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Immigration, Diversity and the Labour Market Outcomes of Native Workers: Some Recent Developments

Gianmarco I. P. Ottaviano

THE LONDON SCHOOL
OF ECONOMICS AND
POLITICAL SCIENCE ■

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Abstract
This brief essay provides a selective discussion of how in recent years economists in the neoclassical tradition have addressed the questions whether and how immigration affects native workers' labour market outcomes. In particular, it discusses: the distinction between the displacement, productivity and amenity effects of immigration; the issues that arise in using wage changes to identify those effects; and the problem of assessing a causal link from immigration to natives' labour market outcomes.

Gianmarco Ottaviano is Director of the Globalisation Programme at the Centre for Economic Performance and Professor of Economics at the London School of Economics and Political Science.

Introduction

"It is not best that we should all think alike; it is a difference of opinion that makes horse races." (Mark Twain)

The debate on immigration is often heated as it triggers instinctual reactions by natives to the perceived 'invasion' of their physical, social and cultural territories by alien newcomers. This brief essay is about the 'invasion' of the economic territory. In particular, it focuses on the labour market, providing a selective discussion of how in recent years economists in the neoclassical tradition have addressed the questions whether and how immigration affects natives' wages and employment levels.[2]

The answers to these questions much depend on the role 'diversity' is understood to play in a market economy. On this point neoclassical economics has straightforward implications based on the main tenet of general equilibrium analysis: in a perfectly competitive environment without distortions there are gains from trade (in goods/endowments/factors) if and only if agents are 'different' (in terms of preferences/endowments/technology). Indeed, if they were all identical, sharing and valuing everything in the same way, there would be no incentive for them to exchange anything and each of them would be an autarkic island. This is wittily captured by Mark Twain's famous quote cited above.

While defining what the 'diversity' of immigrants actually means continues to be a matter of endless discussions, applied studies in economics have taken a pragmatic approach building on what can be actually measured in the available datasets. In this respect, 'diversity' has been captured through aggregate indices based on objectively observable markers (such as ethnicity, language spoken at home or country of birth), which may affect individual economic outcomes beyond standard labour market attributes (such as educational attainment or working experience). A variety of alternative indices has been proposed with the aim of capturing both the 'richness' and the 'evenness' of the immigrant population. The former concept broadly refers to the number of identifiable immigrant groups while the latter concerns the relative number of their members.[3] The basic idea is to relate the chosen diversity index to the economic performance of natives in places exposed to immigration.

A general issue is that unfortunately, even from the narrow economics viewpoint of the labour market, immigration remains a complex multi-faceted phenomenon. In particular, immigration is the outcome of an endogenous location choice by mobile workers, driven by economic and noneconomic reasons, that causes economic and non-economic responses by firms and other workers both in the place of origin and in the place of destination. This essay focuses on a specific methodological approach that cuts through such complexity by studying the labour market responses in the places of destination when immigration can be considered an 'exogenous shock' driven by noneconomic reasons, to which firms and native workers react by entering and exiting the local labour market.

The basic analytical framework is laid out in the first section after the introduction. It is extended in the second section to highlight some potential 'identification' problems that are relevant for empirical investigation and their possible solutions. The corresponding empirical findings are surveyed in the third section where the importance of different dimensions of 'diversity' between natives and immigrants is also discussed. The fourth section debates the issue of how to distinguish a causal impact of immigration on native labour market outcomes from a correlation between them. The last section concludes.

