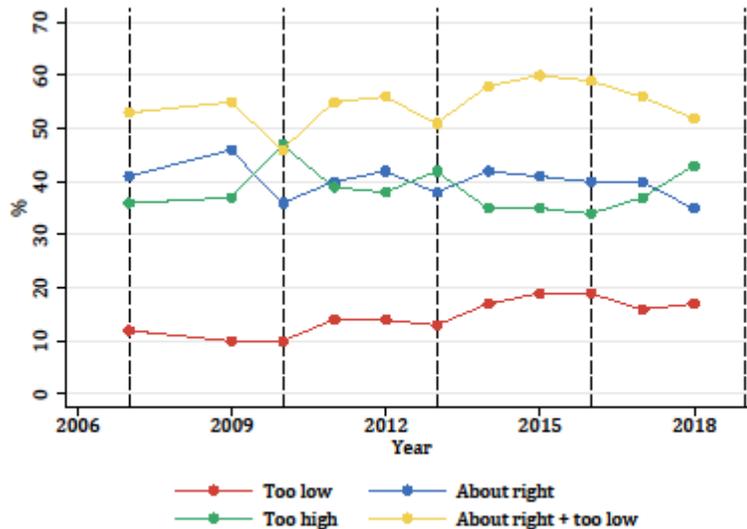


Figure 4: Australians' attitudes towards immigration. Responses to "What do you think of the number of immigrants accepted into Australia?" (Scanlon Foundation surveys). Dashed lines indicate years with federal elections.

When asked by the Scanlon Foundation what they think of current immigration levels, a majority of Australians responded that these levels were “about right” or “too low” in all but one year since 2007 (Markus 2018). The exception to this was during a particularly heated political debate over immigration in 2010 (see Figure 4). However, there is some evidence that attitudes may have deteriorated very recently. As noted above, the 2018 Pew Global Attitudes Survey saw Australia’s share of respondents who were happy with migration levels slip compared to other developed countries. A deterioration is also evident in the Scanlon Foundation surveys, which find an increase from 37% in 2017 to 43% of respondents in 2018 who think that immigration levels are “too high”, as well as the Lowy Institute’s polling, which found that the number of respondents answering that immigration levels are “too high” jumped from 40% to 54% between 2017 and 2018 (Oliver 2018). In April 2018, the Essential Report found a majority (63%) agreeing that “bringing in foreign workers on short-term visas undermines local jobs” and a smaller majority (51%) disagreeing that “without

immigration the rate of economic growth will fall, reducing living standards for all of us” (Essential Research 2019). Nevertheless, it has been speculated that these trends may be driven by the immediate political environment (as in 2010) rather than secular trends (Markus 2018). Indeed, while the Essential Report found a jump in people responding that immigration levels were too high from 50% in October 2018 to 64% in April 2018, this had declined again to 56% by January 2019 (Essential Research 2019). Interestingly, looking all the way between 1974 and 2018, the Scanlon Foundation (Markus 2018) also observed a strong correlation between the number of people with the view that immigration levels are too high, and the unemployment rate (though this does not appear to drive the shifts observed in 2018).

The Scanlon Foundation’s 2018 social cohesion report (Markus 2018) also considered differences in attitudes between different groups of Australians. Breaking down the results by education, there was a 35 point difference between holders of a university degree and those without a year 12 certificate in responding that immigration levels were too high (23% of university degree holders gave this response compared to 58% of those without their year 12 certificate). Australians with intermediate qualifications hewed more closely to their less-educated compatriots, with 49% of those with a year 12 qualification, 55% of those with an apprenticeship or trade qualification, and 46% of those holding a diploma or technical certificate answering that the number of immigrants is too high. Given that immigration to Australia is mainly high skilled, this difference across education groups is unlikely to be primarily driven by labour market concerns, and may relate rather to cultural concerns (see Card et al. 2012). Large differences were also observed between the responses of different

age groups, ranging from 20% of 18-24 year olds answering that immigration levels were too high, to 58% of 65-74 year olds saying the same. In addition, those respondents who felt financially secure were least concerned that immigration levels were too high, with only 27% of those reporting that they were “prosperous” or financially “very comfortable” wanting to restrict immigration, compared to 65% of those who were “struggling to pay the bills” or “poor”.

