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Quantitative Models for Economic Analysis and Management

The Economic Effects of Immigration and Its Impact on The Labour Market Through Comparison of Policies and Examples

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Abstract

This study aims to find out the differences (or the similarities) between the British labour market and the Italian labour market under the effects of immigrants, in an effort to find out the reason for their different immigration policies. We provide, besides a set of theoretical discussions of the underlying economic mechanisms, an empirical investigation of the way immigration affects labour market outcomes. We try at the beginning to empower it with a cost-benefit analysis of immigrants to the market. After that we try to find a relation between immigrants and some important aspects of the labour market with a statistical approach and a time series approach.

1. Introduction

Migration is a very old notion. Humankind migrated for thousands of years from one place to another with the intentions of settling, permanently, in the new location. There are a lot of different factors that give rise to migration. These can be nature/environment, politics, religion or other humans. In general, we can say that humans need an external reason to migrate. Migration is actually the hope of a better life: people leave their living space for the condition that they dont have in their current place and maybe they will have in another".

We can separate migration in two as, domestic and international. They both have some similarities and differences in reasons and results. In this study we are focusing on the international human migration. The persons who emigrates, runs away from something for run towards some better condition. Is it okay? What about the hosting country? How can we describe a country as immigrant or emigrant?

We use Net Migration Rate for this distinction.

$$N = 1000\ x\ \frac{(I - E)}{P} \tag{1}$$

N = net migration rate

E = number of people emigrating out of the country

I = number of people immigrating into the country

P = the estimated mid-year population

Using this definition of Net Migration Rate, the situation of world countries in 2016 is shown in following figure:

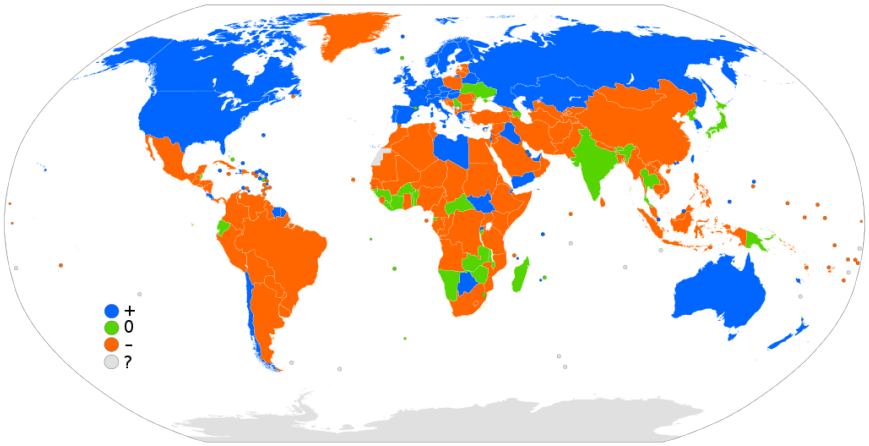

Figure 1: Net migration rate around the world - CIA Factbook

Migration occurs over a series of different push and pull factors that revolve around social, political, economical, and environmental factors according to migration trends.

- Social migration is when an individual migrates to have a higher standard of living or to be closer to family.
- Political migration is when you are going in as a refugee to escape war or political persecution.
- Economical migration is moving to a place where one can aspire to have a career and better job opportunities which end up contributing to better living conditions.
- Environmental migration is when natural disasters force you to move into a new area.

Once we analyze all of the migrating factors we can get to the idea that the net migration rate can tell us so much about a country. For example, if there are a lot of people coming in and not many leaving we can assume it is a wealthy country that keeps evolving and generating more and more opportunities. On the other hand, if not many people are coming in and many are leaving it is easy to assume that there is a chance of violence, weak economy, or not enough resources to fulfill the existing population.

In this study, our focus is the countries who accept more immigrants than their people emigrate, so-called "host countries" and their points of view to the immigrants.

The host countries, roughly speaking, are EU, UK, USA, Russia, Australia, United Arab Emirates, Iraq and Yemen. As of 2015, the number of international migrants has reached 244 million worldwide, which reflects a 41% increase since 2000. One third of the world's international migrants

are living in just 20 countries. The largest number of international migrants live in the United States, with 19% of the world's total. Germany and Russia host 12 million migrants each, taking the second and third place in countries with the most migrants worldwide. Saudi Arabia hosts 10 million migrants, followed by the United Kingdom (9 million) and the United Arab Emirates (8 million) [1].

This situation does not have the same level of acceptance in every host country even though, countries in theory (with the power of law), support migration. Also the research on this subject suggest that migration is beneficial both to the emigrating and immigrating countries as economic effects. Research, with few exceptions, find that immigration on average has positive economic effects on the native population, but is mixed as to whether low-skilled immigration adversely affects low-skilled natives.

On the other hand, practically, we cannot say that all citizenships of host countries have the same idea. Moreover, starting with the UK (in the Brexit referendum process) and then with the US (with President Trump), people who think that immigrants are harmful for the welfare of society, found the answer in the politics. Even if studies show that the elimination of barriers to migration would have profound effects on world GDP, with estimates of gains ranging between 67 and 147 percent and development economists arguing that reducing barriers to labor mobility between developing countries and developed countries would be one of the most efficient tools of poverty reduction, some countries started to take action with regards to limiting immigration.