Immigrants and wages

At the core of the specific methodological approach discussed here is the textbook version of the neoclassical equilibrium of a local labour market with full employment. This is depicted in Figure 1 with the solid labour demand curve ('D-curve') and the solid labour supply curve ('S-curve') respectively representing the wage local firms are willing to pay and the wage local workers are willing to accept for an additional hour of work at each level of employment. The D-curve is downward sloping because, when the wage increases, firms are willing to hire fewer workers. The S-curve is, instead, upward sloping because, as the wage increases, workers are willing to offer more hours. The market is in equilibrium when it 'clears': at the going wage, firms demand exactly the number of hours offered by workers and, vice versa, workers offer exactly the number of hours demanded by firms. This happens at the crossing between the D-curve and the S-curve, corresponding to wage w^0 and employment L^0. Since for the equilibrium wage there are no workers that would like to work more hours than they do, there is no (involuntary) unemployment. Moreover, since for the equilibrium wage there are no firms that would like to hire more hours than they do, there are no vacancies.

The D-curve shifts rightwards (leftwards) when labour productivity increases (decreases), as firms are willing to hire more (fewer) workers at any given wage. The S-curve moves rightwards (leftwards) when the number of workers increases (decreases), as there are more (fewer) workers willing to work at any given wage. Hence, if immigration does not affect firm productivity, and natives and immigrants are identical in all attributes relevant for the labour market, by increasing the number of local workers immigration causes a rightward shift of the S-curve while leaving the D-curve unaltered. In Figure 1 the result of this shift is depicted by the dashed upward sloping curve corresponding to the new S-curve. The new equilibrium at the crossing between the D-curve and the new S-curve exhibits higher employment $L_1 > L_0$ and lower wage $w_1 < w_0$. Accordingly, if the labour market characteristics of immigrants and natives are the same, immigration increases overall employment but depresses the wage, as lower wage is needed to convince firms to absorb the additional supply of labour. This is the direct 'displacement effect' of immigration on native workers.[4]

But the labour market characteristics of immigrants and natives need not be the same due to education, experience or culture heterogeneity. In this case, as firms do not perceive the two types of workers as perfectly substitutable, two parallel diagrams like Figure 1 become relevant, one for immigrants and one for natives, as the two types of workers effectively operate in two distinct, though interconnected, labour markets. These parallel diagrams are represented in Figure 2. The upper panel (a) shows the impact of newcomers on pre-existent immigrants under the assumption that they share the same characteristics and thus are perfectly substitutable in production. Just like Figure 1, this panel describes a displacement effect that increases immigrants' employment but reduces their wage: $M_1 > M_0$ and $w_1 < w_0$. The lower panel (b) refers, instead, to natives. There are two scenarios. In the first, under the assumption that immigrants foster native productivity, immigration makes firms willing to pay a higher native wage than before for all levels of native employment. This is captured by the rightwards shift of the D-curve to its new dashed position, leading to both higher native employment and higher native wage: $N_1 > N_0$ and $w_1 > w_0$. In the second scenario, under the assumption that immigrants rather hamper native productivity, immigration makes firms willing to pay a lower native wage for all levels of employment. This is captured by the leftwards shift of the D-curve to its new dashed position, which leads to both lower native employment and lower native wage: $N_2 < N_0$ and $w_2 < w_0$. Whether the immigrant inflow shifts the native D-curve ('productivity effect') and, if so, in which direction are key research questions of the empirical studies on the impact of immigration on natives' labour market outcomes. Answering these questions, however, faces two types of problems, concerning the 'identification' of the specific channels through which immigration and native performance interact, and the assessment of the causal impact of the former on the latter.

Identification issues when native workers relocate

When the native S-curve does not move as in Figure 2, looking at the change in native wage is enough to understand whether immigrants foster, hamper or do not affect native productivity. This is the case whenever native workers do not react to immigration by relocating. When instead they do react, the change in their wage on its own can be uninformative.

