Some Simple Arithmetic on Immigration and Per Capita Income in Europe

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Abstract

Using some simple arithmetic and reasonable assumptions, this article presents a condition based on relative wages and employment rates under which immigrant flows raise per capita income in the host country. Furthermore, we illustrate the usefulness of such condition by applying it to a set of European countries, showing the plausible different impacts of immigration on the economic performance of receiving countries.

Keywords: immigration, per capita income, wages, employment.

1. Introduction

Few discuss that immigration is one of the most relevant phenomenon in contemporaneous Western societies. At this respect the impact of immigration flows on the host labour market or their effect on the financial sustainability of pension systems have deserved much interest from researchers, but much less attention has been devoted to disentangle the effect of immigration on income per capita, with most of such research is based on enriched versions of the Solow growth model.\(^1\) The aim of this article is to present an economic condition under which the contribution of immigration to per capita income of receiving countries is positive, based on several assumptions on labour market functioning. In the next section, we present such condition and explain the assumptions underlying it. In the third one, we apply this condition to real data from European countries around 2004, while the last section, as usual, sums the main findings of the article.

2. Immigration and per capita income

Let \( GDP \) denote the Gross Domestic Product produced by native workers and \( N \) the total local population. The impact of immigration on national GDP per capita will depend on the contribution of foreign workers to GDP –given by their number \((I)\), employment rate \((e)\) and productivity \((\pi)\)- and the total immigrant population \((I)\). This statement can be summed by the following condition:

\[
\frac{GDP + IeI}{N + I} > \frac{GDP}{N}
\]  

(1)

Obviously, immigration leads to an increase in population and, under most assumptions\(^2\), to an increase in GDP in the receiving country, so the final impact of immigration on GDP per capita would depend on whether its impact is larger on the numerator \((i.e., GDP)\) or the denominator \((i.e., population)\). Therefore, it can be deducted that the final impact of immigration on the GDP per capita of the receiving country depends on whether

\[
\pi_I > \frac{GDP}{Ne_I}
\]  

(2)

\(^1\) For a survey of the impact of immigration on labor market see LaLonde and Topel (1997) and Borjas (1999). An analysis of the effect of immigration on Welfare State can be found, for example, in Collado et al. (2004), Krieger (2005) and Tranaes and Zimmerman (2004). Freidberg and Hunt (1995) provide a comprehensive literature review on immigration and economic growth.

\(^2\) The only scenario under which immigration would not lead to an increase in GDP is under perfect substitutability of immigrants and local workers with a constant effective demand.
In words, the higher immigrants’ employment rate and the higher immigrant’s productivity rate, the larger will be the positive impact of immigration on per capita income. As GDP per capita is equal to local employment rate ($e_N$) times average native workers’ productivity ($e_N$), expression [2] can be rewritten as

$$\pi_I \geq \frac{\pi_I e_N}{e_I} \Rightarrow \frac{\pi_I}{\pi_N} \geq \frac{e_N}{e_I}$$

(3)

Last, assuming that, on aggregate, wage differentials mimic productivity differentials, the final condition is given by

$$\frac{w_I}{w_N} \geq \frac{e_N}{e_I} \Rightarrow \frac{w_I e_N}{w_N e_I} \geq 1$$

(4)

Therefore, immigrants will increase GDP per capita if their relative wage ($w_I / w_N$) is higher than the employment rate of nationals relative to immigrants. It is important to stress that Equation 4 is a pure exercise of accounting, which does not consider any impact of immigration on GDP per capita outside the increase in production derived from the increase of the number of workers (immigrants). Furthermore, such expression implicitly includes the following assumptions:

1) Immigrant and national workers are independent production factors, i.e. immigrant workers neither substitute nor complement national workers. This means that the employment rate and wages of nationals are not affected by immigration.  

2) Wage ratios reflect, on average, productivity ratios, and immigrants do not suffer from economic discrimination by employers (the existence of differences between worker’s productivity and wage are equal for migrant and native workers for the same worker’s productivity level).