In this study, we would like focus on two EU countries (to avoid the confusion of the special conditions of the EU), the UK and Italy, two countries which have been the in EU from 1973 (the year the UK joined) since we can say that they have both been through the same situation. They both have limiting and restricting conditions for immigration. It is not just enough to find a job in those countries to move there as the company has to provide that they need this employee. The company must verify that the desired skills for this job does not exist firstly within the country, then the EU and if the immigration limit has not been exceeded within the hiring year, then the company can hire the non-EU employee but at a high rate of tax.

No matter what the research shows, and even with restrictions against non-EU, in the UK, the labour migration from the EU itself has become a problem in particular with regards to Eastern Europeans from countries like Poland, who have been moving to Britain in large numbers over the past decade or so. In 2004, 10 new countries joined an expanded European Union, including Hungary, Poland and the Czech Republic. Migration Watch UK calls this a "watershed moment"

for European migration because it opened up the UK and its labor market to the citizens of these countries.

Then in 2007, Romania and Bulgaria joined the EU as expansion continued, and people from these countries made their way to the UK as well.

Using their right to freedom of movement within the EU, many from Eastern Europe came to Britain in search of better jobs and wages. During these years, the phenomenon of the "Polish plumber" came about, as many hired Polish tradesmen to fix up houses and paint apartments keeping wages low, some argued, for other workers [2].

UK made its move with a referendum, in order to stop, firstly EU immigration and then non-EU immigration by legislation. Italy also faces the same situation with Eastern Europeans and also non-EU immigrants, but Italy is still continues with its current policy.

2. Literature Review

With the aim to analyse the state of the art and find the literature about the impact of the immigration on the economy we used the largest database of peer-review literature: Scopus.

We searched all the papers, articles and books' chapters about immigration finding more than 60.000 results. This is just a number, so to better understand the importance of this subject, the different fields it involves and also the countries which publish more about this topic, we extracted some intuitive plots given in *Annex A*.

To highlight the choice of the countries UK and Italy, we have used the data provided by Scopus to see their interest about this topic. The plot provided by the tool VOSViewer [13], shows us that together with the United States, UK and Italy are two of the countries that published more documents about immigration.

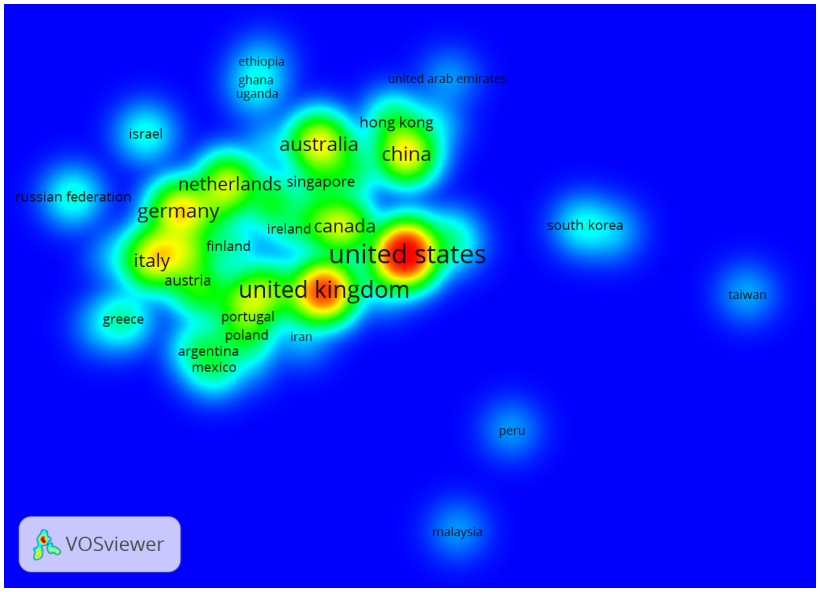

Figure 2: Publications about immigration - Scopus data

It is well known that public discussions made, as far as immigrants are concerned, is focused on the short term consequences of labor market and public economics. In this way, all the theoretical and empirical research concerning the immigration phenomenon in systematic conditions and in the long term are ignored. Such an action is referred to in macroeconomic discussions at the national and international levels. The empirical and theoretical research framing this category, agree with the potential benefits for economic prosperity internationally. The notion which governs the particular research is simple: a workers mobility from an economy with low marginal productivity (low wages) towards a country with a high marginal productivity (high wages) produces a surplus which benefits both the employee and society. At the same time, immigration contributes to economic growth at a national level.

Despite its importance, the relation between immigration and economic growth has not attracted much research attention, with some exceptions. O.Jones (1998) shows that rising population growth rate (including immigration) reduce transitional per capita economic growth. This may be due to adverse effect of rising population on capital labour ratio [3].

Robertson (2002) examined the causality between these two series (immigration and economic growth) using Urzawa-Lucas approach in which unskilled and skilled labour perform distinct services. He found that an unanticipated increase in unskilled workers due to population boom, or inflow of immigrants results in a transitional growth with a slow growth of human capital relative to the balanced path [4].

Some empirical papers have examined the causality between immigration and unemployment and growth on data from different countries (Pope and Withers, 1985; Marr and Siklos, 1994; Islam, 2007; Morley, 2006). The idea is based on the fact that migrants take into account job opportunities in their decision to migrate and the economic conditions are likely to have a significant impact on migrations policies. Generally, the empirical papers on causal link between immigration and host economic activity found no evidence of migration causing unemployment and growth, but found evidence of causation running in the opposite direction [5].

Morley's (2006) findings offer a relevant starting point. He used autoregressive distributed lag (ARDL) approach to cointegration and found evidence of long run causality coming from per-capita economic growth to immigration, but failed to establish the reverse causality [6].