Figure 3 presents two scenarios. In panel (a) immigrants and natives are identical as in Figure 1. The initial equilibrium wage w_0 in the location of interest is equal to the one offered in alternative locations, so natives have no incentive to relocate. For exposition, it is useful to distinguish between the short and the long run effects of immigration. In the 'short run' native workers are considered immobile. Then, as in Figure 1, immigration shifts the S-curve rightwards leading to lower wage $w_1 < w_0$. In the 'long run' natives can relocate. Hence, faced with a wage that, due to immigration, has become lower than in alternative locations, native workers start to leave causing the S-curve to backtrack. Their outflow goes on until the S-curve goes back to its initial position where remaining natives have no incentive to relocate

as the wage is again equal to w_0. In the end, the native wage has not changed but this does not mean that immigration has had no effect on natives' outcomes. Indeed, as also employment has not changed from its initial level L_0, it must be that each hour of work now supplied by an immigrant had been previously supplied by a native.[5] Displacement is still at work but is not revealed by the change in the wage. Observing no departure of the native wage from its pre-immigration level w_0 is, in fact, consistent with two very different stories: immigrants do not affect natives' labour market outcomes, or they actually replace them one to one. In other words, these two stories are 'observationally equivalent'.

A second scenario in which wage changes are uninformative when natives relocate is shown in panel (b) of Figure 3. The panel depicts the equilibrium in the native labour market when immigrants and natives have different characteristics (so it corresponds to panel (b) in Figure 2). Moreover, it considers a situation in which immigrants affect not only native productivity but also their quality of life. This implies that immigration shifts not only the D-curve but also the S-curve. Specifically, panel (b) of Figure 3 describes an example in which immigration increases native productivity (positive 'productivity effect') but also reduces native quality of life (negative 'amenity effect'). Improved native productivity shifts the D-curve rightwards to its new dashed position. Holding the S-curve constant, this leads to higher equilibrium wage w_1. Worsened native quality of life shifts, instead, the S-curve leftwards to its own new dashed position as, for any level of employment, natives now require a higher wage to be convinced not to leave. Holding the D-curve constant, this shift also leads to the same higher equilibrium wage w_1. Hence, an observed native wage increase to w_1 from its pre-immigration level w_0 is again consistent with two very different stories: immigration improves natives' productivity, or it actually worsens their quality of life. Also these two stories are 'observationally equivalent'.

To summarize, in both scenarios depicted in Figure 3 observational equivalence generates an 'identification' issue: it is impossible to identify the exact impact of immigration on natives' labour market outcomes by looking only at natives' wage.

A way to circumvent these 'identification' issues is to focus on situations on which natives' relocation is quite unlikely. This is typically the case at the national level as natives can be generally expected not to react to immigration by leaving their own country. For example, in panel (a) of Figure 3, taking the entire country as the spatial unit of analysis would prevent the corresponding S-curve from backtracking; in panel (b) it would prevent the corresponding S-curve from moving around. As a result, any increase (decrease) in native wage could be read as an increase (decrease) in native productivity. This 'aggregate' approach, estimating the effects of immigration using national level data, has been heralded by Borjas (2003) and Borjas and Katz (2007). More recently, among others it has been adopted also by Borjas, Grogger and Hanson (2012), Manacorda, Manning and Wadsworth (2012) as well as Ottaviano and Peri (2012).

When, instead, the analysis is performed at a finer spatial level than the whole country, natives' relocation cannot be ruled out. In this case 'identification' can be achieved by complementing the observation of the change of the local native wage with parallel

information on the change of the local native employment. To see this, consider Figure 4, which builds on panel (b) of Figure 3. As already discussed, in this scenario the native wage increase from w_0 to w_1 may be equivalently driven by higher native productivity (positive 'productivity effect') or by worse native quality of life (negative 'amenity effect'). In these two cases, however, Figure 4 shows that the reactions of native employment are opposite: the positive 'productivity effect' comes together with the increase of native employment from L_0 to L_1 whereas the negative 'amenity effect' comes together with its decrease from L_0 to L_1'. The reason is that higher local productivity attracts natives from other locations whereas worse quality of life pushes them away. This suggests that keeping track of not only wage but also employment reactions can help solve the identification problem.

