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School of Economics and Management

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The Healthy Immigrant Effect (HIE) in the UK.

A study on health inequality between immigrant and native-born workers for 2009-2013.

Manuel Serrano Alarcón

eut14mse@student.lu.se

Abstract: *The so-called "Healthy Immigrant Effect" (HIE) is based on two complementary hypotheses: i) immigrants who recently arrived to a new country present a better health than the native-born population with similar socio-demographic characteristics; ii) immigrant´s health deteriorates faster than that of the native-born and converges towards native-born levels with the years lived in the host country. This phenomenon has been widely studied for working immigrants in countries who have traditionally received large flows of labour migration as Australia, Canada and the US. The aim of this paper is to study the possible existence of this HIE in the UK, a country which has recently experienced large figures of net labour immigration. For doing so, I use the United Kingdom Household Longitudinal Survey (UKHLS) 2009-2013. With this dataset I find that immigrants working in the UK, both females and males, report a better health status than their native counterparts, and that these differences cannot be entirely explained by observable characteristics. The only group of immigrants who does not show a significantly better self-reported health than that of the native-born population was immigrants born in Developing Asia. In addition, the health distribution of immigrants converges towards that of the native-born workers during the period of analysis. This was mainly led by a faster deterioration in the health of immigrants coming from developing countries, in particular females who recently arrived to the UK.*

Key words: Healthy Immigrant Effect, inequality, self-reported health, immigration, native-born

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1-INTRODUCTION

The number of foreign-born population living in the UK has dramatically risen from around 3.8 million in 1993 to 7.8 million in 2013. (Rienzo and Vargas-Silva, 2014). This originates some challenges in terms of integration of the newcomers in the British society. Actually, immigration and its pressure on jobs and public services has been one of the main topics in the 2015 presidential election campaign, with the main parties arguing that immigration figures have to be cut down to a different extent.[1]

One key element of the immigrant´s integration has to do with health and healthcare. Immigrants might have different health problems than the native population. If they are in worse health than their native counterparts they may cause an additional pressure on public health services, which can make national taxpayers to be reluctant to allow further immigration. On the contrary, if they are shown to be in better health than the native-born, that may relax the anti-migration argument that says that immigrants abuse healthcare and other related public services. As a consequence, the health of immigrants and its evolution compared to that of natives seems relevant for the public health authorities and the population as a whole.

In that sense, there is a growing body of literature who has studied the inequalities in health outcomes between immigrants and natives. Some of these studies have found a phenomenon known as "The Healthy Immigrant Effect (HIE)". The HIE is based in two complementary hypothesis: i) immigrants recently arrived to a new country present better health than the native-born population with similar socio-demographic characteristics; ii) immigrant´s health deteriorates faster than that of the native-born and converges towards native-born levels with the years lived in the host country.

This phenomenon has been mainly proved in countries that have traditionally received large flows of working immigrants such as Australia, Canada and the US (Biddle et al, 2007; McDonald et al, 2005, Antecol and Bedard, 2005). Actually, the HIE hypothesis can be thought to be valid only for working immigrants (i.e: migrants who move because of work-related reasons). Theoretical explanations for immigrants arriving healthier to the host country are based on models which show how immigrants self-select positively on skills and health when they decide to migrate to work in another country. Then, the HIE would not

[1] The immigration pledges of the different UK parties can be found here http://www.bbc.com/news/election/2015/manifesto-guide

be valid for asylum-seeker or refugees who have emigrated forced by extreme conditions in their host country (like war or political persecution) and not by work-related reasons.

In that sense, the UK is a country who has seen their number of labour immigrants dramatically increased during the last decades. Furthermore, asylum-seekers only represent a small share of the total immigrant population[2]. Therefore the UK seems like a potential candidate where the so-called Healthy Immigrant Effect may occur.

Evidence in the UK about the HIE is quite scarce and limited. There are some studies who support the existence of a HIE (Kenney and McDonald 2005, Wadsworth 2012) but they suffer from some limitations. First of all, due to the relative small size of their samples, they normally treat immigrants as a homogenous group and do not distinguish by gender, country of origin or reason for migration. Secondly, their samples are relatively old, and as a consequence, they do not capture the large waves of labour migration that have occurred in the last 15-20 years. Lastly, like most of the HIE studies also outside the UK, they mainly rely on cross-sectional samples which are quite limited in order to study the evolution of health of the immigrants after arrival, due to cohort effects.

In this context, this paper aims to overcome some of the limitations above described of the UK studies, shedding some light on the current inequalities in health between immigrants and natives and testing for the existence of a HIE in the country. For doing so, I use the UK Household Longitudinal Study; a large longitudinal household survey representative of the UK population. This allows me to study the current inequalities in health outcomes between natives and immigrants by gender and region of birth; and to check to what extent these inequalities are explained by observable characteristics. Furthermore, I follow the same individuals over time to study how the health of the different subgroups of immigrants varies with respect to that of the native-born. This way I can avoid any potential bias caused by cohort effects. Lastly, regarding methodology, the paper relies on binomial and multinomial logistic models, using self-reported health status as the main measure of health.

[2] A description of the immigration in the UK during the last decades can be found in Section 4

2-THEORETICAL DISCUSSION

As pointed out before, the Healthy Immigrant Effect (HIE) can be divided into two hypothesis:

a) Immigrants, on arrival, are healthier than the native-born population.
b) Immigrant's health deteriorates with the length of the stay in the host country and converges to native-born levels.

In this section I will provide a theoretical framework based on the previous literature that can help us to understand the possible explanations behind these two hypothesis.

a) "Immigrants, on arrival, are healthier than the native-born population"

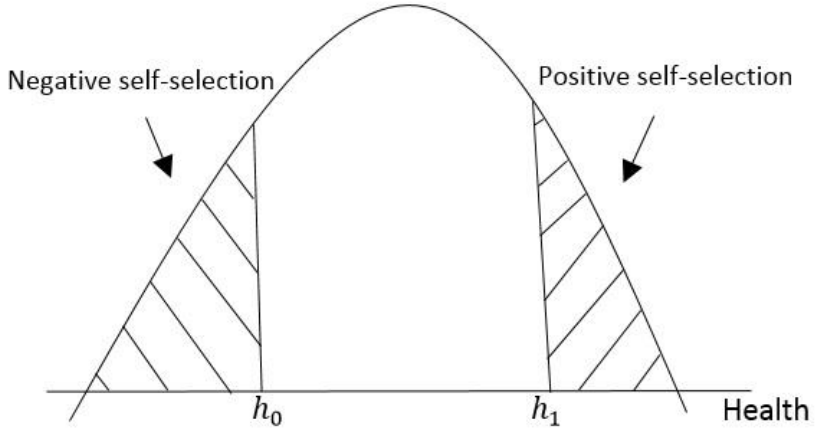
(a.1) Immigrant self-selection

At first, since immigrants arriving to a high developed country like the UK, will come, on average, from less developed countries; we may think that they will have poorer health than the average UK population because the average health level in the source country is expected to be lower. However, immigrants from a country are not a representative sample of the average population. On the contrary, immigration is expected to be led by a self-selection process.

Self-selection occurs when there is a deterministic process to select who migrates and who does not. That means that the decision of migration is non-random and it is related with the characteristics of the individuals. Then, the group of immigrants will have different characteristics than the average population of the source country. As we know, there are many factors that determine whether a person decides to migrate or not, therefore self-selection seems likely to happen (Borjas, 1994).

In our case, if self-selection on health occurs, immigrants will have different health on average than the source country population. This is graphically reflected in Figure 1. With positive self-selection, immigrants will belong to the right side of the health distribution (Health$>h_1$); while they will come from the left side of the distribution if negative self-selection on health occurs. (Health$<h_0$).

Figure 1- HEALTH DISTRIBUTION IN THE HOST COUNTRY



There exist several theoretical models to explain the selection bias in the immigration process. Maybe, the two more well-known are Chiswick (1978) and Borjas (1994) (Bodvarsson and Van den Berg, 2013). Chiswick (1978) shows that immigrants self-select positively on skills and motivation. It also shows that higher migration costs (i.e: long-distance transportation, visa costs, etc.) are related with a selectivity towards individuals who will potentially earn more in the host country, (i.e: high skilled and high-educated immigrants). Since education and health will be positively related, we can expect these individuals to be in the right side of the health distribution.

Unlike Chiswick, Borjas (1994) includes differences in the return to skills by country and the transferability of skills between countries. Within this framework, for positive self-selection on skills to happen, the skills must be transferable between countries and the skill premium in the host country must be greater than in the source country. If the destination country rewards more schooling, immigrants will come from the top of the education distribution of the sending country. However, immigrants will be negatively selected on skills if the earnings distribution is more equal in the host country than in the source country.

Nevertheless, although education is expected to be positively related with health, none of the previous models addresses directly the issue of self-selection on health. Jasso et al (2004) present a simple theoretical framework where immigration decision is set as the difference between the gains and costs. They enter health in the model assuming that health enhances earnings capacity, which is consistent with health being an important part of human capital. Healthier individuals will also show a higher skill utilization since they will be more able to work more hours and will be more productive. Therefore, the model predicts that healthier

immigrants will gain more in the immigration process (enjoying a higher salary in the host country) and as a consequence immigrants will be positively selected on health.

The model also makes predictions regarding other determinants of migration. If the cost of immigration is higher, the minimum level of health to make the immigration benefits overcome the costs will be higher as well, keeping everything else constant. Hence, immigrants will be more positively selected on health. Note that all these models focus on immigrants who make a voluntary decision to migrate, and do not talk about immigrants who may be forced to migrate due to external causes like war or political persecution (asylum-seekers). Still, these models fit our study since I am mainly interested in working immigrants, for whom the HIE is expected to be found.

Another explanation for healthy immigrant self-selection emphasizes on the forward-looking behaviour of immigrants (Kennedy et al 2006). Individuals with forward-looking behaviour are those who have lower discount rates. That is, those who weight more on future benefits rather than short-term benefits. In this context, the decision of migrating can be seen as an investment (with current costs) that increases the future return of human capital. Therefore people who migrate will be more forward-looking, weighting more future returns than current costs. In the same way, those with forward-looking behavior will take choices emphasizing on future health at the expense of short-term rewards. For instance, we can think of an individual who manages to follow a healthy diet avoiding short-term unhealthy pleasures, like chocolate.

On the other hand, there are also arguments for expecting that immigrants can also come from the left side of the health distribution. It is reasonable to think that less healthy individuals will value the availability of good healthcare more. If that is the case, unhealthy individuals from source countries with bad healthcare will have a greater incentive to migrate than healthy immigrants, considering that the healthcare system in the host country will be better.

However, if these immigrants are having severe health problems, they might not be able to face the hard process of migration (e.g: limited mobility or other important physical health problems). Lastly, the case of immigrants coming from the left part of the health distribution may be true as well for asylum seekers. But as I discuss in Section 4, asylum seekers only form a small part of the UK immigrant population.

(a.2) Demand for immigrants in the host country.

The self-selection models only explain the supply side of the immigration process. Individuals who want to migrate to another country will not make it if the host country does not allow them to do it. In that sense, countries normally have policies regarding the characteristics of individuals who can get into the country: i.e.: skills, country of origin or family ties with current residents. (Borjas, 1994). This is normally controlled by the supply of visas.

For the case of the UK, this will only affect to immigrants coming from outside the European-Economic Area (EEA) since immigrants from EEA countries enjoy the principle of free movement of persons. The UK visa system for non-EEA individuals relies on a points-based system with five tiers. All the tiers allocate high value to the skills and education of the applicants. Most of the working immigrants are required to be sponsored by their prospective employer, which again will look for high skilled individuals.

Student's visa also selects on person's skills since students have to be first admitted in an UK university. Furthermore, there also exists visas for entrepreneurs and investors (Tier 1) with the requirement of having a minimum amount of incomes. Therefore "demanded" immigrants will be high educated and to a certain extent, they will have high incomes. Since health is positively related with income and education, immigrants coming under the points-based system are also expected to be healthy.[3]

Nevertheless, in this case, the demand for healthier immigrants will be explained by the demand for high skilled immigrants, not by a healthy immigrant demand itself. For the latter to happen there must be some kind of "health screening" mechanism by the host country. In principle, working visas do not require any health screening with the exception of visa applicants coming from countries with high prevalence of tuberculosis (TB) who will need to have a TB test[4]. But this program was only recently introduced in 2012.[5] Therefore it is not likely to affect our results.