Differences in their views of immigration’s effect on the economy also varied significantly by education and age, with only 1% of highly educated young Australians (those 18-29 with a bachelor degree) disagreeing that immigrants are good for the economy, compared to 18% of their older, less educated (65+ without a tertiary qualification) counterparts. When asked whether immigrants take jobs away from natives, 38% of the older, less educated group agreed, while only 18% of the younger, university educated cohort concurred.

c. Wage growth and the labour market

Australia’s real wage growth since 2000 has been middling among developed countries, ranking 15th in terms of average wage growth between 2000-2017 among the 35 OECD countries excluding Turkey (OECD 2018b; see Figure 5a for selected countries). Over this period average wages have grown 15%, but all of this growth occurred before 2011 — since this date, average wages have stagnated and even fallen slightly (Figure 5b). Bishop and Cassidy (2017) (see also Jacobs and Rush 2015) recently considered the causes of Australia’s low wage growth this decade. Some factors that have been proposed to explain this include

increased slack in the labour market since 2008 and declining terms of trade since 2011, though these do not seem to fully account for the low growth observed in recent years.

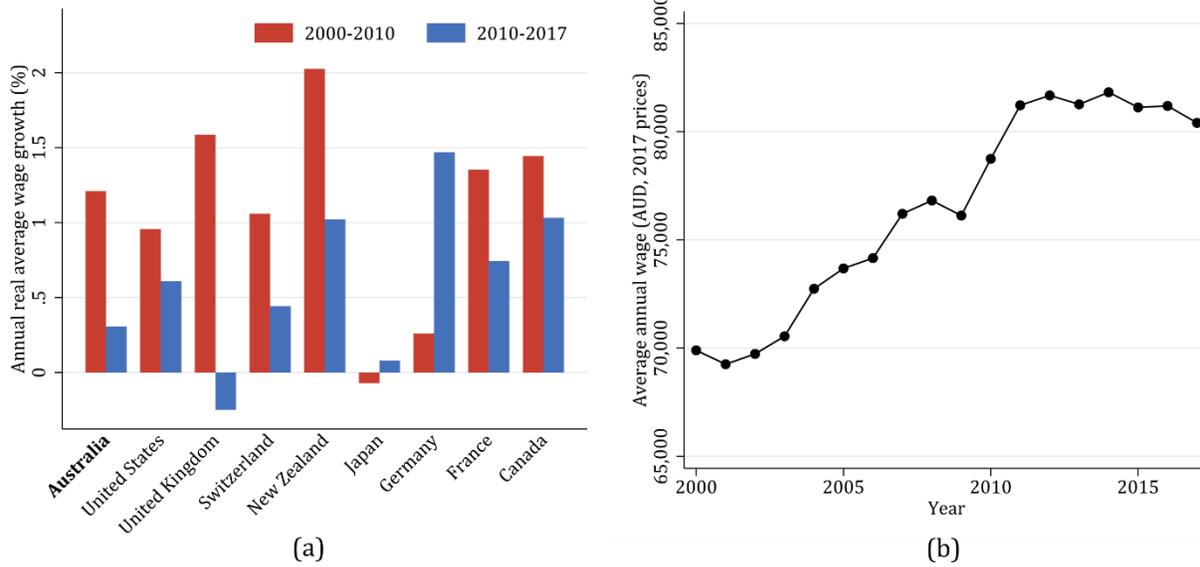


Figure 5: Average Australian wages. a) Australian wage growth compared to selected developed countries (OECD data). b) Australian real average wages over time (OECD data).