Finally, Islam (2007) examined Canadian data within vector error correction model. He found a long term positive relationship among per-capita GDP, immigration rate and real wages. The results indicate that, in the short term, increased immigration is possibly associated with attractive Canadian immigration policies, and in the long term, as the labour market adjusts, Canadian- born workers are likely to benefit from increased migration [7].

With regards to the empirical implementation, the dominant approach to estimation in the literature is that referred to by Borjas (1999) as the spatial correlations approach. Effects of immigration are identified from the spatial correlation between immigrant labour inflows and changes in native or overall labour market outcomes (or between immigrant population shares and levels of these outcomes). Spatial units are intended to correspond to geographical labour markets [8].

3. Description of the Methods chosen

When we decided on studying the effects of immigration on the labour market, we knew that we would face a lot of problems finding relevant and related data, hence, why there isn't clear empirical results on this subject. Under this condition, the best thing we were able to do is follow previous research and use the best methods that we could find.

Based on our decision, we chose the paper of Dustmann, Fabbri, Preston (2015), The Impact of Immigration on The British Market and the paper Gindra Kasnauskien, Loreta Vbrait (2013) The Impact of Population Immigration on The Labour Market of The UK. These papers analysed only the effects of immigration on the British labour market, but from our perspective, we would like to see what is the difference between the United Kingdom and Italy, we had to add to the analysis

Italy's situation also.

Since we couldn't obtain sufficient data for both countries, we decided to integrate our analysis with an empirical approach through cost-benefit analysis.

Without empirical tests, predictions of theoretical models remain at best well-reasoned speculation, and are not suited to guide policy, therefore we are going to focus on empirical analysis. The key problem in empirical analysis is to compare the economic outcomes of certain groups of the resident population with specific cells after immigration with the counterfactual outcomes. While the first measure is observable, the second is not, and needs to be constructed. Construction of this counterfactual is always based on assumptions which are debatable. Another problem is that rely on relatively small sample sizes to compute immigrant concentrations and economic conditions on local level is measurement error. This is likely to be the case in an analysis that is based on a survey of relatively small sample size. The consequences of any measurement error is aggravated when using differenced or within-groups estimation. This problem is addressed by instrumental variable estimation as long as the dependence on the regressor is linear, as it is in our case. Local labour markets are not closed economies and native workers are free to move out. If immigration does drive down local wages for certain skill groups, then one would expect there to be pressure for native workers of that skill type to move elsewhere. This will tend to disperse the impact of immigration through the national economy and undermine the ability to identify the impact from looking at effects within localities, leading to downward biased estimates of the effect of immigration on, e.g., employment of native workers. These are the general problems from the nature of this subject and we will do further discussion on difficulties encountered later on.

At the beginning of our research, we were expecting to do an empirical analysis with the skills of workers (native and immigrant). But as we mentioned before, it couldn't be possible to find relevant data. So, we decided to make a study about skills with cost-benefit analysis. After this implementation, the methods consist in the construction of some models such as multiple linear regression and time series models.

4. Description of the Data chosen

As mentioned previously, the data about the immigrants are the real problem for our project. There exists a lot of disaggregated data, from different sources such as Eurostat, Istat, Immigrati.Stat, Office for National Statisic (UK) and OECD. The information provided are usually not complete

or not available for a long period or for both the considered countries; so it's impossible to use just a single dataset to do the analysis. This is an important limitation if we want to guage this topic accurately. Since aggregating a lot of data from different sources would require a long time, we tried to do our best constructing two datasets, one for the Italy and one for the UK with the variables found in the databases of Eurostat [15], the most complete data source we found for our topic. We considered just the variables available for both countries and for the same period, to make possible the realization of the comparison.
The variables included in the datasets are:

- Year = from 1998 to 2015 (most completed data available)
- TotPop = Total of the population in the country
- Imm = Number of immigrants that join the country in that year
- MalesImm and FemalesImm = Number of male and female immigrants
- PopCit = Total population with considered country citizenship
- PopCitForeign = Total population with foreign citizenship
- EmpRate = Employment annual rate for active population (from 15 to 64 year) calculate as percentage of total population
- GDPpers = GDP in euro per inhabitant
- AnnNetEarn = Annual net earnings for single person

The few missing values being filled with the mean calculated on the nearest values.

5. Description of the Models chosen

The choice of the model is limited by the data found, because they aren't enough to create a really robust model[1].
The first models are multiple linear regression models which seeks to discover a relationship between the labour market and the immigrants. The structure is the following:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon \tag{2}$$

[1] A possibility is to upsampling with an interpolation method the data, for example we could obtain from annual data, quarterly data.

Since we considered two important variables about the labour market as outcome we have constructed two different models: the first one with outcome the Employment rate and as predictors Immigrants, Annual Net Earnings and GDP per capita, and the second with outcome the GDP per capita and as predictors Immigrants, Annual Net Earnings and Employment rate. We didn't include other variables like the sex of immigrants because they weren't significant. Subsequently, we also tried an analytical model considering a time series approach. We treated all our variables as time series and we created a model with the following form:

$$y_t = \alpha_0 + \beta_i y_{t-i} + \epsilon_t \tag{3}$$

considering y_t a vector composed by four elements: the immigrants, the employment rate, the annual net earnings and the GDP per capita, α_0 the vector of constant terms and ϵ_t the error term. Since there was an error correction mechanism we applied an error correction model, usually used for data where the underlying variables have a long-run stochastic trend, also known as cointegration. This kind of models are useful for estimating both short-term and long-term effects of one time series on another. So we applied a vector error correction model (VECM).