More generally, Figure 4 shows how to identify the dominant effect of immigration when both the D-curve and the S-curve may move due to native relocation. If the new equilibrium at the crossing of the new D-curve and the new S-curve happens inside the white quadrants, the shift of the D-curve (and hence the 'productivity effect') must dominate. For the new equilibrium to be in the top-right white quadrant, the D-curve must have shifted rightwards, thus implying a positive 'productivity effect'. The opposite holds if the new equilibrium falls in the bottom-left white quadrant (negative 'productivity effect'). Differently, when the new D-curve and the new S-curve cross, instead, inside the grey quadrants, the shift of the S-curve, and hence the 'amenity effect', must dominate. For the new equilibrium to be in the top-left grey quadrant, the S-curve must have shifted leftwards, thus implying a negative 'amenity effect'. The opposite holds if the new equilibrium falls in the bottom-right grey quadrant (positive 'amenity effect').

Hence, when immigration is associated with higher (lower) native employment and higher (lower) native wage, this is consistent with a positive (negative) productivity effect. When immigration is associated with higher (lower) native employment but lower (higher) native wage, this is consistent with a positive (negative) amenity effect. This identification strategy builds on Roback (1982) and has been adopted by Ottaviano and Peri (2005 and 2006) in order to estimate the effects of immigration using urban level data.[6]

Dimensions of diversity

An important implication of the previous discussions is that whether or not natives and immigrants are identical in terms of labour market characteristics is crucial. A first distinction concerns differences in education and experience (see e.g. Borjas, 2003; Borjas and Katz, 2007; Borjas, Grogger and Hanson, 2012). The idea is that natives can be directly displaced only by immigrants with equivalent education and experience as only workers with identical characteristics compete head-to-head for the same jobs. Accordingly, the displacement argument behind Figure 1 should apply only to the case of immigrant and native workers within the same 'education-experience cell'.

A second distinction concerns any further relevant difference in 'culture' between immigrants and natives with equivalent education and experience (see e.g. Manacorda, Manning and Wadsworth, 2012; Ottaviano and Peri, 2012). The idea here is that immigrants and natives may differ in some culture related characteristics that make then imperfectly substitutable in production even though they share equivalent education and experience. From this perspective, the displacement argument behind Figure 1 should apply only within the same 'education-experience-culture cell'. In this respect, the most commonly used markers of 'culture' at the individual level are language spoken at home, ethnicity and country of birth.

The common result of studies on national data is that heterogeneity in education and experience matters as native workers are only found to suffer from a direct 'displacement effect' associated with immigrants with equivalent education and experience (i.e. the D-curve is downward sloping). On the other hand, they are also found to benefit indirectly from a positive 'productivity effect' associated with the inflow of immigrants with different education and experience (i.e. the D-curve shifts rightwards). Moreover, Manacorda, Manning and Wadsworth (2012) and Ottaviano and Peri (2012) find that also heterogeneity in country of birth is important as immigrants and natives with equivalent education and experience are still imperfectly substitutable in production, and this dampens the displacement effect.[7] Overall, considering the actual characteristics of natives and immigrants in the countries analysed, national studies conclude that there is little evidence of diffuse damages for native workers from immigration. For example, Ottaviano and Peri (2012) find that immigration into the US from 1990 to 2006 is associated with a small increase in native wages not only on average but also individually, at least for the vast majority of native workers.

This evidence of a relevant 'productivity effect' of immigration is confirmed by studies based on urban data. In these studies individual cultural markers are typically aggregated at the city level through some 'diversity index' to provide a unidimensional aggregate measure of local 'cultural' diversity.[8] The index is then correlated with local native wage and employment so as to check whether across cities different degrees of cultural diversity are associated with any of the quadrants in Figure 4. Ottaviano and Peri (2005 and 2006) find evidence of a dominant positive 'productivity effect' of immigration for natives living in US metropolitan areas where diversity increased between 1970 and 1990, respectively measuring diversity in terms of country of birth and language spoken at home.