[3] To get to know more about the visa system in the UK, you may visit the UK Border Agency website https://www.gov.uk/browse/visas-immigration/work-visas

[4] The list of countries of birth where a TB test is needed to enter the UK can be found here https://www.gov.uk/tb-test-visa/countries-where-you-need-a-tb-test-to-enter-the-uk

[5] https://www.gov.uk/government/publications/immigration-pre-entry-tuberculosis-testing

The other option will be if prospective employers who sponsor the visa carry out any health checks on which they decide whether sponsor that visa or not. According to the UK government employers can only ask successful candidates for a health check if a) it is a legal requirement (e.g. eye tests for drivers) or b) the jobs requires it (e.g: insurers demanding it); but employers must not discriminate by doing health checks to different groups of people. That is, they cannot target health checks only on immigrants. Then overall, it seems unlikely that there is any kind of "health screening" mechanism related within the visa system in the UK.

b) "Immigrant's health deteriorates with the length of the stay in the host country and converges to native-born levels"

Three hypothesis are aimed to explain the immigrant´s health trajectories upon arrival. Before developing them, I use, for illustrative purposes, a simple model of health production. Following Grossman (1972) I treat health as a stock of capital of health that depreciates over time in the absence of investments.

$$\Delta H_i = H_{i+t} - H_{i0} = I_i - \delta_t H_i$$

$$I_i(M_i;\ E_i, SE_i)$$

where H_{i0} is the stock of health on arrival, $H_{it}$is health on period t and M_i is medical care. Education,E_i, is assumed to improve the efficiency and the productivity of the inputs in the production of health. More educated individuals will be expected to search for better doctors and follow the advice of the doctors more closely. In the same way, a better socioeconomic status (SE_i) can enhance the health production. Individuals with a higher socioeconomic status will enjoy higher incomes which can be used to buy better health care or better food. Furthermore, they will tend to live in areas with better conditions and socialize with people who follow healthier habits.

δ_t is the depreciation rate during the period t. It can be thought of being a positive function of age and bad healthy habits (like smoking or alcohol consumption)

$$\delta_t = \alpha_i A + \beta_i B$$

Therefore the final health trajectory for individual i in period *t is:*

$$\Delta H_i = H_{i+t} - H_i = I_i(M_i;\ E_i, SE_i) \quad -(\alpha_i A_i + \beta_i B_i)H_i$$

Within this framework, the three hypothesis who may explain the health trajectories of immigrants are the following:

(b.1) Acculturation hypothesis

Immigrants may have had better or worse health habits in their country of origin prior to migration. If immigrants come from countries will poorer health habits, their health can be improved when assimilating the local habits. On the contrary, if immigrants have healthier habits regarding the diet, alcohol consumption or substance abuse on arrival; their health will deteriorate with the adoption of poorer health-related habits of the destination country ($\frac{\partial \Delta H_i}{\partial B_i} < 0$). In this case the evidence is rather limited to the increase of smoking rates between certain groups of immigrants with the years of migration (Bethel and Schenker 2005; Hawkins et al 2008).

(b.2) Worse Socioeconomic status

Immigrants arriving to a new country can be socioeconomically disadvantaged at the beginning. Employers may not recognize educational qualifications from other countries. As a consequence, immigrants can be forced to take lower-status jobs which can negatively affect their health, as discussed above. The Educational-Occupational mismatch of overeducated immigrants taking relatively lower-status jobs has been widely proved for several developed countries (Chiswick and Miller 2010, Friedberg 2000). The level of English language fluency can also be a barrier that keep immigrants out the high-status jobs. In that line, Shields and Price (2002) found English language speaking fluency to be an important determinant of occupational success between immigrants in the UK.

(b.3) Restricted access to healthcare

Inadequate legal entitlement to access healthcare can be a major barrier for immigrant´s healthcare. For the case of the UK, entitlement to free National Health Services (NHS) is available for all individuals living on a lawful basis. It does not require a minimum time period of residence in the country (Grove-White, 2014). Hence, on principle, legal immigrants should not face legal barriers to the use of healthcare.

On the contrary, these issues are normally more serious for undocumented immigrants. Many European countries have restricted their entitlement to health. In 2010, public primary and secondary care was available for undocumented immigrants in only five EU Member States (the Netherlands, France, Italy, Portugal, and Spain), not in the UK.

Nevertheless, although the survey used in the present analysis does not offer information about the legal status of immigrants, it is unlikely to think that undocumented immigrants will be part of it, since you must be part of an identified household to be surveyed. Furthermore, illegal immigrants will predictably be reluctant on participating in a survey funded by the government because of fear of being identified. Therefore, immigrants in this analysis are expected to be entitled to use the NHS under the same conditions than natives.

However, migrants might face other obstacles to access health care, in particular more recent immigrants. At the beginning or their stay, they might be ignorant of how the destination country health system works and where they have to attend in case of falling ill. This difficulties can be exacerbated if the immigrants do not possess good English language skills. Immigrants might face difficulties to communicate with the doctors and health care providers. Furthermore, they can find difficult to understand any written information such as medication instructions or preventive public health information (Chiswick, 2014). If this is the case their investment in health capital will be reduced $(\Delta I_i < 0)$due to lower medical care ($\Delta M_i < 0$)

3-LITERATURE REVIEW

There is a compelling body of evidence supporting the "Healthy Immigrant Effect" (HIE) in countries which have traditionally been net recipients of labour migration like the US, Canada or Australia. Kennedy et al (2006) studies this phenomenon for the three mentioned countries using pooled national cross-sectional individual datasets. They measure health by self-reported health status and self-reported chronic conditions. In the regression analysis, health status depends on demographic and socioeconomic characteristics. Their estimation results show that more recent immigrants (those who were residing in the country fewer than 10 years) were in better health than the native-born population across all the countries. In addition, their results are robust to the use the two health measures.

McDonald and Kennedy (2004) using a probit model, with self-reported chronic conditions as a measure of health, find that being an immigrant is also associated with a better health

status as compared to the native-born population. But the longer the immigrant stays in Canada, the more their health converges towards the level of the native-born population.

The same pattern, using the same health indicator, was found for Biddle et al (2007), but for the Australian population. In this case, the probability of immigrants reporting a chronic condition increased within the first 10-20 years of stay in Australia, and then became stable below native-born levels. Another paper, but for the US (Antecol and Bedard, 2006), uses as a measure of health not only the presence of health conditions, but also activity limitations and self-reported health status. Comparing the different health measures, immigrant´s health convergence towards native levels occurs faster for self-reported health than for the other measures. Lastly, one important new feature of this study is that they use a pooled cross-section for 1989-1996. This allows them to group immigrants into arrival cohorts to control by cohort effects. In that sense, results are consistent across all cohorts.

However, in other countries like Sweden the evidence point towards the opposite direction, suggesting that immigrants have a worse level of health than the native born. Iglesias et al (2003) found that women born in Finland, Southern European and refugees had higher risks of reporting a poor health status, than the native Swedes, after controlling for other socioeconomic variable. Taloyan et al (2008) found a similar pattern for Kurdish immigrants, who had higher odds of self-reporting a poor health and psychological distress.

In addition, Leao et al (2009) group migrants by length of stay and shows that recent immigrant (those who were living in Sweden fewer than 15 years) were more likely to report a poor health status than the native-born population. On the contrary, immigrants who were residing in the country longer than 15 years reported a similar health than the nationals. This results for Sweden contrary to the HIE hypothesis, might be influenced by refugees being a large share of the immigrant population. They may arrive to the country with worse health than natives due to negative factor like war or political prosecution. However, as stated in the introduction the HIE is more likely to happen within labour immigrants and therefore it will be expected to appear in countries with very large flows of this type of migration and relatively lower share of refuges, like US, Canada, Australia or the UK.

It is worth noting that one common shortcoming of the studies discussed so far is that they rely on cross-section samples. This does not allow to look at the health trajectories of the

same individuals over time. Therefore, the apparent health deterioration from immigrants with the years of stay in the country might be due to new immigrants being different (healthier) with respect to old immigrants[6].This is known as cohort effects and will be further discussed in Section 7.1.

To overcome this problem, Chiswick et al (2008) use the Longitudinal Survey of Immigrants to Australia (LSIA). Following the same immigrants along time, they show that there is a deterioration in the health status of immigrants three years after arrival. Besides, the author discusses several hypothesis to explain this phenomenon, (although does not show consistent evidence in favor of any of them): i) "regression to the mean" (i.e.: a statistical phenomenon which says that if a variable shows an extreme value in its first observation, it will tend to show a value closer to the average in the next observation), ii) change in the reference point (they show that deterioration is greater, although not significantly different, when coming from countries with lower life expectancy), iii) change in life style and health habits.

Another contribution of Chiswick et al (2008) is that it classifies immigrants by visa category. As a result, they show that self-reported health is higher among those immigrants selected on the basis of their potential for economic success (i.e: working immigrants) while it is worse for humanitarian immigrants. However, differences between visa types almost vanish once the human capital characteristics that influence visa category are taken into account. This suggest that the difference in health by visa category were explained by human capital differences. So visa category by itself, does not seem to matter (except for refugees) when other socioeconomic characteristics are taking into account. Therefore, for the case of Australia, there does not seem to be any particular health screening mechanism in the visa system, which could increases the "demand" of healthy immigrants.

Newbold (2009) also uses a Longitudinal Survey and distinguishes between three types of immigrants: economic immigrants, family reunification and refugees. He uses a proportional hazard model to estimate the probability of transitioning from good to poor health. A rapid decline in self-assessed, physical and mental health is shown for recent immigrants. Economic immigrants report the highest level of health status, whereas refugees report the lowest and a faster deterioration. This again reinforces the idea that there can be marked differences in health across types of immigrants. Furthermore, he argues that job status plays an important role to explain the rapid deterioration in health. Immigrants who were working

[6] I discuss the potential drawbacks of cross-section evidence more in detail in Section 7.1

were less likely to transition to poor health, and those with lower income presented higher odds or of transition to poor health. This implies that socioeconomic status is an important determinant of health transition.

Nevertheless, Chiswick et al (2008) and Newbold (2009) only use a sample of immigrants, and do not compare them with the native-born. Therefore, although immigrant´s health deteriorates, we cannot get to know whether it was converging towards native-born levels or not. It might be the case that native-born health deteriorates faster and immigrant´s health actually diverges from native-born levels as a consequence. Unlike them, So and Quan (2012) use a longer longitudinal study, including both the foreign-born and native-born population (Canada´s National Population Health Survey (NPHS) from 1994 to 2004). They use four binary indicators of health: self-reported health status, self-reported chronic condition, obesity and fair/poor Healthy Utility Index Mark 3. (HUI3)[7].

Regarding methodology, they estimate the probability of an individual reporting an improvement or a decline in health status by using a multinomial logistic regression, controlling for other socioeconomic characteristics determinants of health as well. Their results show that immigrants were more likely than the native-born to report both an improvement and a deterioration in HUI3, obesity and the presence of a chronic disease. Therefore, the paper does not support neither convergence nor divergence regarding towards native-born levels of health. It only says that immigrant´s health is more volatile than native-born health.

3.1- Empirical Evidence in the United Kingdom

Regarding the UK, there are few studies that look at the so-called Healthy Immigrant Effect. Keneddy and Mcdonald (2005) use the General Household Survey (GHS) from 2000-01 to 2004-05 and pooled cross section data from two waves (1999 and 2004) of the Health Survey of England (HSE). Overall, results show how immigrants report a better health compared to natives. Furthermore, they find evidence of a positive immigrant selection on education. However, education by itself cannot explain the health differences between immigrants and natives.

[7] HUI3 uses vision hearing, speech, ambulation, dexterity, emotion, cognition and pain to determine the health status of a person.

After controlling by education and other demographic variables, immigrants still present a lower incidence of chronic conditions. Therefore differences in health between immigrants and the native-born cannot be fully explained by differences in socioeconomic characteristics. However, this paper does not look at the health trajectories of the immigrants over time.

Wadsworth (2012) uses a pooled sample from the panel data of the British Household Panel Survey (BHPS), from the year 1991 onwards. By doing a random effects estimation, he shows that immigrants with less than ten years in the UK are less likely to report poor health, whereas that difference vanishes for long-term immigrants (more than 10 years in the UK).

One limitation of the paper is that the BHPS does not sample new households every year. Therefore, new immigrants who arrived to the UK in the last 25 years are not added to the sample, unless they come to live to a household who was included at the beginning of the survey. That implies that the sample of immigrants does not include the large new waves of working immigrants, and it is only representative from relative "old" immigrants (those who arrived to the UK prior to 1991). Furthermore due to the small size of the immigrant sample, the paper does not take into account immigrant´s country of origin.

Other studies have used other health indicators, and not self-reported health status. For instance, Averett et al (2012) use the Body Mass Index (BMY) to measure obesity with data from the BHPS in the years 2004 and 2006. Controlling for socioeconomic characteristics female immigrants have a BMI 2 points lower than natives. The effect for male immigrants, although it is of the same sign, is not significant. The variable that measures the years in only positive and significant for women, suggesting an increase in obesity for women with the time spent in the country. So, these findings support HIE for the case of obesity, but only for women.

Nevertheless, there are marked differences depending on the country of origin. For instance, results for women from India and Pakistan oppose the HIE hypothesis since they have 1.1 point percentage point higher BMI. One critique that can be made is that the sample of immigrants was composed only by 584 immigrants, representing 4.6 percent and 3.6 percent of the female sample and male sample respectively. Therefore after dividing the immigrant group by gender and by region of origin the subgroups samples are relatively small.

On the other hand, there is some evidence that opposes the HIE, showing that immigrants are disadvantaged in terms of health compared to natives for certain diseases. For instance,

studies in the UK and other European countries have shown that asylum seekers are more likely to suffer from mental health problems than the national population. They may have suffered persecution and other traumatic experiences in their country of origin which can affect to their mental health. These damaging effects can be exacerbated by certain policies like detention or dispersal in the country of arrival. (Health Protection Agency 2010).