Looking past the mean wage, Australia is also in the middle of the international pack for wage dispersion, with Australia's 90:10 interdecile wage ratio of 3.32 in 2016 almost exactly equal to the OECD average (OECD 2018b). While this wage dispersion has increased from 3.01 in the year 2000, basically all of this growth has been driven by upper-tail inequality rather than developments in the lower tail (Figure 6). This also highlights that the Australian wage distribution is skewed, with a longer right tail than left, but again this not exceptional, with the split almost exactly reproducing the OECD averages in 2016.

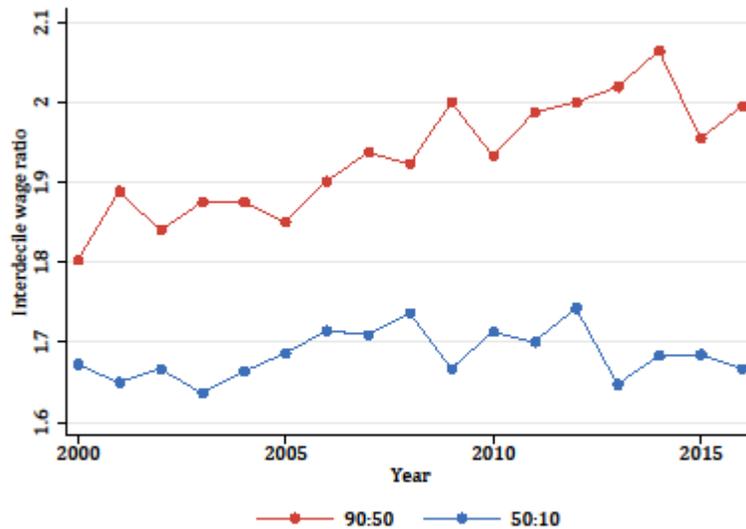


Figure 6: Dispersion in Australian wages, as measured by interdecile wage ratios

More broadly looking at labour market indicators, we see that Australia’s participation rate has climbed this century, from around 74% in 2000 to above 77% in 2017 (OECD 2018b; see Figure 7). This was driven by increasing numbers of women entering the labour force, while the male participation rate stayed roughly constant between 82-83%. The unemployment rate dropped from 2000 until the financial crisis, suddenly increasing in 2009 and settling around its 2017 rate of 5.8%.

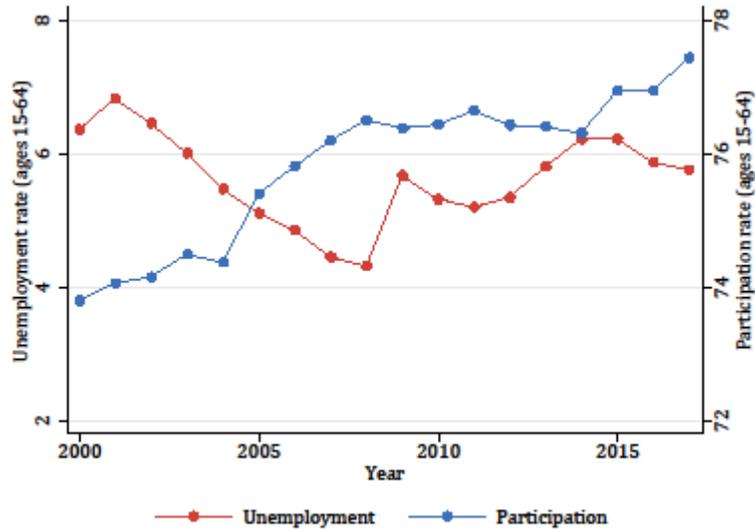


Figure 7: Australian unemployment and participation rates (OECD data)

5. Immigration and wages in Australia: Existing evidence

Compared to the literature on migration and labour market outcomes in, for example, the USA, direct evidence about the effect of immigration on Australians’ wages is relatively scarce. The state of the field was recently reviewed by the productivity commission for its 2016 report “Migrant Intake into Australia” (Productivity Commission 2016). While sparse, the evidence generally indicates that Australians’ wages are not adversely affected by immigration on average. In considering the outcomes of particular subgroups, the available evidence is weaker still, and sometimes mixed, but also does not strongly support the idea that immigration is hurting natives’ wages.