6. Description and Interpretation of the obtained results

a) Cost-Benefit Analysis

One of the key questions on migration concerns its benefits and costs for the receiving economies. Fears that migration may, at least in the short run, have adverse effects on labour market opportunities of the resident working population are a main reason for opposition to more liberal migration policies.

The first question that arises is how to model immigration and immigrants. Some early papers assume a closed economy, with only one skill type, and capital complementary to labour. In these papers, immigrants are considered as a distinct factor of labour [9]. Such models give valuable insights into the effects of immigration on wages and returns to capital. However, much of the debate on immigration is about whether immigrants are skilled or unskilled, and how the inflow of immigrants of particular skill endowments affect economic outcomes of skill groups in the resident population. It seems, therefore natural, to distinguish between different skill groups when modelling the impact of immigration.

Much of the later literature has taken this into account, by distinguishing between different types

of labour. However, Grossmans idea that immigrants and natives may be different factors of production has been taken up again in the latest literature, which assumes that immigrants and natives are imperfect substitutes within skill groups [10].

We will start by discussing a simple model framework and extend it in directions that seem important for studying the possible labour market effects of immigration. We distinguish between skilled and unskilled workers who may be natives (born in the destination economy) or immigrants (born in a country other than the destination economy). We commence by assuming that immigrants and natives within a particular skill group are perfect substitutes, i.e. they are exchangeable. Finally, we assume throughout that capital supply is perfectly elastic. This means that firms obtain capital at a fixed interest rate, which could be thought of as being set on an international market. We thus exclude from our consideration possible redistributional effects of migration from workers to capital owners, but concentrate on possible redistribution between skilled and unskilled labour [11].

Suppose now that such an economy experiences immigration. Immigrants could be either skilled, or unskilled, or both. A first key observation is that immigration only affects economic outcomes of resident workers if it changes the skill mix of the economy. Suppose further the economy is in labour market equilibrium before immigration in the sense that all workers are fully employed at equilibrium wages, which may differ for the skilled and the unskilled. If now immigration occurs, and immigrants differ in their skill composition from native workers, any change in the skill composition as a result of immigration will lead to disequilibrium between supply of and cost-minimizing demand for different labour types at existing wages and output levels. If for example all immigrants are unskilled, there will be an excess supply of unskilled workers at the going wage rate. Absorption of these new workers into the economy, and restoration of equilibrium will therefore almost certainly involve short- run changes in wages and employment levels of different skill types. Whether effects on wages and employment are permanent or only temporary depends on the different possibilities of the economy to adjust to the labour supply shock induced by immigration and the consequent changes in relative supply of skilled and unskilled workers. In the simplest case the economy produces one good only, and any adjustment to a change in the skill composition of the labour force through immigration will be through wages. In more realistic cases, where the economy consists of multiple sectors, adjustment can also take place by changing the output mix [12].

Here, we would like to use some figure in order to explain better the cost-benefit analysis, from Migration Advisory Committee report.

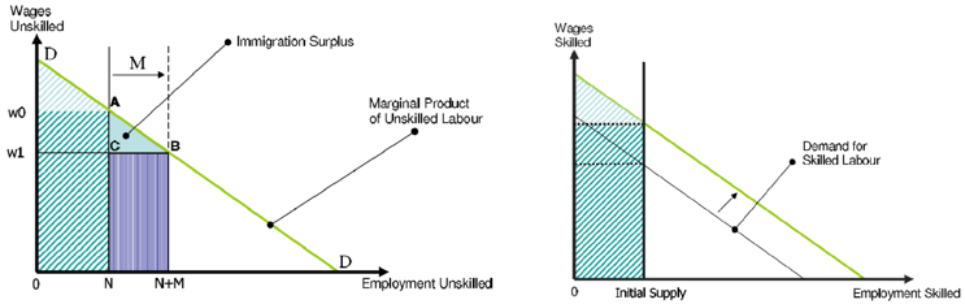

Figure 3: Cost Benefit Analysis - Migration Advisory Committee

b) Statistical analysis with regression models

As we said at the very beginning of the project, we can have a lot of information about countries just following the trend of immigration. Regarding the situation of *Figure* 4, we may say that Italy has less opportunities than UK, mostly for the latest years. But we can say this only in case of any policy change in these years.