Other diseases from which immigrants are particularly affected are infectious diseases like Tuberculosis and HIV. Registered data from England 1999-2009 shows that the vast majority of cases of tuberculosis diagnosed in children aged five years or younger, were from foreign-born[8]. South Asia and Sub-Saharan Africa immigrants are particularly affected reporting more than 80% of the cases within the immigrant group. Besides, according the Survey of Prevalent HIV Infections Diagnosed (SOPHID), from the new reported cases of HIV in South England in 2008, around two thirds were reported by immigrants.

The higher prevalence of these infectious diseases between migrants may be a consequence of higher exposure in their country of origin, or to friends and family from the same country of origin. Still, these diseases are marginally prevalent in the UK, compared to other more prevalent diseases. Hence, the higher prevalence of these marginal diseases is not likely to affect the overall health of the immigrant population[9] (Health Protection Agency 2010). In addition, this evidence is only based on a descriptive analysis and it does not take into account other factors, like demography or socioeconomic variables that might be driving these differences.

For the case of cancer, Wild et al (2006) shows that there are wide differences in age-standardised cancer mortality rates depending on the country of origin. Only women born in Ireland and men born in West Africa presented higher rates, whereas men and women born in East Africa, South Asia and China and women born in Eastern Europe and West Indies reported lower rates than the native-born. However, these results must be taken with caption and they cannot be interpreted as immigrants having a lower or higher prevalence of

[8] Tuberculosis infection in children aged five years or younger is a good indicator of TB transmission within families (Health Protection Agency, 2010)

[9] 7,892 cases of tuberculosis and 6000 cases of HIV were notified in the UK in 2013 which corresponds to an incidence of 12.3 per 100,000 and 10 per 100,000 population respectively (Public Health England 2013)

cancer since we are dealing with mortality and not with morbidity data. That is, the fact that natives are more likely to die of cancer does not necessarily mean that they are also more likely to have cancer.

Finally, other studies have looked at the health related behavior. Hawkins et al (2008) analyses smoking and alcohol during pregnancy and breast feeding after birth for British mothers and mothers from ethnic minority groups. For immigrants, the likelihood of smoking during pregnancy increases by 31%, and the likelihood of having breast- fed at least four months decreases by 5%, after adjusting for socioeconomic characteristics. Association between length of stay and alcohol consumption was not found though. These findings support the acculturation hypothesis which says that immigrants tend to replicate the unhealthy behaviors of the native-born with the length of stay

Summing up, there is wide evidence supporting of a HIE in countries that have traditionally been receptors of working immigrants like Australia, Canada or the US. This evidence shows that economic migrants normally present a better health status on arrival as compared to natives, and their health deteriorates with the length of stay. On the contrary, other type of immigrants have been shown to have worse health status than the native-born (asylum-seekers and refugees) across different countries. Nevertheless, most part of the studies supporting the HIE rely on cross-sectional comparisons. This may provoke findings that support the second hypothesis of the HIE (i.e: immigrant´s health deteriorate and converges towards native-born levels) to be driven by new waves of immigrants being healthier than old waves of immigrants (cohort effects).

In particular for the UK, there is not a study who follows the same individuals through time and studies the health variation within the same individuals. Furthermore, immigrant's samples are old and do not capture the new waves of migration. In addition, these samples have normally a relative small size which does not allow to study the health inequalities by gender and region of birth. In this context, this paper aims to study the Healthy Immigrant Effect in the UK. For doing so, I will use a recent dataset large enough to study the health inequalities between natives and immigrants by region of birth. Furthermore, I will take advantage of the longitudinal format of the dataset to follow the same individuals over time and check the health deterioration and convergence hypothesis. Doing this I will try to overcome the above discussed shortcomings of the cross-section studies.

4- MIGRATION IN THE IN THE UK AT A GLANCE

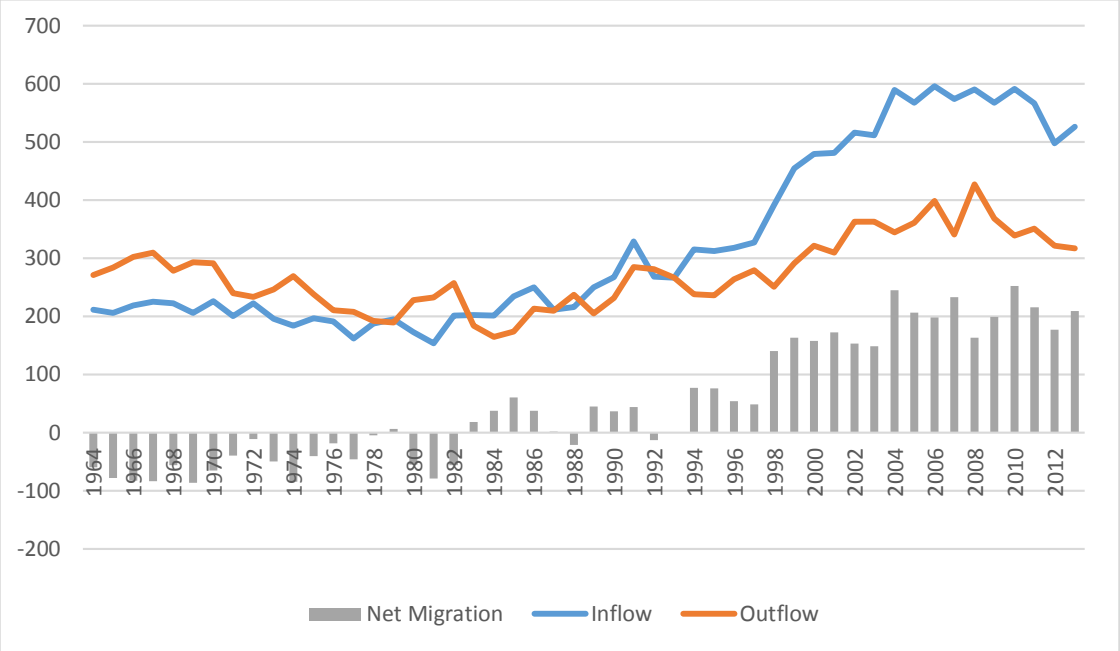
Foreign-born population in the UK has increased from 3.8 million in 1993 to 7.8 million in 2013. (Rienzo and Vargas-Silva, 2014). This sharp increase was due to the fact that the UK has repeatedly been a net recipient of immigrants since 1994, as we can notice by looking at Figure 2. Prior to that, during the 60s and 70s, immigration flows were fluctuating around 200,000 per years. That, jointly with higher emigration flows to other English-Speaking countries like Australia or Canada, made the UK to present a negative net migration.

Then, immigration flows started to slightly increase during the 80s. Afterwards, since 1997, they dramatically went up until reaching a peak of almost 600,000 immigrants by 2006. That rise was led by non-EU immigrants whose annual number went up from below 200,000 in the 90s to over 300,000 in the following decade (ONS, Long-Term Migration Statistics).

On the other hand, the annual number of immigrants coming from EU countries was set below 100,000 immigrants prior to 2004. In that year, 10 new countries joined the EU, and therefore its citizens were entitlement to free movement within the EU[10]. As a consequence, immigration from those countries dramatically rose leading EU migration inflows to the UK to reach a peak of 200,000 by 2008. Meanwhile, emigration rates increased since the 80s as well, but not up to the levels of immigration. Consequently, the UK has received a flow of net migration of around 200,000 per year during the last 10 years.

[10] The 10 new countries that joined the EU in the enlargement of 2004 were: Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia

Figure 2- MIGRATION FLOWS FROM AND TO THE UK

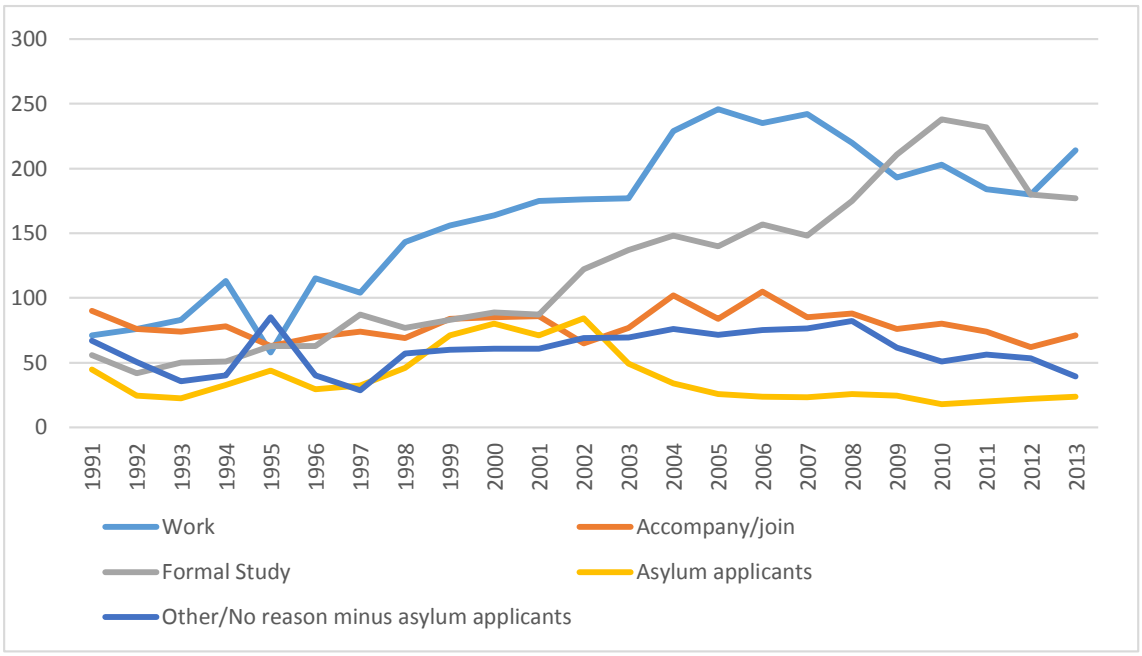


Source: ONS, Long-Term International Migration. Note that Britons coming back to the UK are also included in the inflow figures. The annual amount of Britons coming to the UK has remained constant around 100,000 per year for 1991-2013.

The evolution of immigration by reason for migration can be found in Figure 3. Data from the International Passenger Survey (IPS) of the Office for National Statistics (ONS) classifies immigrants according to their main "reason for migration": work, study, join family or other/no reason. However, IPS does not include asylum-seeker data. Then, following Blinder (2014) I assume that asylum-seekers are found within those labelled as "other/no reason for migration" by the IPS. Next, I have matched administrative data about asylum-applicants from the Home Office and subtracted it from "other/no reason for migration".

As we can see, work has been the most common reason for immigration to the UK during the recent decades, excluding the years 2009-2011 when working immigrants were overcome by student immigrants. This last group more than doubled its size in the last decade, although it has suffered a slight decrease in the last three years. Other important group of immigrants is formed by those declaring that to join their family members. The inflow of this type of migrants has remained relatively constant, below 100,000 (except in 2004 and 2006) during the last two decades.

Figure 3- IMMIGRATION TO THE UK BY REASON FOR MIGRATION



Source: ONS, Long-Term International Migration Table 2.04 & Home Office UK, Immigration Statistics, July to September 2014

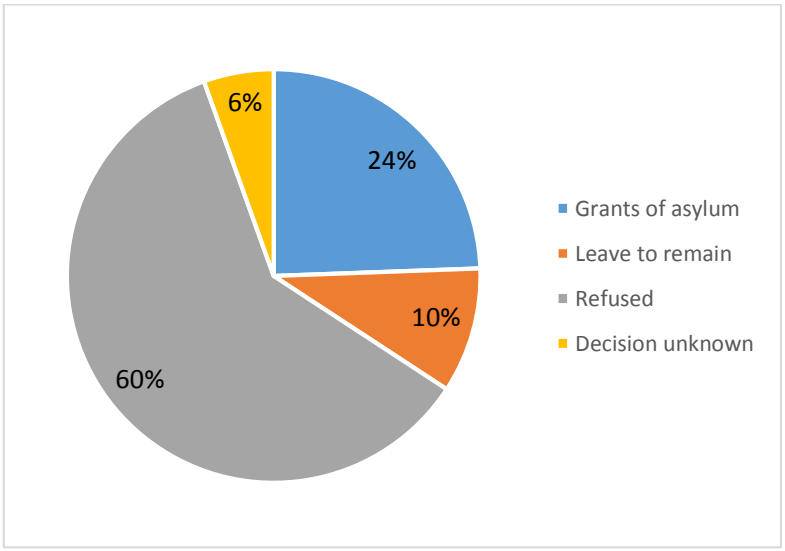
Regarding asylum applicants, they reached a record high of 84 thousand in the year 2002. However this number has been reduced by more than a third since 2005. Consequently, they represent less than 5% of the total migration inflow occurred in the last ten years. It is worth noting that being an asylum applicant does not guarantee you to get the refugee status and the entitlement to stay in the country. Actually, according to the data presented in Figure 4, from all the asylum applicants in the period 2004-2012, 60% were rejected their refugee status and encouraged to leave the country, whereas 34% were granted refugee status or given leave to remain and 6% are still waiting for a decision. In addition, in the year 2012/2013 50% of asylum cases were concluded within 6 months[11].