Causation and reverse causation

Showing that native labour market outcomes are positively correlated with immigration, and that this is associated with an underlying positive correlation between native productivity and immigrants, does not necessarily imply that immigration *causes* higher native productivity. Causation may actually run in the opposite direction whenever some other feature makes a location more productive and thus more attractive to both native and immigrant workers ('boomtown effect').

A way to attenuate the possible relevance of such 'reverse causation' is to look at 'natural experiment' that closely fit the concept of an exogenous increase in the supply of immigrants to a given labour market. A famous example of 'natural experiment' is the study by Card (1990) of the labour market of Miami after the Mariel Boatlift, that is, after the arrival in 1980 of 125,000 Cuban immigrants following Fidel Castro's declaration on April 20th 1980 that Cubans wishing to do so were free to emigrate to the US from the Cuban port of Mariel. This resulted in a 7 percent increase in Miami's labour force as between 50 and 60 percent of the boatlifted decided to stay in Miami. Two features of this exodus are appealing in terms of 'exogeneity'. On the one hand, reportedly refugees largely consisted of undesirables who were pushed out of Cuba ('exogenous push'). On the other hand, they disproportionately settled in Miami rather than elsewhere in the US due to the presence of a relatively large local community of previous Cuban immigrants ('exogenous pull'). The analysis of Card (1990) focuses on the direct 'displacement effect' for pre-existent less-skilled workers. Even though most of the boatlifted were relatively unskilled, he finds virtually no effect of the Mariel influx on the wage and employment of non-Cuban less-skilled workers in Miami from 1979 to 1985.[9]

The interpretation of these results, however, has been questioned based on the 'identification' issue presented in panel (a) of Figure 3 (see e.g. Autor, 2003). For example, it has been noted that after the boatlift the population growth rate slowed down much more in Miami than in the rest of Florida, possibly suggesting that natives and older immigrants were deterred from migrating to Miami. According to the logic of panel (a) of Figure 3, such response could have muted the 'displacement effect'. More fundamentally, the study of the Mariel Boatlift, as all natural experiments, faces the challenge of generalization. Autor (2003) points out that Miami was extremely well set up to absorb Cuban immigrants due to its established Cuban employment and social networks, to its occupational structure and its long experience in accommodating Cuban immigration.

An alternative standard strategy to solve the problem of reverse causation is to use econometric techniques to separate the exogenous component of immigration from the endogenous one driven by the 'boomtown effect'. The idea is to find substitute actual local immigration with some 'instrumental variable' correlated with it but not with local productivity. In their studies of the impact of cultural diversity in US cities from 1970 to 1990, Ottaviano and Peri (2005 and 2006) 'instrument' the exogenous component of immigration in two ways. First, they use the distances of each city from the international border, from the coast, and from the closest main 'gateway' into the US (i.e. New York, Los Angeles or Miami). The underlying idea is that, in the period of observation, immigrants came to the US for reasons exogenous to the local events of any particular city and, due to pre-existent immigrant communities, tended to settle disproportionately close to their points of entry into the US. Hence, simply by geographic accident and not because of local productivity shocks, cities closer to the coast, the border or the main gateways received larger immigrant inflows.

The second way to proxy the exogenous component of immigration borrows the so-called 'shift-share' methodology from Card (1999). This alternative 'instrumental variable' is

constructed by grouping foreign-born workers according to language spoken at home (Ottaviano and Peri, 2005) or country of birth (Ottaviano and Peri, 2006) and calculating the initial share of each group in each city in 1970. A group in a city is then imputed the growth experienced at the national level (due to immigration) from 1970 to 1990 according to its initial share in the city in 1970. This gives an 'imputed' change in the size of each group in any given city that does not depend on the actual immigration of that group in that city after 1970. For example, a city with a large initial Mexican-born population in 1970 would be 'imputed' a large share of Mexican immigrants in 1990 independently of whether and how the city actually attracted them. The idea is that using the initial local shares of immigrant groups in 1970 together with the national immigration trends for those groups from 1970 to 1990 should insulate the 'imputed' changes in a city from any city-specific productivity shocks, as long as the initial presence of a given group of immigrants makes the city attractive to newcomers of the same group independently of any productivity advantage.