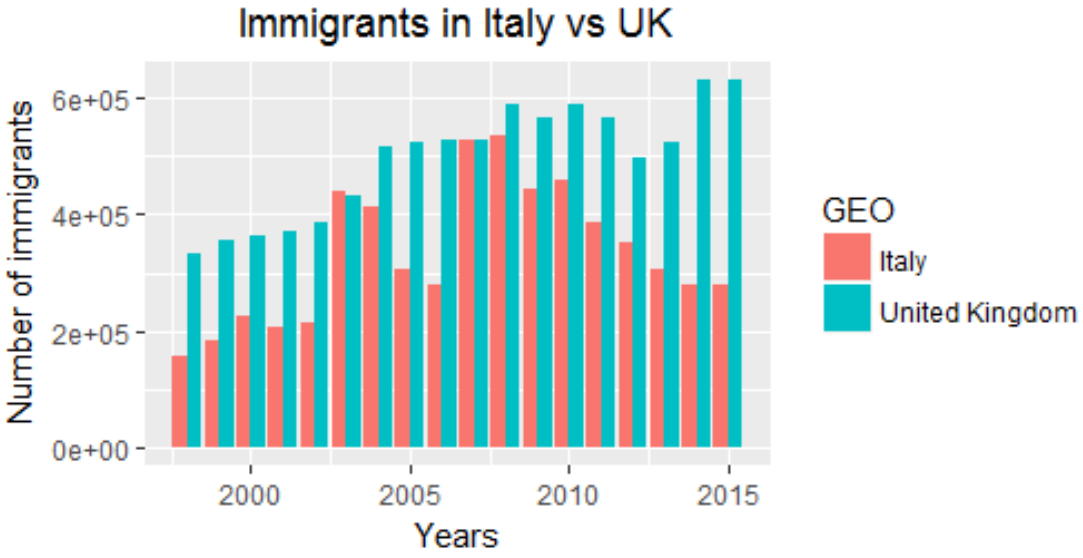

Figure 4: Immigrants IT vs UK

We can see more clearly the same result on *Figure* 5 (light blue=UK, purple=Italy) where we have two overlapping histograms (comparison also justified by the fact that the total population of the two countries is approximately the same). Even if the number of foreign people living in both countries is continuously increase, the total number of foreign who lives in Italy, always less than UK. It shows us that the conditions (social, economic, politic, etc.) are better in UK than in Italy.

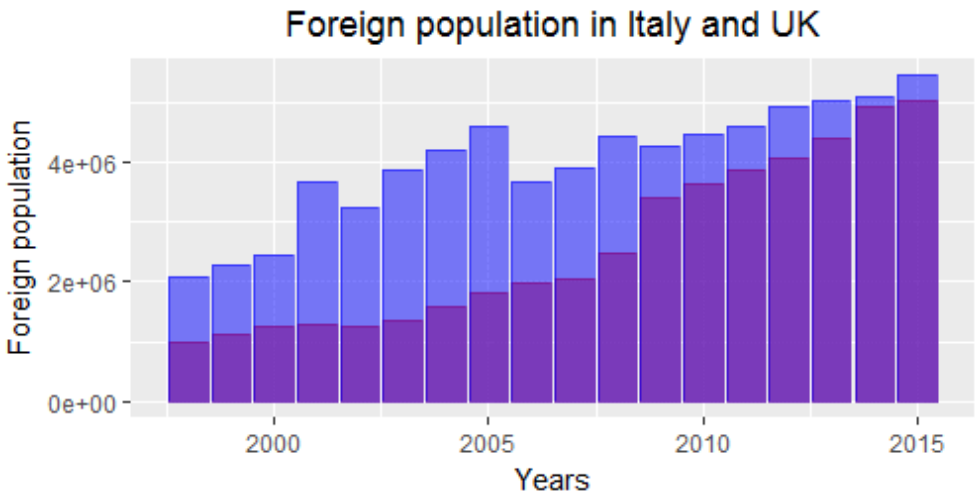

Figure 5: Foreign population in Italy and UK

We may say similar result to regarding the GDP per capita of both countries. On *Figure* 6, we can easily see that UK's welfare is higher than Italy's.

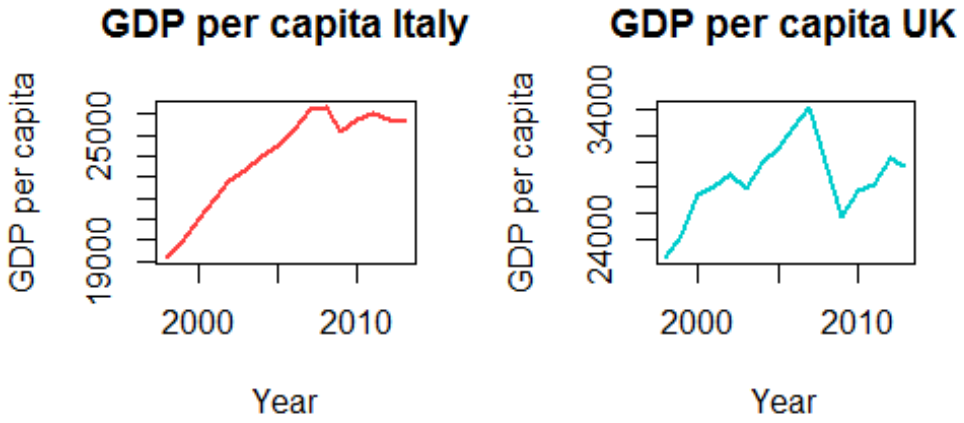

Figure 6: GDP per capita IT vs UK

Another way to look at the situation is checking the annual net earnings per person of both countries *Figure* 7. Italy, even if it has always an increasing trend, always stay under the UK's numbers. UK has the sensibility to changes in economy, maybe because of its bigger economy. But at the end, we can still go on to say that UK's welfare is higher than Italy's, regarding also to annual net earnings per person.