All this implies that an important part of the asylum applicants shown in Figure 3, should not be considered as long-term immigrants[12]. Therefore, data from Figure 3 should be taken only as an upper-bound of immigrants entering in the country as asylum-seekers, and in any case as a figure for refugees. Hence, although reason for migration is not included in the dataset that I use for the econometric analysis, I do not expect asylum-seekers and refugees to be an important part of the immigrant population in the UK. On the contrary, labour

[11] "A case is concluded if the individual is granted leave to remain in the UK, is removed from the UK or the individual withdraws their asylum claim" (Asylum Performance Framework Measures, Home Office)
[12] "A long-term migrant is a person who moves to a country other than that of his or her usual residence for a period of at least a year (12 months)" (0ECD)

immigrants will be the most important group of immigrants since work has traditionally been the main reason for immigration to the UK, as reflected in Figure 3.

Figure 4 - OUTCOME OF ASYLUM APPLICATIONS (2004-2012), AS AT MAY 2013



Source: Home Office UK, Immigration Statistics, July to September 2013 Table as_06

Lastly, we can look at the stock of foreign-born immigrants by country and region of origin.[13] From about 7 millions of immigrants living in the UK between July 2009 and June 2010, 37% were European and 63% non-Europeans (Figure 5). South Asia is the most common region of origin (23%), with Indians representing almost a half of this group. Furthermore within Europe, 21% of immigrants come from the EU-15 whereas 16% come from the rest of the European countries. The relatively high percentage of the latter group is led by the new EU members, as explained above. Sub-Saharan Africa also represents 16% of the foreign-born population with South Africa and Nigeria being the most important countries in this group.

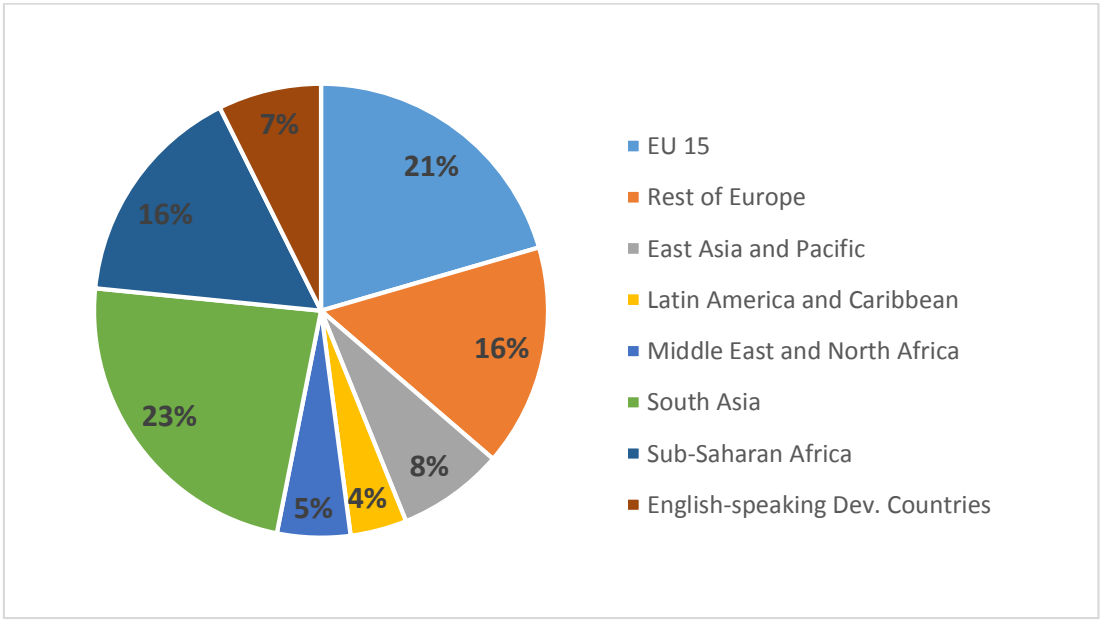
The rest of the regions represent less than 10% of the total foreign-born population each: East Asia and Pacific (8%), English-speaking Developed Countries (7%), Middle East and North Africa (5%) Latin America and Caribbean (4%). The name of the countries included in every region can be found in Table 12 (Appendix).

[13] I have chosen data about the stock of foreign-born for the year 2009/2010 because this is the year when my sample under analysis starts; and where I will focus the most part of my econometric analysis. (See Section 5 to know more about my sample)

In terms of countries, we can see that India and Poland are the most popular countries of origin with more of half a million of residents in the UK from each country (Table 1). Both correspond to relatively recent immigration flows; Poland was the first sending country for the period 2004-2008 while India was it during the period 2009-2011[14]. The rest of the countries who make it in the top ten of foreign-born residents in the UK are, by order, Pakistan, Ireland, Germany, South Africa, United States, Bangladesh, Nigeria and Jamaica.

Summing up, we can say that the UK has been receiving relatively large flows of net immigration during the last two decades. As a consequence, the number of foreign-born living in the country more than doubled during that period. Immigration has been traditionally driven by working migrants, although student immigration dramatically increased since the beginning of the century. On the other hand, asylum-seekers have represented a decreasing share of immigrants during the last years. Regarding source of migration, South Asia and European Union countries are the most important countries of origin between the foreign-born population living in the UK.

Figure 5- FOREIGN-BORN POPULATION IN THE UK 2009-2010 BY REGION OF BIRTH



Source: ONS, Population by country of birth and nationality July 2009 to June 2010. These figures are based on information about the 60 most important sending countries, which represent 88% of the total foreign-born population in the UK

[14] http://www.neighbourhood.statistics.gov.uk/HTMLDocs/dvc123/index.html

Table 1- 10 MOST IMPORTANT COUNTRIES OF ORIGIN

	Country	Thousands	% of foreign-born
1	**India**	678	9.73%
2	**Poland**	520	7.46%
3	**Pakistan**	421	6.04%
4	**Ireland**	398	5.71%
5	**Germany**	292	4.19%
6	**South Africa**	225	3.23%
7	**United States**	201	2.88%
8	**Bangladesh**	196	2.81%
9	**Nigeria**	157	2.25%
10	**Jamaica**	148	2.12%
	Total foreign born	**6971**	

Source: ONS, Population by country o birth and nationality July 2009 to June 2010

5- DATA AND ECONOMETRIC MODEL

The dataset I use for the analysis is the UK Household Longitudinal Study (UKHLS), a longitudinal survey of the members of around 40000 households in the United Kingdom. It follows the same respondents from 2009/2010 (Wave 1) to 2012/2013 (Wave 4). This dataset has not been used to study the health of immigrants so far to the best of my knowledge. One advantage of this survey is that it includes an Ethnic Minority Boost Sample, which allows me to have more observations of immigrants and to distinguish between regions of birth. However, this makes the immigrant group overrepresented in the survey. Furthermore, response rates differ between subgroups of the sample. As a consequence, sample weights are used in the descriptive and estimation analyses to make the analysis representative of the UK population. (Knies 2014)[15]

I have restricted my final sample to the working population in the UK since, as discussed before, the HIE is more likely to happen between working immigrants. As a consequence, I have dropped out those individuals who are out of the job market (students, retired or taking care of the family/house). Then, the final sample includes 29,970 individuals who were between 16 and 60 years old in the Wave 1. From them, 15,105 (50.4%) are females and 14,865 (49.6%) are males. The number of immigrants is 5,837, accounting for 21% of the respondents.

[15] All the weights have been chosen following the instructions of the survey´s Manual (Knies 2014)

The first part of the quantitative analysis, which aims to study the current health inequalities, carries out a cross-section analysis with data of the Wave 1. Self-reported health status (SRH_i) is used as a measure of general health. This measure has been previously used for the study of health inequalities and the HIE across different countries. Regarding this, the suitability of this measure for the present study will be further discussed in Section 8.1.

This indicator shows how respondents classified their health as "excellent", "very good", "good", "fair" or "poor". From this, I have created a dichotomous variable representing either good health ("excellent", "very good" or "good") or bad health ("fair" or "poor").

Hence, the dependent variable of the econometric model can take two values:

$$GoodHealth_i = \begin{cases} 1 \text{ if the individual reports to have a good health } (SRH_i = 3, 4, 5) \\ 0 \text{ if the individual reports to have a bad health } (SRH_i = 1, 2) \end{cases}$$

The probability of declaring to have a good health will depend on a set of explanatory variables and the cross-section regression model will look as follows:

$$(1) \quad P(GoodHealth_i = 1/x_i) = F(x_i'\beta) = F(\alpha I_i + \gamma YSM_i + w'_i\delta)$$

Assuming that *F* follows a standard logistic distribution function, I will use a logit model. The model is estimated as a cross-section model using observations from the Wave 1. $GoodHealth_i$ is a binary variable representing self-assessed status as pointed out above; x_i' is a vector of explanatory variables or "determinants of health" which can be decomposed into different variables:

I_i is a dummy variable indicating if the individual is an immigrant (I_i=1). I will also divide this variable into seven dummies of region of birth: *Europe, Poland, English-Speaking Countries, India, Developing Asia, Africa* and *Other Countries*. Therefore, native-born are taking as the base category to which compare the marginal effects. Table 2 in Section 6 shows which countries are included in each group.

YSM_i represents the number of years since the immigrant arrived to the UK. This variable is set to 0 for the native-born. Furthermore the square of this variable will be also included to control for no linear relations.

w'_i is the vector of the remaining explanatory variables including demographic and socioeconomic characteristics of the individuals like age, gender, education level and job and socioeconomic status. In terms of socioeconomic status variables, individuals can be either working or unemployed. For those who are currently working, I use the five categories version of the National Statistics Socio-economic Classification (NS-SEC), which classifies individuals into a socio-economic status according to their current job[16]. The lowest socioeconomic status (NS-SEC 1) is set as the base category. Regarding education five different levels are considered, with no formal education set as a base category. For a detailed description of these and the rest of the variables see Table 13 (Appendix).

Our main variables of interest are I_i and YSM_i. The coefficient α will determine whether immigrants are more, less or equally healthy compared to natives. γ is a measure of the "health trajectories" of the immigrants. That is, it shows how the health of immigrants varies with the years lived in the country. In particular it measures how much or less likely the immigrants are to report a good health with the time spent in the country. Since the magnitudes of these coefficients are not easy to interpret directly, marginal effects will be reported instead.

Next, to further study the health trajectories of the immigrants avoiding cohort effects, I will use a Multinomial logit model following So and Quan (2012). The dependent variable will be set as the difference between self-reported health status in Wave 4 (SRH_4) and self-reported health status in Wave 1 (SRH_1) as follows:

$$(2) \qquad \Delta SRH = SRH_4 - SRH_1 \begin{cases} > 0 & \text{improvement in health status} \\ = 0 & \text{constant health status} \\ < 0 & \text{decline in health status} \end{cases}$$

As we can see, there are three possible outcomes for the dependent variable; individuals either reported an improvement of their health status ($\Delta SRH > 0$); a decline ($\Delta SRH < 0$) or no change ($\Delta SRH = 0$). Constant health status is then set as the base category. Marginal effects of the probability of having improved the health status and the probability of having worsened the health status, compared to the rest of the alternatives, will be presented. The

[16] Details about the construction of this occupational classification can be found at the Office for National Statistics (ONS) website http://www.ons.gov.uk/ons/guide-method/classifications/current-standard-classifications/soc2010/index.html

same explanatory variables will be included as in model (1). Our main variable of interest is immigrant status (I_i) again. Hence, if the marginal effect of being an immigrant ($I_i = 1$) is significantly positive for "decline in health status", immigrants are more likely to report a deterioration in health than natives over the 3 years of the survey. Similarly, if the marginal effect of being an immigrant is significantly positive for "improvement in health status", immigrants are more likely to report an improvement in health, compared to the native-born, over the three years of the survey. This way we can test the second hypothesis of the HIE which says that immigrants deteriorate their health after arrival and converges towards native levels. Therefore immigrant´s health will converge towards native-born levels if they are more likely to report a decline in health, less likely to report an improvement in health, or both.

6- DESCRIPTIVE ANALYSIS

In this section I will describe the characteristics of my sample, which is representative of the working population in the UK aged 16-60 for the years 2009/2010. From all this population, 13.21% of them were foreign-born. India and Poland are the two countries of origin which represent the largest share of the foreign-born population (together they correspond to almost 20% of the immigrant population under analysis). This is consistent with the data presented for the whole UK population in Section 4. In terms of the regions of origin that I have constructed (Table 2), Europe provides the largest number of immigrants (13.43%) followed by Developing Asia (11.62%), Africa (11.21%) and English-Speaking Countries (6.96%). Above a third of the immigrants representing under analysis where classified into the group "Other Countries" because country of birth was only available for the 23 most important countries in terms of immigration.