Following the discussion in Section 3, in reviewing the literature on wage effects of migration in Australia it will be convenient to categorize studies as i) those that undertake a national

skill-cell based estimation (a la Borjas 2003), ii) those using a spatial estimation approach (a la Altonji and Card 1991), and iii) simulations of economic models.

a. National skill-cell studies

Breunig et al. (2017) undertake a thorough analysis, primarily using a national skill-cell approach to study the effects on natives' labour market outcomes of Australian immigration. Based on multiple survey datasets covering the period 2001-2013, the authors consider the Australian-born population's earnings, wage levels, hours worked, participation rate, and unemployment rate. Over two data sets and several specifications, the authors do not find robust significant effects of immigration on wages or earnings for the native-born population at large or for any of the subsamples considered (by gender and experience), though one methodology yields a negative effect on female wages (but not earnings). In addition to considering the effects of immigrants on the labour market outcomes of the native-born, this study also looks at the effect of recent immigration on incumbents (defined as the native-born and those who migrated to Australia more than 5 years prior). In this analysis, again no significant effect of migration on incumbent wages is found. As well as their main national analysis, this study also includes a spatial analysis, in which some evidence is found for a positive impact of migration on female wages and earnings, but no significant effects are found for men or for the population as a whole. Overall, the authors find little evidence that immigrants have negative effects on the labour market outcomes of natives, and any effects they do find are not robust to changes in methodology.

Kifle (2009) analyzes data from the 2001 census. Both low- and high-skilled (in terms of education) Australian-born workers are found to experience large positive wage effects from immigration, with the low-skilled enjoying a greater proportional effect. On average, a 1% increase in immigrant share in a worker's skill group is estimated to increase earnings by around 1.5%. However, looking instead by occupation, immigration is found to reduce wages in low-skill occupations while improving them in high-skill occupations (for an overall positive average effect). It is argued that the estimated wage losses in low-skill occupations are likely due to skill mismatch (as a result of downgrading) rather than pure substitution of foreign-born workers for natives.

A further study by Bond and Gaston (2011) uses the national skill-cell approach on survey data from 2001-2005. Their analysis finds generally positive impacts on Australian-born workers' earnings (estimating a 1% increase in foreign-born population in a given skill group increases earnings of comparable native-born workers by 0.4%). When disaggregated by skill level, significant negative impacts of immigration are found only on earnings of native workers with vocational (TAFE or diploma) qualifications (though this finding is not robust, and disappears if one considers only migrants whose education was completed overseas). In any case, this study has been criticized as being flawed, since the data it uses is not representative of the population share of immigrants and non-immigrants, and variation in this share may be driven by differential attrition and recruitment into the survey sample rather than real variation in the population (Productivity Commission 2016, Breunig et al. 2017).

b. Spatial analyses

Looking instead from a regional perspective, Sinning and Vorell (2012) made use of geographic variation in census data from 1996-2006. Their OLS analysis yields positive effects of immigration on regional median income levels, though the magnitude of this effect is quite sensitive to the specification used, and vanishes when using an instrumental variables analysis. In any case, no evidence is found for adverse effects of immigration on income.