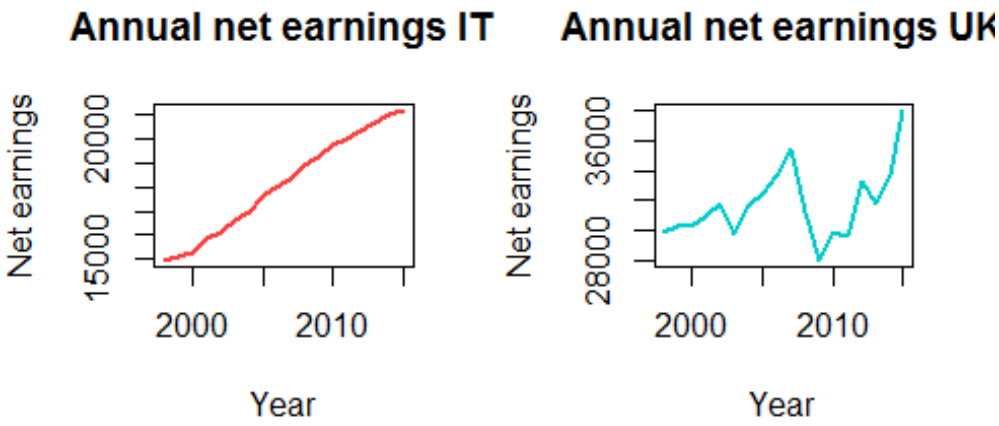

Figure 7: Annual net earnings IT vs UK

To understand different immigration policies, we would like add one more detail: employment rate. On *Figure* 8 we can see that UK employment rate is always higher than Italy. Both of the economies has lower employment rate after the crisis, and since the employment rate is a lagging indicator, following a recession, the employment rate tends not to grow to any significant extent until the remainder of the economy has recovered. This is because of the high risk and expense of creating jobs. But after this period again we can see an increasing trend which means again the welfare of these economies is increasing. By the end of 2013 the UK's employment rate was 72.1%. This is reasonably healthy, but still lags behind some of European countries [16].

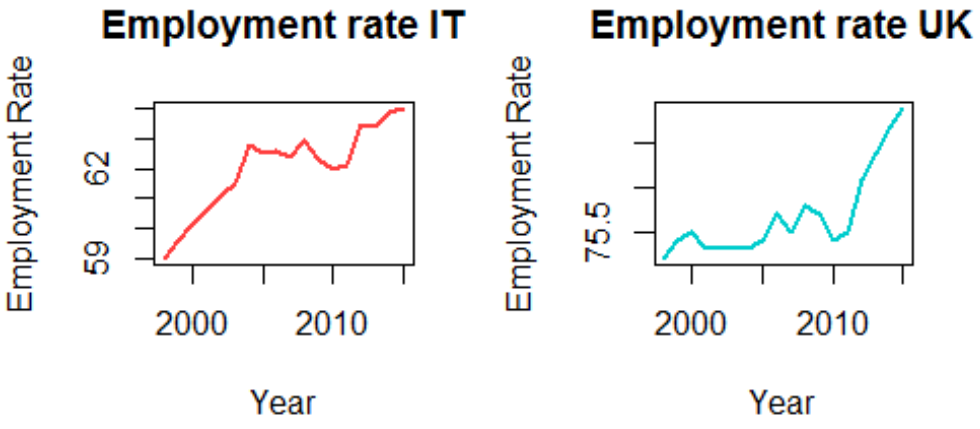

Figure 8: Employment rate IT vs UK

We didn't plot the series of values on the same plot because the scale of the values was different, so to better see the variations we preferred two different plot side by side.

Given this introduction about the situation of immigrants in the two considered countries we can proceed with the regression analysis. As said before, we created two different models for each country. We present first the models for the Italian case.

```
Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  4.84e+01   2.39e+00   20.26    9e-12 ***
Imm         -1.17e-06   2.39e-06   -0.49    0.634
AnnNetEarn   4.15e-04   1.31e-04    3.15    0.007 **
GDPpers      2.72e-04   1.82e-04    1.49    0.157
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.67 on 14 degrees of freedom
Multiple R-squared:  0.823,     Adjusted R-squared:  0.785
F-statistic: 21.7 on 3 and 14 DF,  p-value: 1.56e-05
```

Figure 9: Model with Employment rate as outcome

As we can see from the table, this model explains a portion of the variance in the data equal to 0,785. There is just one significant variable, which is the Annual net earning that have a positive impact on the Employment rate. So, we cannot find an impact of the immigrants on the employment rate. The second model has got as outcome the GDP per capita.

```
Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) -1.53e+04   1.75e+04   -0.88  0.39509
Imm          9.23e-03   2.18e-03    4.24  0.00083 ***
AnnNetEarn   2.65e-01   2.24e-01    1.18  0.25660
EmpRate      5.06e+02   3.39e+02    1.49  0.15726
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 914 on 14 degrees of freedom
Multiple R-squared:  0.855,     Adjusted R-squared:  0.824
F-statistic: 27.5 on 3 and 14 DF,  p-value: 3.99e-06
```

Figure 10: Model with GDP as outcome

In this model we have an high R-squared equal to 0,824 and we can noticed that the immigrants have a positive effect on the GDP per capita.

Now we can show the results of the models for the UK case.

```
Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  7.22e+01   1.02e+00   70.70   <2e-16 ***
Imm          2.97e-06   8.62e-07    3.45   0.0039 **
AnnNetEarn   1.44e-04   3.92e-05    3.67   0.0025 **
GDPpers     -8.91e-05   3.55e-05   -2.51   0.0250 *
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.307 on 14 degrees of freedom
Multiple R-squared:  0.699,     Adjusted R-squared:  0.634
F-statistic: 10.8 on 3 and 14 DF,  p-value: 0.000609
```

Figure 11: Model with Employment as outcome

As we can see from the table, the model explains 0,634 of the variance in the data and all the variables are significant. There is a positive effect of the immigrants on the employment rate, this means that if we increase the number of immigrants by one unit and keep the other variable constant, the employment rate has a small increase indicated by immigrant's coefficient. In the second model with GDP per capita as outcome, we obtained the following results.

```
Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  2.56e+05   9.94e+04    2.58    0.022 *
Imm          1.53e-02   6.08e-03    2.51    0.025 *
AnnNetEarn   8.88e-01   2.48e-01    3.58    0.003 **
EmpRate     -3.48e+03   1.39e+03   -2.51    0.025 *
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1920 on 14 degrees of freedom
Multiple R-squared:  0.593,     Adjusted R-squared:  0.506
F-statistic:  6.8 on 3 and 14 DF,  p-value: 0.00466
```

Figure 12: Model with GDP per capita as outcome

This model doesn't explain a high portion of the variance in the data and the variables are all significant but not at a high level since the p-values are not smaller than 0.001. So there is probably a weak relation between our variables and the GDP per capita.