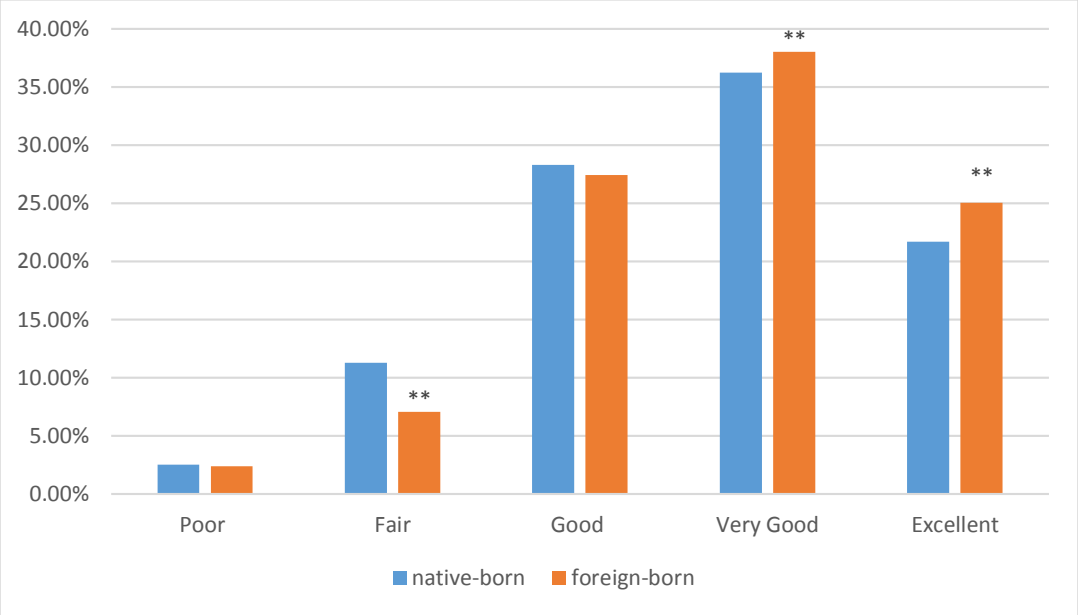
Table 2- PROPORTION OF IMMIGRANTS WHO ARE IN THE WORKING POPULATION BY REGION OF BIRTH

Region	Proportion	Countries
Europe	13.43%	Ireland (4.32%), Germany (5.18%), France (1.87%) Italy (1.33%) and Spain (1.21%)
Developing Asia	11.62%	Pakistan (5.24%), Bangladesh (2.42%), Sri Lanka (2.19%) and China (2.09%)
Africa	11.21%	Kenya (2.2%), South Africa (3.7%), Nigeria (2.86%), Ghana (1.79%) Uganda (0.98%)
India	10.36%	-
Poland	8.75%	-
English-Speaking Countries	6.96%	United States (2.89%), Australia (1.81%), New Zealand (1.27%), Canada (1.18%)
Other Countries	37.67%	Rest of the countries in the world

Weighted means with Wave 1 cross-section weights. Country of origin data was only available for the 23 most important countries in terms of immigration, the rest were labelled as "other countries". Poland and India were not included into the "Europe" and "South Asia" respectively since they represent the two most important countries in terms of immigration, hence it is of interest to analyse them separately.

In Figure 6 the distribution of self-assessed health status for the immigrant and the native-born subpopulation is displayed. In general, the health distribution for immigrants is more skewed towards higher values of self-reported health, compared to the health distribution of the native-born. Around 63% of the foreign-born report to have an "excellent" or "very good" health, compared to a 58% percent of the native-born population. In line with this, a higher and significant proportion of natives reported to have a "fair" or "poor" health compared to immigrants (13.8% vs 9.42%). Both subgroups reported a similar proportion of having a good health, with no more than a one percentage point of difference between them. Distinguishing by gender, the distribution of health follows the same pattern, with immigrants tending to report higher levels of health, compared to the native-born population of the same gender. Furthermore females present slightly poorer levels of health than men, for both the foreign-born and the native-born subsample (Figures 10 and 11 in Appendix).

Figure 6- HEALTH STATUS DISTRIBUTION IN WAVE 1



**p<0.05, p<0.1 of Adjusted Wald test for the difference in means between the native-born and the foreign-born. Weighted means with Wave l cross-section weights.

In Table 3 I present the rest of the summary statistics for both the immigrant and the native-born working subpopulations. Weighted means are presented with the Adjusted Wald test for the difference in means. In line with the above presented data, the dichotomous health dependent variable shows that the proportion of immigrants declaring to have good health is around 4 percentage points higher than natives. Regarding gender, there is a larger share of males in the immigrant subpopulation that in the native-born one. Furthermore, immigrants are around two years younger than natives in the sample.

Regarding education, working immigrants are shown to be much higher educated than the native-born working population. More than 55% of the foreign-born subpopulation has high education compared to 37% of the native-born subpopulation. However, if we look at the lowest level of education (no education qualification) we see that the percentage of population in that level is higher for immigrants (9.84%) than for natives (7.53%). Then, in general immigrants are in general higher educated than the native-born (with a probability 18 percentage higher of having a University degree). This supports the prediction of the immigrant self-selection model Chiswick et al (1978) which said that immigrants positively self-select on skills and education.

In terms of job and socio-economic status there are also some differences between the foreign-born and the native-born. Foreign workers are taking as a higher percentage the lowest category job (NS-SEC 1) compared to the native-born workers. Also, the share of the foreign-born in the second highest job category (NS-SEC 4) is almost four percentage points lower than the native-born. On the other hand, the share of unemployed workers is not significantly different between the two subpopulations. Comparing this data with the education distribution we see a clear job-education mismatch. While a much larger proportion of immigrants have a high education degree, they are equally or less likely to have high-skilled occupations. From this, it can be inferred that immigrants are taking jobs for which they are overqualified.

Table 3- SUMMARY STATISTICS

	native-born	immigrant	Adjusted Wald test (p-value)
Good Health	86.21%	86.21%	0
Years in the uk	0	16.48	0
Age	39.53	37.74	0
Males	53.29%	56.15%	0
EDUCATION			
High Education	37.86%	55.20%	0
A level	21.91%	14.48%	0
GCSE	24.62%	10.34%	0
Other Education	8.05%	5.82%	0
No qualification	7.53%	9.84%	0
SOCIOECONOMIC STATUS			
Unemployed	9.65%	10.39%	0.17
NS-SEC 5	36.73%	37.15%	0.67
NS-SEC 4	12.26%	8.48%	0
NS-SEC 3	8.05%	9.87%	0
NS-SEC 2	7.60%	5.83%	0
NS-SEC 1	21.87%	25.50%	0

Weighted means with Wave 1 cross-section weights. Adjusted Wald test of the difference between means

Overall, immigrants in our sample seem to be healthier, higher educated but having a lower socioeconomic status, in contrast with the native-born. However, it would not be accurate to treat the immigrant subsample as a homogeneous group. In that sense, although data about the reasons for immigration to classify immigrants into different types (i.e: working immigrant, family member and asylum-seekers) was not available, we do have data of the

country of birth to some extent[17]. Using that data, the main important determinants of health status (education and job and socio-economic status), by region of origin, are presented in Tables 4 and 5. As before, Wald test of differences in means were carried out between every region of birth´s mean and the UK-born subsample´s mean. As we can see there is a high level of heterogeneity between regions of origin.

All immigrant subgroups show a larger proportion of individuals with high education than the native population do. However the magnitude of the differences varies by region of birth. Whereas more than 75% of the immigrants coming from the four English-Speaking Developed Countries have high education, only 45% of the immigrants coming from Poland do; yet this percentage is still significantly higher than the one for the native-born population (37.9%). Immigrants from the most developed countries (Europe, North America, Australia and New Zealand) are less likely to be non-qualified compared to the native-born. This is also the case for African immigrants, which presents one of the lowest share of non-qualified individuals. On the contrary, there is a larger proportion of non-qualified immigrants coming from Asia. In particular 17.7% and 11.5% of the immigrants coming from the Developing Asia group and India respectively, are non-qualified; as opposed to a 7.5% of the native-born population.

Table 4- EDUCATION LEVEL BY REGION OF ORIGIN

Region/country	High Educ.	A level	GCSE	Other Educ.	No Educ.
UK	0.379	0.219	0.246	0.081	0.075
Europe	0.573*	0.177*	0.117*	0.088	0.045*
Poland	0.450*	0.134*	0.049*	0.248*	0.119
English-Speaking Countries	0.755*	0.105*	0.064*	0.043*	0.033*
India	0.620*	0.093*	0.073*	0.098	0.115*
Developing Asia	0.481*	0.130*	0.125*	0.086	0.177*
Africa	0.646*	0.161*	0.096*	0.062	0.035*
Other Countries	0.504*	0.158*	0.122*	0.101*	0.115*

* $p<0.05$ for Adjusted Wald test for differences with UK-born population mean. Weighted means with Wave 1 cross-section weights.

In terms of employment and socioeconomic status we can also see marked differences depending of the region of origin (Table 5). Polish immigrants present the lowest percentage of unemployment (6.6%) whereas Developing Asia presents the highest one (12.7%). Immigrants coming from English-Speaking Developed Countries, Europe and Africa are

[17] Country of origin was available for the 23 most important countries in terms of immigration, the rest were labeled as "other countries".

more likely to be in the highest socioeconomic job category as opposed to the natives. These are the groups that present the largest proportions of higher educated individuals as well.

On the contrary, immigrants coming from Developing Asia and Poland present very low proportions in the two highest socio-economic categories compared to the native-born. This in sharp contrast with their level of education considering that they are high educated in a higher proportion than the native-born. There seems to be an important job-education mismatch for the Indian immigrants as well. Whereas their share of high educated almost double the UK-born one (62% vs 38%), they are similarly likely to be working in the two highest socioeconomic categories.

Looking at the lowest level of socio-economic job status we can also perceive important differences. Immigrant coming from the English-Speaking Developed Countries are much less likely to be working in a "routine or semi-routine job" compared to the UK-born. On the other hand, 43.2% of the Polish immigrants are employed in the lowest occupation level (NS-SEC 1), compared to 21.9% of the native-born subsample. The share of individuals working in the lowest job category is also higher than in the UK-born population for Developing Asia and India. In general terms, it seems that Polish and Asian immigrants are those who are more disadvantaged in the job market, despite their level of education is higher than the native-born average.

Table 5- SOCIEOCONOMIC STATUS BY REGION OF BIRTH

VARIABLES	Unemp.	NSSEC 1	NSSEC 2	NSSEC 3	NSSEC 4	NSSEC 5
UK	0.097	0.219	0.076	0.081	0.123	0.367
Europe	0.080	0.184	0.041*	0.060	0.111	0.495*
Poland	0.066*	0.432*	0.129*	0.141*	0.032*	0.192*
English-Speaking Countries	0.072	0.080*	0.054	0.074	0.097	0.588*
India	0.113	0.263*	0.064	0.069	0.099	0.376
Developing Asia	0.127*	0.276*	0.042*	0.155*	0.072*	0.288*
Africa	0.075	0.205*	0.054*	0.086	0.095*	0.469*
Other	0.126*	0.277*	0.056*	0.102	0.083*	0.323*

* $p<0.05$ for Adjusted Wald test for differences with UK-born population mean. Weighted means with Wave 1 cross-section weights.

7- RESULTS

7.1- Cross-section analysis

The goal of this section is to study the health inequalities between immigrants and natives in the UK working population and to check to what extent health inequalities can be explained by observable characteristics. First, we will treat immigrants as a homogenous group, and later we will distinguish by country of birth.

In Table 6, I present in the estimation results of the logit model (1), and I include the control variables stepwise. First, I control for demographic characteristics: age and gender. After that, immigrants are above 4 percentage points more likely to report a good health than the native-born population. Next, in column (2), other socioeconomic characteristics are included in the model as explanatory variables (education and socioeconomic status) to see to what extent differences in health are explained by observable characteristics or not.

As we saw in the descriptive statistics, immigrants were on average, higher educated but in a lower socioeconomic status. Then, part of the health differences shown in column (1) could be explained by immigrants having a much higher share of graduates (having completed higher education is associated with a 7 points higher probability of being in a good health status, compared to not to have any qualification). But, on the other hand, that difference could be also underestimated since immigrants have on average a lower job status and a lower job status is related with a poorer health. As a result, both forces that operate in opposite directions cancel each other and the immigrant coefficient remains the same after controlling for these variables.

Besides that, the model is estimated separately for males and females (Columns (3) and (4)).We can see that differences between immigrants and natives are higher for males. On the other hand, the rest of the control variables behave in a similar way for both genders and as predicted in the theoretical discussion: a higher level of education is associated with a higher probability of declaring to have a good health, being unemployed increases the probability of reporting bad health compared to be in the lowest job position (NS-SEC 1), and a higher socioeconomic status is associated with higher odds of declaring to have good health.

So far we have compared health status between the foreign-born and the native-born, but we have not say anything about how health changes with the years of stay in the country. In columns (5) and onwards I have included the variable that measure years in the country (*Years in UK),* and its square (*Years in UK*^{2}*).* Now, we see that recent immigrants are around 14 points more likely to be in good health than the native-born population. This health gap is higher than the one between natives and the immigrant population as a whole. Furthermore, the negative and significant coefficient of the *Years in UK* variable suggests that immigrant's health worsens with the length of stay. However, this association is not linear since the coefficient of *Years in UK*^{2} is negative and significant. If these coefficients were measuring the health convergence between immigrants and natives trough time, an immigrant with the average sample characteristics will converge towards the health level of a native-born with the average sample characteristics, within 27 years.

Regarding the gender subsamples, the difference is higher for male immigrants than for female immigrants on arrival compare with the native-born population of the same gender. However, male immigrants seem to converge faster towards native-born health levels than immigrant females. The health gap between the immigrants and natives narrows down at a speed of 0.8 percentage points per year of stay for males as opposed to 0.6 percentage points per year of stay for females.