Further back in time, Addison and Worswick (2002) exploited regional variation in survey data from 1982-1996. Their OLS estimates generally do not find significant effects of recent immigration on natives' wages. Several IV strategies are also used, but do not produce consistent effects of immigration on wage levels. As well as their aggregate analysis, the authors consider subsamples of young workers and low-skilled workers, but conclude that their results do not support adverse effects of immigration on income.

c. Model simulation

The final class of studies we consider simulate macroeconomic models under various circumstances to analyze the impact of immigration on locals' wages. One of the most detailed such modelling efforts was made by Independent Economics for the Migration Council of Australia in 2015 (Independent Economics 2015), to project the effects of migration on Australia's economy over a 35 year horizon to 2050. Their model predicts that

immigration will provide an average boost to wage growth of existing residents of 0.26% per year over this period. Low-skilled workers would reap the largest gains (0.57% per year), while high-skilled workers would suffer a mild decrease (0.10% per year). The report also distinguishes the effects of immigrants from each visa category, finding that students are the primary drivers of these wage effects, rather than migrants on specifically designated working visas. Student migrants are not found to have adverse effects on any native skill group's wages, and account for essentially the entire net wage gains accruing to low- and mid-skilled workers. The model predicts that the visa categories most detrimental to Australians' wages are the family and humanitarian streams, but the wage losses attributed to these migrants are modest (on average 0.06% and 0.02% per year respectively). Looking specifically at the effect of the skilled visa categories, the average impacts are found to be positive, but with losses for high-skilled workers.

An alternative attempt at modelling immigration and the labour market has been made by Docquier et al. (2013). These authors consider migration flows of a number of countries between 1990 and 2000 and simulate the corresponding effects on native labour outcomes. In the case of Australia the model predicts, as a result of immigration, an increase in average wage growth of 0.18% per year, with less-educated workers enjoying the bulk of this benefit (0.45% per year), and an earlier version of this work (Docquier et al. 2010) estimating a loss in high-skilled Australians' wages of 0.11% per year. While sensitive to the parameter choices made in the model, these results can be seen to be quite consistent with those found by Independent Economics (2015).

Finally, the Productivity Commission for its 2006 report (Productivity Commission 2006) modelled the economic impact over two decades of an increased migration scenario in which the level of skilled migration was taken as 50% higher than the base case. This analysis predicted that the increased migration scenario would lead to average wage growth around 0.09% per year lower than the base case (though average income including returns to capital would increase slightly). This modelling also found significant variation in the strength of these effects by occupation, concluding that workers who are competing with immigrants will experience slower wage growth.

d. Other outcomes

In terms of other labour market outcomes, Elnasri (2015) considers the effect of Australian immigration on aggregate unemployment. Looking at the period between 1985 and 2013, Elnasri tests for a causal relationship between immigration and unemployment but finds no evidence for such a relation. Employment effects of immigration were also more directly estimated by Breunig et al. (2017), where no robust effect on the unemployment rate is detected. Similarly, Sinning and Vorell (2012) do not find significant effects of immigration on unemployment. In terms of modelling analyses, Docquier et al. (2013) predicts increased employment both for low-educated workers and the population at large as a result of immigration. Independent Economics' (2015) analysis is more mixed, predicting that immigration will cause small short-term unemployment increases for high-skilled workers and longer-term unemployment decreases for low skilled workers, but with little net effect by the end of the modelling period.

Aside from these studies, Parham et al. (2015) considered immigrants' contribution to productivity growth, estimating that between 2006 and 2011 migrants contributed 0.17 points of labour productivity growth per year (around 7% of long term average labour productivity growth). Jensen (2014) also discusses the effect of migration on innovation in the Australian context, but it appears that the empirical evidence on this topic is so far limited.

e. Summary

Overall, these studies do not provide much evidence that immigration is hurting locals' wages. Where immigration is found to have a significant effect on average wages, it is generally estimated to be positive. Insofar as negative effects are found for some subpopulations, they are typically not robust to changes in empirical specification. However, some authors have argued that particularly vulnerable segments of the labour force may be susceptible to impacts of specific visa programs that may not have been captured by existing empirical studies. In particular, Boucher (2016) emphasizes that while on paper, Australia's immigration system is geared towards skilled migration, the fact that temporary student and working holiday visa classes allow holders to undertake paid work may be having a disproportionate impact on youth, unskilled, or regional workers. Similar concerns have also been noted elsewhere, for example by Reilly (2015). Limited work has been done studying the effects of these particular visa categories (e.g. Tan et al. 2009; also Independent Economics' 2015 modelling considers individual visa classes as mentioned).