We notice some differences between the results for the Italian case and for the UK case, but in general we can conclude that all these models (*Annex B*) are not so informative for our purpose, they seem to show a possible correlation between the immigrant flows and the labour market but this is not enough to provide accurate information.

c) Time series approach

To proceed with this approach we considered our variables as time series and to costruct the model described before, first of all, we need to verify that the series are stationary, to be suitable for econometric modelling. Since the series of data weren't stationary, the data are made stationary by differentiating them; we obtained four series integrated of order 3. It should be noted that we have also converted our series to logs. After this, we used the augmented Dickey-Fuller test (ADF) to determine the stationary of a series and from the results we can see that the variables of the model became stationary after the differentiation procedure (*Annex C*). Now we have stationarity series so we want to test the cointegration between them, which means if there exists a long-run relationship. This is important to establish if there exists an impact of immigration on the host countrys labour market in the long run. Since the variables are integrated in the same order we could use the Johansen technique to test the cointegration. We chose this technique because its more suitable in models with more than two variables where it allows to determine the exact number of cointegrating vectors and to avoid the two-step evaluation.

Applying the test on the variables for the Italian case and the UK case we obtained the following results:

```
######################
# Johansen-Procedure #
######################

Test type: trace statistic , with linear trend

Eigenvalues (lambda):
[1] 0.971 0.808 0.531

Values of teststatistic and critical values of test:

          test 10pct  5pct 1pct
r <= 2 |  9.83   6.5  8.18 11.6
r <= 1 | 31.30  15.7 17.95 23.5
r = 0  | 77.54  28.7 31.52 37.2
```

Figure 13: Johansen method for Italian case

```
######################
# Johansen-Procedure #
######################

Test type: trace statistic , with linear trend

Eigenvalues (lambda):
[1] 0.99999997 0.97265505 0.04133103

Values of teststatistic and critical values of test:

           test 10pct  5pct  1pct
r <= 2 | 12.02  6.50  8.18 11.65
r <= 1 |  36.41 15.66 17.95 23.52
r = 0  | 209.04 28.71 31.52 37.22
```

Figure 14: Johansen method for UK case

Interpreting these results, we could say that in both cases we have cointegration, because the test values are greater than a confidence level's value (10%, 5%, 1%) written in the other columns of the tables, so we have 2 cointegrating vectors. The existence of cointegration relationships enabled the estimation of a vector error correction model (VECM), but we cannot extract information about the impact of immigration on the labour market. A possibility is to apply a structural error correction and create a structural vector error correction model (SVEC) in order to find if there is a short term impact of immigration on the labour market.

8. Conclusions

This project provides a first analysis of the way immigration may affect labour market of Italy and UK. Our aim is trying to understand the different immigration policies of these countries. We commence by reviewing and discussing the theoretical background. Later we go on with a cost-benefit analysis of immigration for the host country. And finally we apply a statistical analysis with regression models and time series analysis that we think we can find some relationship between variables. We couldn't find any remarkable relationship between the number of immigrants and the economic outcome. But thanks to our analysis, we may say that there is more pressure of immigration on the UK than on Italy. Even if we couldn't see any negative effects of immigration on the UK economy, we could see that the UK is receiving more immigrants than Italy to may be a reason to for Brexit. We can align some difficulties about the very nature of the subjects as below. These are all what we were discussing during the research and what we investigate meanwhile we were reading the literature about the subject. First of all, the immigration affects the host country in a multitude of different ways. Some economists have investigated some of these channels, but many others have not been explored, or have sometimes not even been identified. Moreover, some

of the cultural and political effects of immigration may have on host countries are not measurable or quantifiable. Thus, there are large gaps in our understanding of the way immigration affects the host country. Also, there is no unifying framework, or model, that produces answers to all the questions we may want to pose.

Secondly, a small progress on measuring the effects immigration has on the labour market and on other key areas in the host country is difficult, very slow, and much related to the quality of available data sources. The key difficulty for the estimation of the effects of immigration relates to the construction of a counterfactual situation: whenever immigration occurs we always observe how the labour market of the receiving country changes through immigration; however, we do not observe how the labour market would change in the absence of immigration. The notions of migration, globalisation, being cosmopolitan...vs are the major, the significant values of our century. On the other hand, we start to see counter politics in some of the most emigrant countries. we really would like investigate some relationship in order to understand this trend- which seems to us not belongs to this century. We hope that our investigation is a first step in the analysis of this important issue for a new global generation. We would like to draw attention to many of the weaknesses in the available data and conceptual problems in the empirical analysis all of which should urge caution before drawing strong conclusions.