In Table 7 I show the results of estimating the same model as the one above, but grouping immigrants into region of birth. First, in column (1) we look at the cross-section health inequalities between the native-born and the foreign-born depending on the region of birth. As we can see, all groups of immigrants report better health than the native-born, except for immigrants born in Developing Asia which have similar levels of health than the locals. This is consistent with the prediction of Jasso et al (2004) model which says that immigrants self-select positively on health.[18]

[18] This model has been further discussed in Section 2

Table 6- ESTIMATION RESULTS OF LOGIT MODEL (1)

VARIABLES	(1) All	(2) All	(3) Males	(4) Females	(5) All	(6) Males	(7) Females
immigrant	0.043***	0.040***	0.047***	0.032***	0.138***	0.150***	0.124***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.03)	(0.02)
Years in UK					-0.007***	-0.008***	-0.006***
					(0.00)	(0.00)	(0.00)
Years in UK²					0.000***	0.000***	0.000
					(0.00)	(0.00)	(0.00)
Age	-0.003***	-0.003***	-0.004***	-0.003***	-0.003***	-0.003***	-0.002***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Males	0.001	0.004			0.004		
	(0.00)	(0.00)			(0.00)		
EDUCATION							
High Education		0.077***	0.084***	0.071***	0.076***	0.083***	0.072***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
A level		0.040***	0.035***	0.047***	0.042***	0.036***	0.051***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
GCSE		0.033***	0.022**	0.045***	0.035***	0.024**	0.049***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Other Education		0.017**	0.021*	0.011	0.015*	0.018	0.012
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
SOCIOECONOMIC STATUS							
Unemployed		-0.074***	-0.074***	-0.075***	-0.072***	-0.072***	-0.073***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
NS-SEC 5		0.044***	0.035***	0.055***	0.046***	0.037***	0.056***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
NS-SEC 4		0.028***	0.016	0.034***	0.030***	0.018	0.035***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
NS-SEC 3		0.042***	0.040***	0.048***	0.044***	0.043***	0.049***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
NS-SEC		0.021**	0.027**	0.006	0.022**	0.028**	0.006
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	29,936	29,386	14,540	14,833	29,354	14,520	14,821

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Weighted analysis with Wave 1 cross-section weights

Part of the health advantages in health for immigrants coming from Europe, English-speaking countries and Africa can be explained because immigrants who were born there, were much higher educated and were doing higher status jobs, than the average native-born population (as described in Section 6). As a consequence, their coefficients go down when education and socioeconomic status are included as explanatory variables (Column (2)). Nevertheless, health inequalities remain significant for all of the regions of birth, except for Developing Asia. This implies that education and socioeconomic status by themselves cannot explain the health differences between immigrants and natives. This is in line with Kennedy and Mcdonald (2005) results and other papers who found significant differences in health after controlling for socioeconomic characteristics.

Lastly, we include again the variables measuring the length of stay in the country. As we can see, health differences between immigrants on the time of arrival and the native-born are larger than between the rest of the immigrants and the natives. That means that recent immigrants present a better health status than older immigrants, after controlling for the rest of observable characteristics.

Now, even recent immigrants coming from Developing Asia are 8.6 percentage points more likely to report a good health than the native-born. Recent immigrants born in other regions present an even better health status, with the maximum difference found for immigrants born in English-Speaking Developed countries who are 12.1 percentage points more likely to be in good health than the native-born, after controlling for everything else. Again, these health differences cannot be explained by other determinants of health like age, education or socioeconomic status.

Table 7- ESTIMATION RESULTS OF LOGIT MODEL (1) WITH REGION OF BIRTH

VARIABLES	(1) All	(2) All	(3) Males	(4) Females	(5) All	(6) Males	(7) Females
Europe	0.046***	0.034**	0.033	0.036*	0.108***	0.106***	0.109***
	(0.02)	(0.02)	(0.03)	(0.02)	(0.01)	(0.02)	(0.01)
Poland	0.086***	0.086***	0.101***	0.069***	0.110***	0.123***	0.096***
	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
English-Speaking Countries	0.083***	0.069***	0.076***	0.065**	0.121***	0.124***	0.118***
	(0.02)	(0.02)	(0.03)	(0.03)	(0.01)	(0.02)	(0.01)
India	0.050***	0.051***	0.062***	0.031	0.110***	0.115***	0.100***
	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)
Developing Asia	-0.000	0.006	0.004	0.011	0.087***	0.086***	0.088***
	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)
Africa	0.046***	0.032**	0.052***	0.010	0.103***	0.113***	0.091***
	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(0.02)
Other Countries	0.027***	0.030***	0.039***	0.021*	0.096***	0.100***	0.090***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Years in UK					-0.007***	-0.008***	-0.007***
					(0.00)	(0.00)	(0.00)
Years in UK²					0.000***	0.000**	0.000*
					(0.00)	(0.00)	(0.00)
Age	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***	-0.002***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Males	0.001	0.004			0.004		
	(0.00)	(0.00)			(0.00)		
EDUCATION							
High Education		0.076***	0.084***	0.070***	0.075***	0.081***	0.071***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
A level		0.040***	0.035***	0.047***	0.041***	0.035***	0.050***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
GCSE		0.033***	0.022**	0.045***	0.035***	0.023**	0.049***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Other Education		0.016*	0.019*	0.010	0.015*	0.017	0.011
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Unemployed		-0.073***	-0.073***	-0.074***	-0.072***	-0.072***	-0.073***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
SOCIOECONOMIC STATUS							
NS-SEC 5		0.044***	0.036***	0.055***	0.046***	0.037***	0.056***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
NS-SEC 4		0.028***	0.016	0.034***	0.030***	0.018	0.035***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
NS-SEC 3		0.043***	0.040***	0.049***	0.045***	0.043***	0.049***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
NS-SEC 2		0.021**	0.026**	0.006	0.022**	0.028**	0.005
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	29,932	29,383	14,538	14,832	29,351	14,518	14,820

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Summing up, working immigrants, both females and males, present a better health status than their native counterparts, and those difference cannot be explained by demographic, education or socioeconomic characteristics of the individuals. Differentiating by region of birth, only immigrants coming from Developing Asia do not show better health than the average native-born worker. Furthermore, when we control for years lived in the UK, immigrants on arrival show a much higher probability of being in good health than the native-born. However, this health advantage narrows down with the years spent in the country. This results would support the two hypothesis who form the HIE.

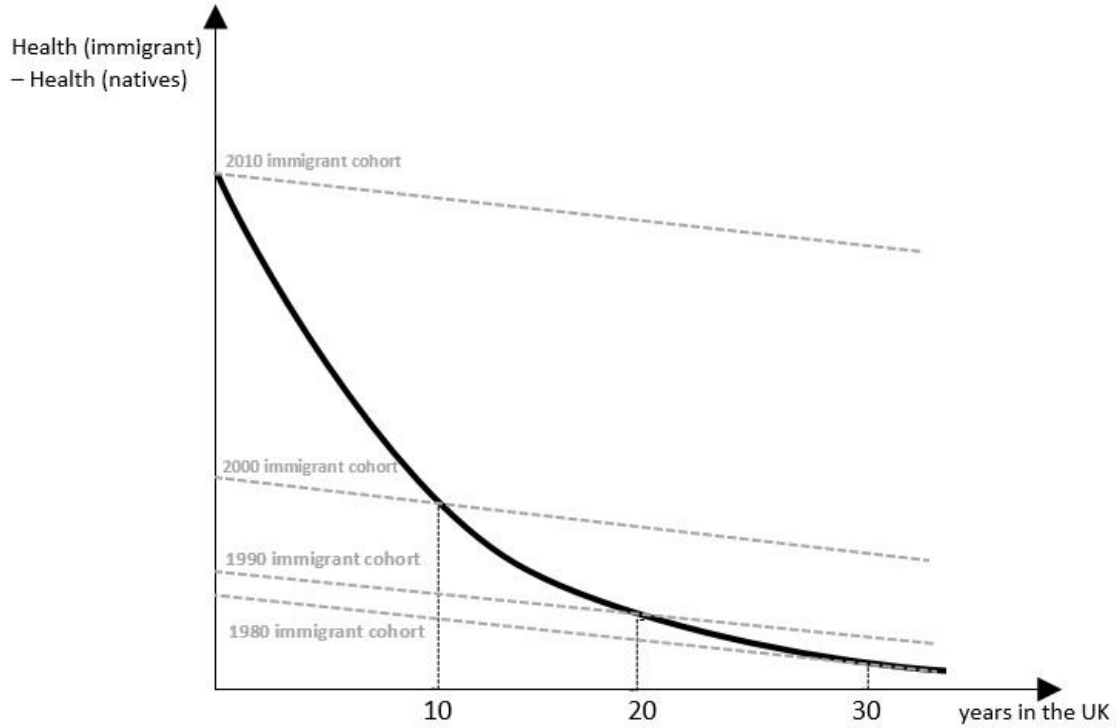
Nevertheless, although it seems clear by the evidence here presented that recent immigrants are healthier than the native-born population it is not that clear that the negative coefficient of *Years in UK* responds to an actual health deterioration of immigrants with the length of stay in the UK. To understand this, I adapt Borjas (1994) critique towards cross-section studies of immigrants "earnings assimilation" to the health context. A negative cross-section correlation between health status and years since arrival to the UK, does not necessarily mean that health of immigrants converges to that of the natives.

Working with cross-section estimations, we are interpreting evidence from a snapshot of the immigrant population at a certain date as it was longitudinal evidence where we followed immigrants over time. For cross-section evidence to be able to support the second hypothesis of the HIE (i.e. immigrant´s health deteriorates and converges towards native-born levels over time), we must assume that immigrants coming at different points of time are not different in terms of health.

However, it might be the case that new immigrants are different to those who arrived before. Then, it would not be accurate to assume that the current health status of immigrants who arrived 10 years ago will be the same to the health status in ten years of those who recently arrived. Therefore, the cross evidence supporting the health deterioration hypothesis might be driven by immigrants who arrived more recently being healthier than "older" immigrants, compared to natives. This is known in the literature by cohort effects.

In Figure 7 this phenomenon, adapted to the health framework, is graphically represented. The difference between health of immigrants and natives is measured on the vertical axis. The dashed line represents the "real" longitudinal health trajectories of immigrant cohorts over time. The most recent cohort (2010) is assumed to arrive to the UK with the highest levels of health, whereas older cohorts are assumed to have arrived with worse health. The "snapshot" taken by the cross-section model is represented by the thick black line. As we can see, that line includes observations of the 2010 immigrant cohort in the first year of arrival, of the 2000 immigrant cohort with 10 years of stay, of the 1990 immigrant cohort with 20 years of stay and so on. If this were the scenario, the cross-section line would wrongly look like there is a quick health convergence. However, the longitudinal health trajectories lines do not show a real health convergence. Therefore it seems clear that using longitudinal datasets, as I will do in the next subsection, is the best way to overcome these difficulties.

Figure 7- CROSS-SECTION COHORT EFFECTS vs REAL LONGITUDINAL TRAJECTORIES



7.2- Longitudinal analysis.

For this part of the analysis I use the subsample of those individuals who responded to the survey in both Wave 1 (2009/2010) and Wave 4 (2012/2013). 3 years might seem like a relative short period of time to test the health convergence hypothesis, but other papers like Chiswick et al (2008) and Newbold (2009) have already shown an important health deterioration for immigrants after 3 and 4 years of arrival, respectively.

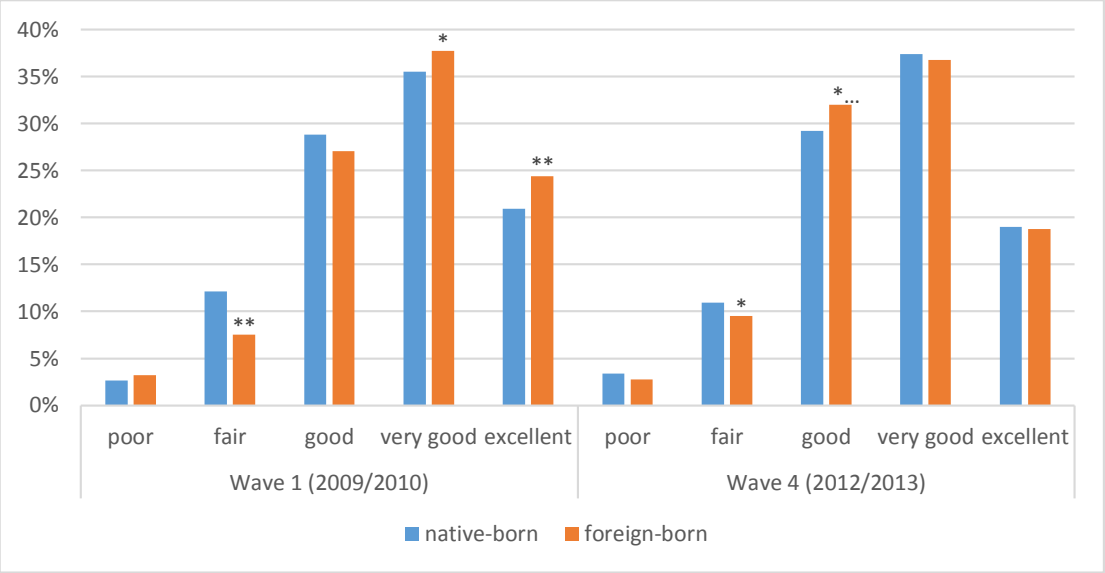
From the 29,970 individuals included in the sample used in the previous cross-section analysis (Wave 1), 18,269 responded in Wave 4 as well. From those, 2.992 were foreign born (16%). Overall the dropout rate is 39%, which is quite a large figure. This can cause a problem of attrition in the longitudinal analysis. As a consequence, this issue will be further discussed on detail in Section 8.2.