Both 'instrumental variables' lead to the same conclusion: from 1970 to 1990 immigration caused a positive 'productivity effect' on natives in US cities, associated with higher native wage and higher native employment.[10]

Conclusion

Observing how the local wage of native workers changes after an inflow of immigrants can be uninformative of the actual impact of immigration on the local labour market. The reason is that the actual composition of the natives' workforce and the actual composition of the immigrants' inflow, as well as their tastes, matter a great deal. Natives are harmed by the competition of immigrants with equivalent skills as their services become relatively more abundant, hence less valuable (negative 'displacement effect'). But they may benefit from the inflow of immigrants with different skills as their services become relatively scarcer, hence more valuable (positive 'productivity effect').

At the same time, cultural differences between immigrants and natives may raise barriers to effective interactions in the workplace, turning the 'productivity effect' from positive to negative. But cultural differences may also generate a positive or negative 'amenity effect' as natives may simply like or dislike having immigrants around. On the one hand, cultural diversity may give rise to conflicts of preferences, barriers to communication, outright racism, prejudice or fear of other groups, leading to a sub-optimal provision of private and public goods.[11] On the other hand, it can generate benefits in terms of the variety of goods, services and skills available for consumption and production.[12] By pooling different skills, abilities and solutions, cultural diversity can also help creativity and innovation.[13]

Whether the 'displacement effect' and the 'productivity effect' of immigration on natives have any practical relevance, whether they are positive or negative, and which eventually dominates are then empirical issues. The studies discussed in this essay provide evidence of a negative 'displacement effect' and a positive 'productivity effect', with the latter dominating

for the average native worker as well as for the majority of native skill groups in the countries analysed.

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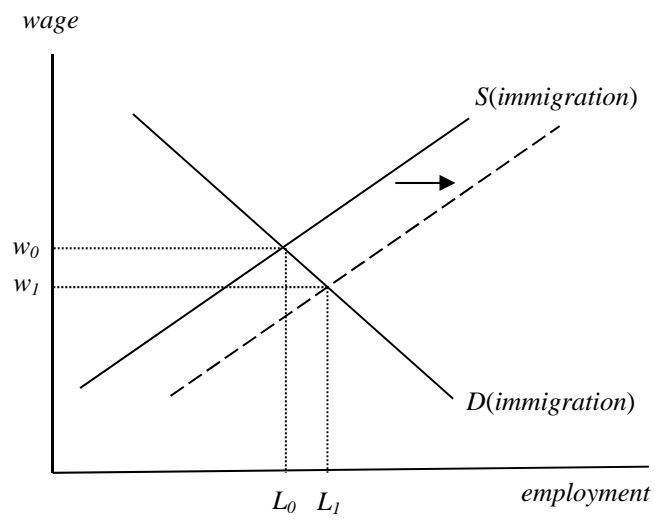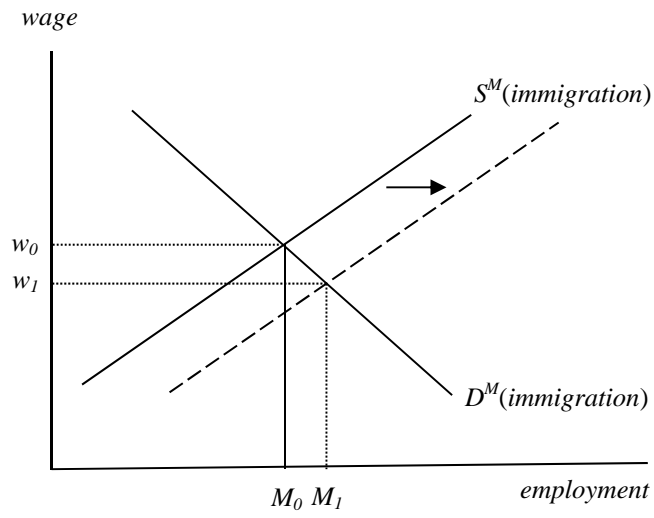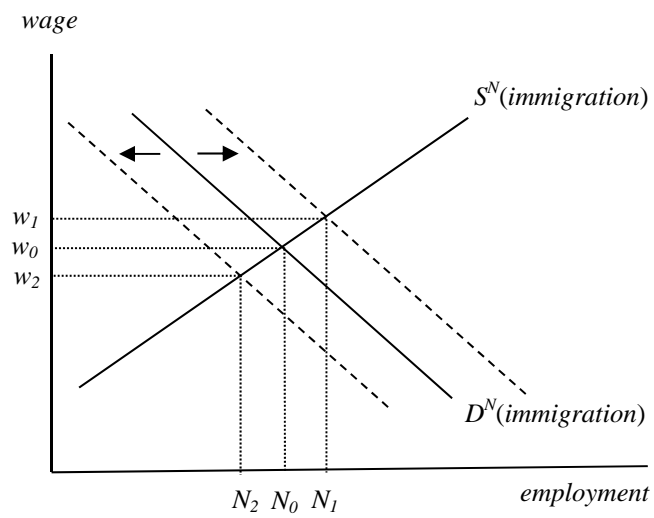
Figures