The Productivity Commission's 2016 report also touches on the potential for impacts of immigration on youth labour. Despite high youth unemployment and underemployment rates (around 14% and 20% respectively in 2015), the commission estimated that temporary migrants accounted for 13% of youth employment, and half of all growth in the youth labour force in 2014-15. As such, though there is not currently strong evidence that any particular group's wages are suffering as a result of immigration, concern remains that this may be the case, and so further evidence is needed to resolve the question satisfactorily.

6. Discussion and conclusion

Given the large migrant population and immigration flows in Australia, it is natural to ask what effects immigration has had, and can be expected to have in future, on the local population. It is perhaps surprising that so little direct evidence is available on this subject to date. As outlined in Section 2, different economic adjustment mechanisms are possible in response to an immigration flow, and these channels can have quite different effects on natives' labour market outcomes. Since Australia's immigrants are disproportionately skilled, the most basic adjustment mechanisms would predict that the likely response, if any, of real wages to migration inflows would be to increase on average, with skilled (i.e. highly paid) workers suffering wage losses at the expense of unskilled (lower paid) wage gains. This points towards the possibility that Australia's migration program may be functioning as a channel for decreasing inequality in the country. In this context, it is also interesting that low-skilled Australians are the most concerned about the economic effects of immigration,

despite the fact that the theory would predict that Australia's skilled migration program would disproportionately benefit them. Reasons for this may be that labour market issues are not the only factors that drive concerns about immigration, and that cultural concerns may be more salient among the lower skilled (see Card et al. 2012 for analysis). As we point out in Section 2, the simple demand-supply model that predicts these wage effects also ignores additional channels by which high skilled migration may affect the receiving economy, for example the possibility to adopt technologies that require highly skilled workers as complements, or the impact highly skilled migration may have on innovation and technology. It should be interesting to investigate these in the Australian context. Moreover, immigration, in particular in the Australian case where immigration policy intends to address possible shortages in the labor market, may lead to additional positive effects, by improving efficiency and competitiveness of industries. All these may have effects on wages of native workers.

In any case, we have no guarantee that the real world will follow the intuitive economic theory we have discussed, and it is a pressing concern of policymakers to ensure that the most vulnerable are not losing out as a consequence of migration policy. Despite Australia recently having quite large immigration intakes, wages have not grown particularly quickly compared to other developed countries, nor do we observe that low-paid workers are gaining relative to their higher paid compatriots (if anything, the reverse seems to be true). Of course, there are innumerable factors that influence wage levels other than migration, and so rigorous estimation methods are needed to disentangle the effects of immigration from other economic determinants.

Simulations and modelling analyses (Independent Economics 2015, Docquier et al. 2013, Productivity Commission 2006) of the effect of immigration on Australians' wages typically find results loosely in line with the theory: gains on average, these gains concentrated on low-skill workers, and small potential losses for high-skill workers. However, these results have to be evaluated with particular caution, as they reflect the assumptions underlying their models, which may well ignore some important additional channels that connect immigration to wages of native workers.

Looking instead to results of direct estimation methods (Breunig et al. 2017, Kifle 2009, Bond and Gaston 2011, Sinning and Vorell 2011, Addison and Worswick 2002), we typically do not see large effects of immigration on wages, and the effects these studies do find are often positive. This gives us some confidence that, on balance, Australians' wages are not detrimentally affected by immigration. However, even with the conclusion that Australians generally are better-off as a result of immigration, potential channels have been suggested through which specific visa programs may disadvantage certain vulnerable segments of the labour market. The empirical evidence to assess these specific questions is as yet limited and should be taken with caution, but does not currently strongly support the hypotheses that youth or low-skill workers are broadly experiencing wage losses due to immigration. More research is needed to look carefully at these specific issues, as well as to monitor the overall effect of Australia's migration program.

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