To start with the longitudinal analysis, Figure 8 shows how the health distribution of immigrants and natives have changed during the three years of our analysis, from Wave 1 to Wave 4. First, it is worth noting that distribution of health in Wave 1 estimated with our new subsample (those who responded in Wave 4 as well) is very similar to the health distribution estimated with the initial sample (Figure 6). Now, the health distribution of the foreign-born is also significantly more skewed towards higher values of health status, as compared to that of the native-born. This is a first hint saying that attrition is not likely to be a problem in our analysis.[19]

Next, we see that differences in health status between the foreign-born workers and the native-born workers have narrowed down over the three years (Figure 8). In particular, the share of immigrants declaring to have an "excellent" health has dropped from almost 25% to below 20%, reaching native levels. Significant differences have also vanished for the share of individuals in a "very good" health status. Furthermore, the share of immigrants declaring to have a "fair" health has increased, being now closer to native levels as well. Therefore, although in Wave 4, some differences still remain between natives and immigrants in terms of health status; we can say that the health distribution of immigrants has converged towards that of the native-born.

[19] Potential problems related with attrition will be further discussed in Section 8.2

Figure 8- DISTRIBUTIONS OF HEALTH STATUS IN WAVE 1 AND WAVE 4



**p<0.05, p<0.1 of Adjusted Wald test for the difference in means between the native-born and the foreign-born. Weighted means with longitudinal weights.

Next, it is relevant to know which groups of immigrants are leading this convergence in health since it is obvious that all immigrants won´t behave in the same way. Table 8 shows the proportion of the health trajectories between Wave 1 (2009/2010) and Wave 4 (2012/2013) by country of birth. That is, what percentage of the individuals per country of origin have reported to suffer a decline, an improvement or no variation in health status after three years. Looking at the share of people reporting a decline, we can see a clear pattern: Whereas individuals coming from countries from Europe and English-Speaking Countries show a similar share of deterioration in health than the native-born. Those coming from what we could call *developing* countries (India, Developing Asia and Africa) show significantly higher rates of deterioration in health (always over 32% whereas it is below 27% for natives).Therefore it seems that the convergence in health is coming by a higher deterioration in health of immigrants who were born in developing countries. On the other hand, immigrants coming from what we could called *developed countries* (Europe, Poland and English-Speaking countries) do not show significantly different health trajectories as compared to the native-born.

Table 8- HEALTH TRAJECTORIES BY REGION OF BIRTH

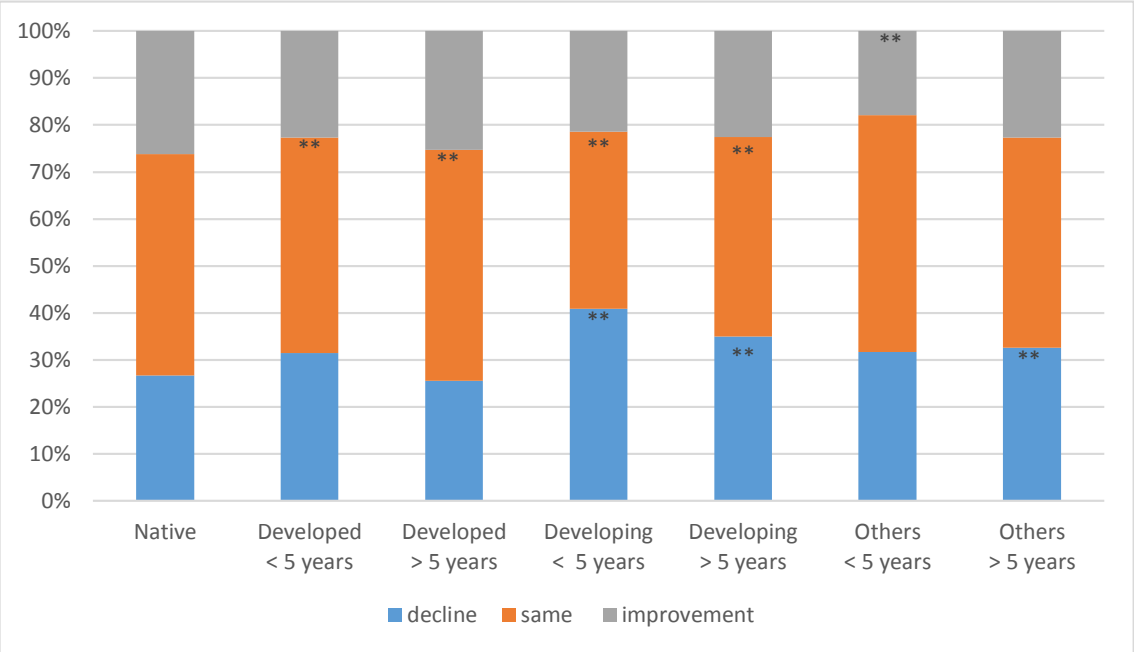
	decline	same	improvement
UK	26.73%	47.10%	26.17%
Europe	28.34%	45.88%	25.78%
Poland	28.63%	50.38%	20.99%
English-Speaking Countries	24.93%	47.39%	27.68%
India	32.15%*	49.37%**	18.48%**
Developing Asia	39.76%**	37.31%**	22.93%
Africa	37.31%**	37.37%	25.31%
Other	32.43%**	45.94%	21.64%**

*p<0.05, p<0.1 of Adjusted Wald test for the difference in means between every immigrant group and the native-born population. Weighted means with longitudinal weights.

Since the HIE hypothesis that we are trying to test is focused on the health trajectories of the immigrants after arrival, in Figure 9 I juxtapose health trajectories of natives and immigrants by length of stay. We can see how decline rates are higher between workers coming from developing countries, and within them, those who arrived to the UK more recently present the highest rates of decline. Another important finding in this graph is that the native subpopulation presents the highest rate of improvement in health, although differences in improvement rates are not statistically significant between immigrants from developed and developing countries and the native-born.

Lastly, we replicate the same graph only for the male and the female subsample (Figures 12 and 13 in Appendix). In this case, we see that differences in health deterioration rates within females are more severe than within males. Specifically, females who arrived from developing countries 5 or less years ago, present the highest likelihood of health deterioration (above 50%), followed by those from developing countries who were residing longer than 5 years in the UK (38%) . For males, on the contrary, the differences between immigrants who were born in developing countries and the native-born are not that broad.

Figure 9- HEALTH TRAJECTORIES BY REGION OF BIRTH AND LENGH OF STAY



**p<0.05, p<0.1 of Adjusted Wald test for the difference in means between every immigrant group and the native-born population. Weighted means with longitudinal weights

Taking altogether, working immigrant´s health has deteriorated faster than native worker´s health over the three years of analysis. This deterioration has been led by immigrants coming from developing countries, especially females who arrived to the UK five or fewer years prior to the beginning of the survey. This is a first piece of evidence supporting the "health deterioration and convergence" hypothesis of the HIE. However, before making any final conclusion it is important to know what factors are really driving this faster health deterioration of immigrant´s health.

For doing so, I present here the results of the Multinomial logit model (2) explained in Section 5. In particular, Table 10 shows the marginal effects of the probability of reporting a decline in health in Wave 4 with respect to the health in Wave 1. As we can see by column (1), immigrants coming from *developing* countries and *other countries* are significantly more likely to report a decline in health than natives, whereas immigrants coming from *developed* countries aren´t.

Including years since arrival as a control variable, we see that the probability is even higher for immigrants from *developing* countries on arrival, as discussed in Figure 9. Furthermore this association is robust to the inclusion of demographic characteristics (age and sex).

However, when we separate the samples by gender, we see again that these differences are driven by females since the immigrant coefficients for males are not significant. Females born in *developing* countries, who arrived to the country the same year of the beginning of the survey, are 25.4 percentage points more likely to report a decline in health as compared to UK-born females of the same age. The negative and significant coefficient of *Years in UK* suggest that health deterioration between the three years of the survey was lower for female immigrants who had resided longer in the UK.

Some authors argue that the apparent convergence in health might be driven by the so-called "regression to the mean" effect (Chiswick et al 2008, Biddle et al 2008). This hypothesis says that in general when we observe repeated observations of a same subject, extreme values are likely to be followed by less extreme ones nearer to the true mean. (Barnet et al 2005). Similarly, individuals who report to have the highest value of health ("excellent"), will be more likely to report a decline in health, simply because they do not have the option of reporting an improvement in health, and therefore their health status can only remain constant or go down.

This phenomenon could be occurring in our sample because, as we saw, immigrants were more likely to report extreme good values of health at Wave 1 (Figure 8). To control for this phenomenon I include a dummy variable (*Excellent SRH*) which equals one when the individual has reported an excellent health status in the base year (Columns (5) (6) and (7)). As expected, the coefficient of this variable is positive and highly significant, showing that having reported an excellent health status on the first wave is associated with a 33 percentage points higher likelihood of reporting a health deterioration three year after, as compared to having reported other lower health status.

The inclusion of this variable, makes the coefficient on *developing* immigrants for the entire sample to go down. This occurs due to the fact that the same coefficient for the male subsample hast turned negative (although still insignificant). On the contrary, coefficient on *developing* immigrants for females remains significant and of the same size suggesting that their higher health deterioration and convergence is robust to the "regression to the mean" effect.

Table 9 – ESTIMATIONS RESULTS OF MULTINOMIAL LOGIT MODEL (2): MARGINAL EFFECTS FOR THE PROBABILITY OF REPORTING A DECLINE IN HEALTH

VARIABLES	(1) All	(2) All	(3) Males	(4) Females	(5) All	(6) Males	(7) Females
Developed Countries	0.009	0.049	0.053	0.042	0.008	0.011	0.008
	(0.03)	(0.04)	(0.05)	(0.06)	(0.04)	(0.06)	(0.06)
Developing Countries	0.098***	0.142***	0.055	0.254***	0.111***	-0.006	0.260***
	(0.02)	(0.04)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)
Other Countries	0.057***	0.102***	0.035	0.168***	0.064	-0.025	0.157***
	(0.02)	(0.03)	(0.05)	(0.05)	(0.04)	(0.05)	(0.06)
Years in UK		-0.003	0.004	-0.008**	0.001	0.011**	-0.008*
		(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)
Years in UK²		0.000	-0.000	0.000*	-0.000	-0.000**	0.000
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Males		0.009			0.014		
		(0.01)			(0.01)		
Age		0.001***	0.001	0.002***	0.001***	0.001	0.002***
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Excellent SRH					0.330***	0.343***	0.318***
					(0.01)	(0.02)	(0.01)
Observations	18,209	18,203	8,668	9,433	18,203	8,668	9,433

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Weighted estimation with longitudinal weights

Next, in Table 11 we include other socioeconomic characteristics as potential determinants of the deterioration in health. As expected by the theoretical framework, being in a worse socioeconomic status in term of job, is associated with a higher probability of reporting a health decline. In particular being unemployed in Wave 1 is related with 6.6 percentage point higher odds of reporting a decline in health in the next three years, compared to having a job in the lower status (*NS-SEC 1*). Furthermore, being in the two highest socioeconomic job categories is associated with lower odds of reporting a decline in health, as compared to being in the lowest socioeconomic category. Immigrant's coefficients, however, remained unaltered after the inclusion of these variable. Therefore, the faster health deterioration of recent females cannot be explained by socioeconomic status in the base year.

Lastly, as explained in the theoretical discussion, language restrictions have also been proposed as a potential determinant of health deterioration. This has been discussed to be likely to restrict immigrants from access to healthcare and public health information as well

as getting better jobs. To study this, we include a dummy variable (*English Difficulties*) that equals one if the individual declares to have "difficulties speaking day to day English", and 0 otherwise. This variable is not significant for any of the subsamples. This is expected since only 6.8% of the immigrants reported to have difficulties on day-to-day English. Therefore, English language proficiency does not seem to explain the faster health deterioration of female immigrants.

Lastly, in Tables 14 and 15 (Appendix) I report the marginal effects of reporting an improvement in health status of the same Multinomial Logit Model. According to column (2) in Table 14 all group of immigrants (*developing* countries, *developed* countries and *other* countries) on arrival, are significantly less likely to report an improvement in health than the native-born. Immigrants born in *developing* countries are those who are less likely to enjoy an improvement in health after three years.

Furthermore, the likelihood of reporting an improvement in health for immigrants gets closer to that of the natives with the length of stay. These results are robust to the "regression to the mean" effects (In this case we include a dummy variable "poor" which equals one if the individual had a poor self-reported health on Wave 1). In addition, socioeconomic and language variables are not found to be relevant to determine the probability of transitioning to a better health status.

Summing up, convergence in self-reported health between the foreign-born and the native-born seems to be driven by two forces. First, a particular group of immigrants reporting a significantly much higher rate of deterioration in health: females who were born in developing countries. Secondly, native-born being significantly more likely to transit to a higher health status, with immigrants coming from developing countries having the lowest odds, after controlling for everything else.