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Appendix

Annex A

Scopus results

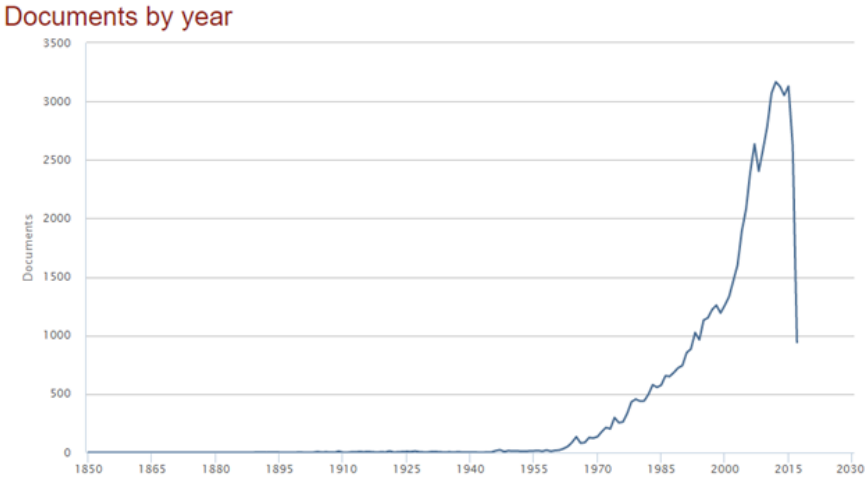

Figure 15: Documents about immigration by year - Scopus

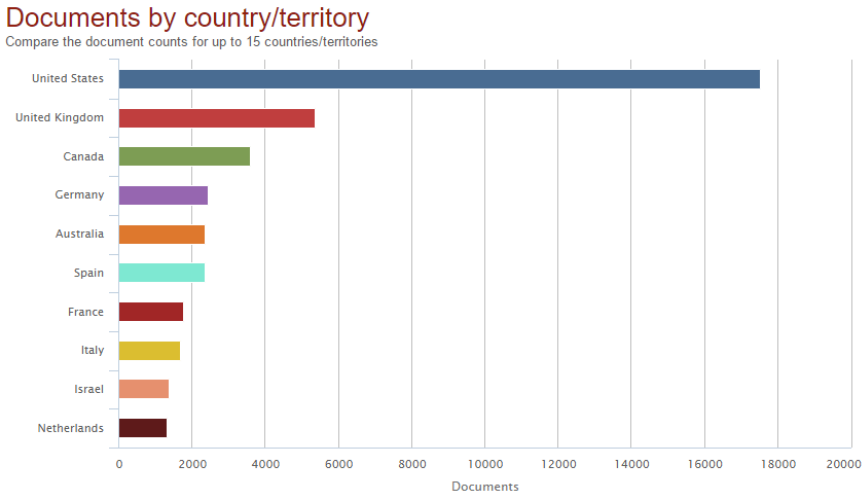

Figure 16: Documents about immigration by country - Scopus

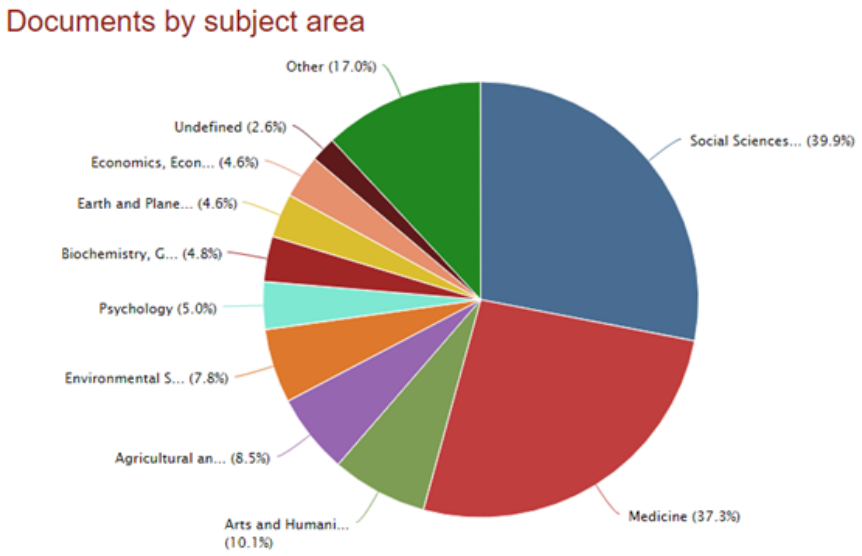

Figure 17: Documents about immigration by subject - Scopus

Annex B

Specification tests for the multiple regression models

After the estimation of the multiple regression models we have tested that all the hypothesis at the base of the model are satisfied. So we used a t-test to verify that the mean of the residuals is not significantly different from 0 and with the test of Shapiro Wilk we checked the normal distribution of the residuals. Furthermore we have controlled the homoscedasticity and the absence of correlation with the Breusch-Pagan test and the Durbin-Watson test respectively. For simplicity, since we have tested four models, these results are not reported here.

Annex C

Stationarity test for the time series model

As we can see from the following table about the variables considered for the Italian case, after the differentiation the series are stationaries [2].

[2]More results available in the code

```
        Augmented Dickey-Fuller Test

data:  dlearn_it
Dickey-Fuller = -4, Lag order = 2,
p-value = 0.04
alternative hypothesis: stationary
```

Figure 18: Stationarity of Earnings

```
        Augmented Dickey-Fuller Test

data:  dlim_it
Dickey-Fuller = -5, Lag order = 2,
p-value = 0.01
alternative hypothesis: stationary
```

Figure 19: Stationarity of Immigrants

```
        Augmented Dickey-Fuller Test

data:  dlemp_it
Dickey-Fuller = -5, Lag order = 2,
p-value = 0.01
alternative hypothesis: stationary
```

Figure 20: Stationarity of Employment

```
        Augmented Dickey-Fuller Test

data:  dlgdp_it
Dickey-Fuller = -4, Lag order = 2,
p-value = 0.03
alternative hypothesis: stationary
```

Figure 21: Stationarity of GDP