wage

S(*immigration*)

w_0
w_1

D(*immigration*)

L_0 L_1

employment

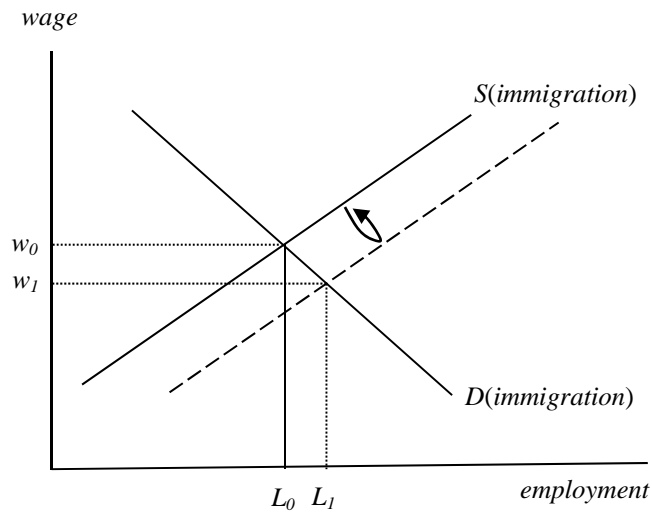**Figure 1 - The effects of immigration when natives and immigrants are identical**

(a) Immigrants

(b) Natives

Figure 2 - The effects of immigration when natives and immigrants are different

(a) Natives' relocation when natives and immigrants are identical
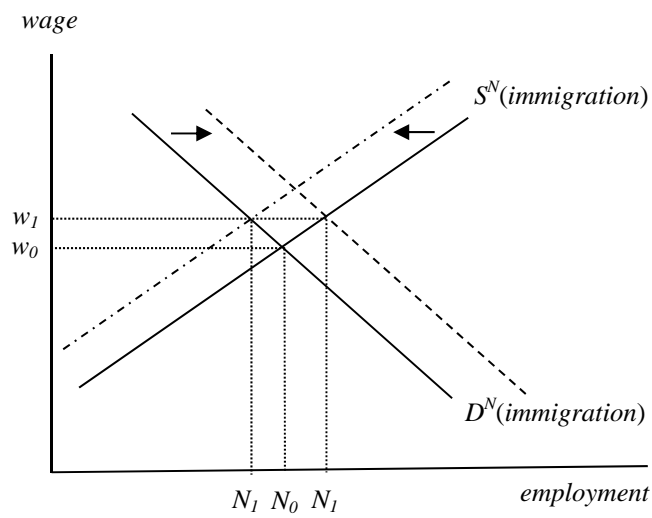
(b) Natives' relocation when natives and immigrants are different