3. Empirical Illustration

3.1. Data

In order to illustrate the application of the condition stated in Equation 4, we compute the relative employment and average wage rates for most of European Union countries and Norway around 2004. Employment rates of 2004 are taken from Eurostat database (whose figures comes from the European Labour Force Survey, LFS), while relative labour incomes have been computed from the 2005 wave of the Survey on Income and Living Conditions (whose information is mainly referred to the previous year). We estimate the wage and labour market income of immigrants and nationals in 23 countries, although the Czech Republic, Slovakia and Hungary were left out of the analysis due to the low number of immigrants included in the sample. The average wage is calculated including employees and self-employed in all cases apart from Spain, Portugal, Italy and Greece, where that was not possible as self-employment income is not available.

3.2. Results

Figures 1 and 2 show the value of the relative employment rate and average wage ratio in a set of selected European countries, respectively. In many of them, immigrants’ employment rate is higher than among native population, so, for all these countries, a positive contribution to GDP per capita is expected as long as immigrants do not face a very high wage gap. In other countries –especially those that has traditionally hosted large shares of foreigners-, immigrants’ employment rates are lower than locals’ ones, which makes very difficult a positive contribution of immigration flows to income per capita, unless foreign workers have a positive wage differential. Regarding wages, we can see that foreigners receive lower wages than natives, with some exceptions like Belgium.

In order to conclude our analysis of the impact of immigration on the GDP per capita of the receiving country we have calculated the relative wage (or wage gap) of most European Union member states and Norway estimating the average labour income of immigrants and national workers using the 2006 wave of the Statistics on Income and Living Conditions (SILC) of the EU. We were able to estimate the wage and labour income of immigrants and nationals in 23 countries, although the Czech Republic, Slovakia and Hungary were left out of the analysis due to the low number of immigrants included in the sample.

3 Although this assumption might look a bit strong, evidence from “natural experiments” like the massive arrival of Cubans to Florida after the Mariel boat lift (Card, 1990), the increase in labor supply in France resulting from the return of the so called pied noirs to France with the independence of Algeria (Hunt, 1992), or the migration of Russian Jews to Israel with the fall of the Berlin wall (Friedberg, 2001), point to the existence, at the most, of a relative small substitution effect in presence of a sudden and large immigration shock.
The average wage was calculated including employees and self-employed in all cases but Spain, Portugal, Italy and Greece, where that was not possible due to problems with the data. Figure 2 reproduces the estimated wage gap, or more precisely labour income gap, of immigrants.

Insert Figure (1) about here

Insert Figure (2) about here

Figure 3 plots both indicators (the employment and the wage ratio) in order to evaluate the sign of the contribution of immigrants to GDP per capita. Because of the composite effect of lower wages (proxies of productivity) and lower employment rates, in most countries of the sample immigration has a negative contribution to GDP per capita. Only in Greece, Spain, Italy, Luxembourg and Poland, the impact of immigration is positive. In the three Mediterranean countries and Luxembourg, the higher employment rate of immigrants clearly compensates their lower productivity. In Belgium (and Poland), a positive wage gap for immigrants, probably explained in the Belgium case by the high concentration of European Union employees in Brussels, more than compensate their lower employment rate.

Insert Figure (3) about here

4. Conclusions

The main aim of this article has been to explore a theoretical condition capturing the contribution of immigrants to receiving income per capita of host countries. Such requisite is based on immigrant-native employment and wage gaps and some assumptions on labour market structures and productivity. We have applied such condition to several European countries, finding that, while the contribution of immigration to GDP can be reasonably considered positive in all countries, the impact on national per capita income of receiving countries would be negative.

References


Figure 1. Relative employment rate of nationals and immigrants (100·e_n/e_l) in selected European countries

Source: Authors’ analysis from LFS.

Figure 2. Relative labour income of immigrants (100·w_I/W_N) in selected European countries

Source: Authors’ analysis from SILC.

Figure 3. Relative employment and wage of immigrants in selected European countries

Source: Authors’ analysis from the LFS.