Figure 3 – Identification problems when natives relocate
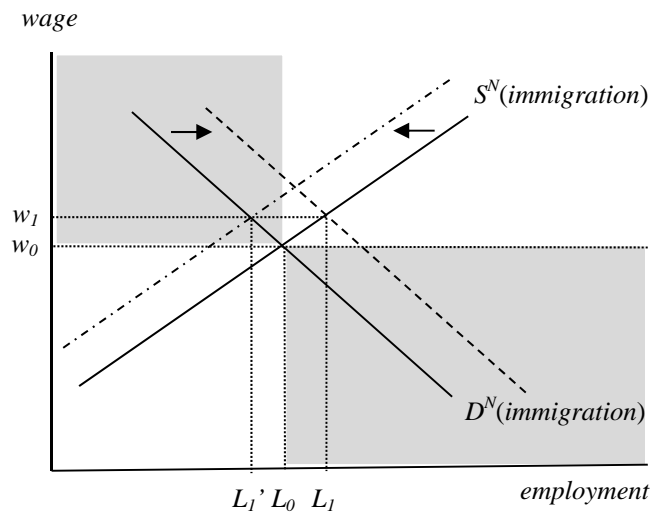
Figure 4 – Identification strategy when natives relocate

Endnotes

[1] Paper prepared for the book "The History of Migration in Europe - Perspectives from economics, politics and sociology", F. Fauri (ed.), Routledge explorations in economic history, edited by L. Magnusson, Vol. 71, Taylor and Francis, Abingdon.

[2] See Alesina and La Ferrara (2005), Okkerse (2008) and Pekkala Kerr and Kerr (2011) for recent surveys; Borjas (1994) and Friedberg and Hunt (1995) for overviews of the earlier literature.

[3] See e.g. Maignan, Ottaviano, Pinelli and Rullani (2003) for a survey of alternative diversity indices.

[4] When, differently from the textbook neoclassical model, the wage cannot adjust (for example, because of labour market institutions), the displacement effect materializes in higher unemployment rather than lower wage (D'Amuri, Ottaviano and Peri, 2010).

[5] This is sometimes called the 'skating rink mobility model', whereby each immigrant who skates into an area knocks one native off the ice. See Autor (2003) who attributes the labelling to David Card.

[6] Ottaviano and Peri (2005) follow the exact identification procedure described in Figure 4. Closer to Roback (1982), Ottaviano and Peri (2006) use land rent instead of employment to complement wage information. The two procedures follow the same logic and are mutually consistent.

[7] Other recent studies finding imperfect substitutability between immigrants and natives with equivalent education and experience include Card (2007) and Raphael and Smolensky (2008) for the US as well as D'Amuri, Ottaviano and Peri (2010) for Germany.

[8] See e.g. Maignan, Ottaviano, Pinelli and Rullani (2003) for a discussion of alternative indices.

[9] Other examples of 'natural experiments' include Carrington and de Lima (1996) on repatriations from Africa to Portugal in the 1970s and Friedberg (2001) on immigration from the Soviet Union to Israel in the early 1990s.

[10] Bellini, Ottaviano, Pinelli and Prarolo (2013) reach comparable conclusions in the case of European regions.

[11] See e.g. Alesina, Baqir and Easterly (1999) and Alesina, Baqir and Hoxby (2004).

[12] See e.g. Lazear (1999 a, b), O'Reilly, Williams and Barsade (1998) and Kahane, Longley and Simmons (2013).

[13] See e.g. Berliant and Fujita (2008) and Florida (2002 a, b).

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