Furthermore, the probability of suffering a decline in health for female immigrants decreases with length of stay, whereas the probability of reporting an improvement in health status for all the immigrants increases with the length of stay. This implies that the convergence in health occurs faster within the first years of arrival to the UK. Overall the evidence presented in this section supports the "health deterioration and convergence towards native levels" hypothesis of the HIE, but only for female immigrants coming from developing countries. Furthermore it also shows that natives are in general, more likely to improve their health over the three years of the survey, after controlling for everything else.

Table 10 - ESTIMATIONS RESULTS OF MULTINOMIAL LOGIT MODEL (2): MARGINAL EFFECTS FOR THE PROBABILITY OF REPORTING A DECLINE IN HEALTH WITH REGION OF ORIGIN

VARIABLES	(1) All	(2) Males	(3) Females	(4) All	(5) Males	(6) Females
Developed Countries	0.004	0.002	0.016	0.007	0.018	0.009
	(0.04)	(0.06)	(0.06)	(0.05)	(0.07)	(0.06)
Developing countries	0.112***	-0.001	0.261***	0.114***	0.005	0.253***
	(0.04)	(0.05)	(0.06)	(0.04)	(0.06)	(0.06)
Other countries	0.055	-0.031	0.151**	0.054	-0.033	0.142**
	(0.04)	(0.06)	(0.06)	(0.04)	(0.06)	(0.06)
Years in UK	0.001	0.010*	-0.008*	0.001	0.010*	-0.008
	(0.00)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)
Years in UK²	-0.000	-0.000**	0.000	-0.000	-0.000**	0.000
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Males	0.007			0.006		
	(0.01)			(0.01)		
Age	0.001***	0.001*	0.002**	0.002***	0.001*	0.002***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Excellent SRH	0.340***	0.350***	0.331***	0.328***	0.335***	0.323***
	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
EDUCATION						
High Education	-0.028	-0.011	-0.046	-0.022	-0.002	-0.043
	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)
A level	-0.010	0.001	-0.026	-0.008	0.007	-0.028
	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)
GCSE	-0.008	-0.013	-0.006	-0.004	-0.004	-0.007
	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)
Other Education	-0.000	-0.010	0.014	0.001	-0.004	0.010
	(0.03)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)
SOCIOECONOMIC STATUS						
Unemployed	0.065***	0.074**	0.054*	0.061***	0.072**	0.046
	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)
NS-SEC 5	-0.027*	-0.027	-0.024	-0.030**	-0.038	-0.019
	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
NS-SEC 4	-0.032*	-0.004	-0.048**	-0.033*	-0.012	-0.042*
	(0.02)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)
NS-SEC 3	0.020	0.029	0.014	0.010	0.009	0.016
	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)
NS-SEC 2	0.021	0.025	0.026	0.024	0.024	0.029
	(0.02)	(0.03)	(0.04)	(0.02)	(0.03)	(0.04)
English difficulties				0.013	-0.063	0.152
				(0.06)	(0.07)	(0.10)
Observations	17,981	8,558	9,317	17,344	8,062	9,171

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Weighted estimation with longitudinal weights

8- FURTHER DISCUSSION

In this section I discuss two of the limitations that are normally attached to studies like this. One has to do with the variable used to measure the health of individuals, self-reported status; and the other is related with the potential problems that attrition can cause to any longitudinal study.

8.1 – Self-reported health variable

Self-reported health status has traditionally been used in most of the previous studies of the Healthy Immigrant Effect as a measure of general health (McDonald and Keneddy 2004, Kennedy et al 2006, Wadsworth 2012, Chiswick et al (2008)). This indicator has been found to be a good predictor of mortality. In particular, Idler and Benyamini (1997), doing a literature review on the topic, report that 23 of 27 studies show that self-rated health is a consistent predictor of mortality, even when controlling for health risk factors and other determinants of mortality. Not only that, self-reported status is considered a good predictor of morbidity (Jayaweera 2010, Chandola and Jenkinson 2000, Idler and Benyamini 1997), physical health and physician contacts (Milunpalo et al 1997).

However, self-reported health status implies a subjective valuation of your health which might be influenced by your individual characteristics, like ethnicity in this case. In that line, So and Quan (2012) suggest that the fact that they did not find differences in self-reported health status by immigrant status, but they did find significant differences in other health measures (obesitiy, presence of chronic diseases, etc.) might be because changes in self-reported health are more changes in perceptions that changes in real health. More studies have compared self-reported health status with other health indicators; Leung et al (2007), in a study for Canada, show that Chinese had less chronic conditions but were more likely to report a poor health status than whites.

In a study for the same country, Menec et al (2007) argued that if differences in self-rated health are due to discrepancies in health, (and not due to cultural or perception differences), then including other health measures in the regression should make ethnic differences disappeared. After doing so, ethnic differences were still significant between individual with Eastern European background and those with Canadian background. This suggests that ethnicity may influence the way individuals assess their health, and differences in self-reported health status may not be necessarily underlying differences in health (as measured by other health indicators).

Nevertheless, in a paper focused on our country of interest, the UK, Chandola and Jenkinson (2000) using the Health Survey for England (HSE), find that the association between self-rated health and morbidity was not significantly different between ethnic groups. Then, as opposed to Leung et al (2007) and Menec et al (2007), Chandola and Jenkinson (2000) argues that self-rated health is valid to compare health status between ethnic groups. Therefore, evidence is not conclusive so far, with papers both supporting and rejecting self-reported health status as a reliable measure to compare the health of individuals from different ethnicities.

To clear this up, I have estimated the cross-section logit model (1) using other health variables as dependent variables. Specifically I have used six new dependent variables representing the presence of the 6 most prevalent health conditions in my sample: asthma, high blood pressure, arthritis, clinical depression, diabetes and hypothyroidism[20]. The dependent variable for every health condition equals 1 if the individual reports to have that condition and 0 otherwise. Hence, if the immigrant coefficient is negative, it means that immigrants are less likely to report to have that health condition than the native-born[21].

These estimations can be found in Table 16 (Apendix). As we can see, immigrants are in general less likely to have these health conditions, with the only exception of diabetes and high blood pressure. However, the immigrant coefficient for these conditions turns negative as well when the variable measuring years of stay is added to the model. This means that immigrants on arrival are also less likely to have these health conditions, and healthier as a consequence. Therefore it seems that results of the cross-section estimation are robust to the use of the presence of health conditions instead of self-reported health status. This suggests that self-reported health status is a reliable measure to compare the overall health of immigrants with that of the native-born in our sample.

[20] These were the only reported health condition that presented a prevalence proportion higher than 1%. In particular prevalence proportions in my sample for these conditions were the following: 9.27% for asthma, 6.85% for high blood pressure, 6.10% for arthritis, 3.2% for clinical depression, 2.4% for diabetes and 1.7% for hypothyroidism

[21] I have only estimated the cross-section model with these new measures of health, and not the longitudinal model because the presence of health conditions was only available for Wave 1, and not for Wave 4.

8.2- Attrition

Migrants may have not participated in Wave 4 for different reasons, including return migration. If immigrants who decided to come back to their country of origin, are those who were in better health after some period in the host country, then an apparent "health deterioration and convergence" may be driven by return migration, which causes immigrant with worse health to stay in the country.

To check if attrition can cause these types of problems I carry out the same cross-section estimation that I did in Tables 6 and 7, but now using only the subsample of individuals that I used for my longitudinal analysis. As explained before, this subsample is formed by those who responded in both Wave 1 and Wave 4[22]. If immigrants who dropped out are relatively less healthy than the native-born who dropped out, we expect that the health differences between immigrant and natives, would disappear or at least become smaller when using only the new longitudinal subsample for the cross-section estimations.

These new estimations are reported in Tables 17 and 18 (Appendix). But, as we can see there are not marked differences in the estimation results between the original cross-section results and the new estimations using only the subsample of respondents who did not dropped out in the 3 years of the survey (Table 6 vs Table 17 and Table 7 vs Table 18)[23]. Therefore, attrition does not seem to be an important problem in our analysis.

9- CONCLUSIONS

This paper had two main objectives. First, to study the present health inequalities between natives and immigrants by country of birth, within the UK working population. Secondly, it aimed to test the existence of the so-called Healthy Immigrant Effect which says that immigrants are healthier than the native-born population on arrival, but their health deteriorates and converges towards native-born levels with the length of stay.

The results of the logit model showed that immigrants working in the UK, both females and males presented a better health status than their native counterparts; and that those

[22] I include longitudinal sample weights to make the sample representative of those who responded in Waves 1 and 4

[23] The only coefficient that turns insignificant is the immigrant coefficient for females, suggesting that female immigrants who stayed in the sample are in worse health than those who dropped out. However this is not relevant for testing the health convergence hypothesis, since for doing so we are interested in the behaviour of recent immigrants. And as we can see the coefficient for female immigrants on arrival (Columns (7) of Table 6 vs Table 17) remains significant and of the similar magnitude when using the new sample.

differences cannot be entirely explained by demographic, education or socioeconomic characteristics. The only group of immigrants who did not show a significantly different self-reported health was immigrants born in Developing Asia. Then, it seems plausible that the immigrant's self-selection mechanisms on skills and health that were theoretically discussed, have been driving the working immigration towards the UK. In that sense, the UK visa system was also discussed to play an important role on selecting high educated immigrants.

In addition, when I controlled for years lived in the UK, immigrants on arrival reported a good health status with a much higher likelihood than the natives. However, this health gap narrowed for immigrants who had resided longer in the UK. This results are in line with Kennedy and Mcdonald (2005) Wadsworth (2012) and in principle would support the HIE. However I discussed that, although it is clear that immigrants are healthier than natives (especially more recent immigrants); it might have been the case that the apparent health deterioration and convergence of immigrant´s health towards native levels was driven by cohort effects.

To avoid this cohort effect I carried out a longitudinal analysis. First, by a simple comparison of health distributions through time, health distribution of immigrant workers was shown to have converged to that of the native-born workers between 2009 and 2012. This convergence was caused by two main forces. First, a faster deterioration in immigrant´s health coming from *developing* countries, in particular females who recently arrived to the UK. Second, natives were more likely to report an improvement in health status than immigrants; whereas immigrants from *developing* countries reported the lowest odds of improvement in health.

Therefore, immigrants were shown to be a heterogeneous group and the second hypothesis of the HIE (i.e: immigrants deteriorating their health after arrival and converging towards native levels with the years of stay) was only confirmed for females coming from *developing* countries. This show how important is to distinguish by region of birth when we study the health of immigrants, and not to treat the immigrant population as a homogenous group as other previous studies have done (Wadsworth 2012).

Lastly, the "deterioration and health convergence" hypothesis of the HIE was discussed to have different explanations behind it, according to the literature: immigrants being in a lower socioeconomic status, immigrants adopting bad health behaviours of the native population (i.e: smoking, alcohol consumption, etc.) and immigrants facing restricted access to healthcare due to language limitation and other factors.

I tried to test for some of these hypothesis. After controlling for socioeconomic status, and English language limitations on the base year, female immigrants coming from developing countries were still showing significantly higher odds of reporting a decline in health status. This suggests that socioeconomic status and language restrictions cannot explain the faster deterioration in health of this group of immigrants. However, these control variables were only at the base level (Wave 1), and I did not look at their change over time.

Regarding this, Chiswick (2008) suggest that if self-reported health deterioration is greater among immigrants coming from developing countries that may be due to a change in their reference point, and not to a real change in health. That is, he argues that when individuals are asked to value their level of health, they do it with respect to people around them. Therefore, if the level of health in their country of origin was lower, maybe when they get to the host country, their reference point changes and they realise that their health is actually worse with respect to the host country citizens. Nevertheless, in this paper only women coming from developing countries are those reporting a significantly higher deterioration in health as compared to natives. Hence, if the change in the reference point was the real cause of deterioration in self-reported health, we would expect that to happen for male immigrants coming from developing countries as well, and this is not the case in this analysis.

Lastly, although this paper lacks of data about bad health habits, many authors point out to an acculturation process as an explanation of the health deterioration of immigrants (Hawkings et al 2008, Averett et al 2012). Regarding this, other studies suggest that the higher deterioration of health in immigrants is due to an initial adjustment to a new climate and lifestyle and the stressful experience of immigration. (Chiswick et al 2008).

Overall, it was not clear why female immigrants from developing countries are those showing a higher decline in health and driving as a consequence the overall immigrant´s health convergence towards native levels. Therefore, more research would be needed on this issue in the absence of time and data constraints.

More limitations of this paper are related with the relatively short period of the panel (3 years). Although other studies also show significant declines in immigrant´s health within a similar short period of time (Chiswick et al 2008, Newbold 2009); it seems clear that a longer period will make possible a more detailed study of the health trajectories of the immigrants and natives. This way, we could test whether other group of immigrants suffer a decline in health towards native levels, but within a longer period of time or not. Therefore, future waves of the UKHLS will allow to improve the present analysis.

10 – BIBLIOGRAPHY

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APPENDIX

Table 11- COUNTRIES PER REGION

REGION	COUNTRIES
South Asia	**I**ndia, Pakistan, Bangladesh, Sri Lanka, Nepal
EU 15	Ireland, Germany, France, Italy, Portugal, Spain, Netherlands, Sweden, Austria, Greece, Belgium, Denmark
Sub-Saharan Africa	South Africa, Nigeria, Kenya, Zimbabwe, Somalia, Ghana, Uganda, Mauritius, Tanzania, Zambia
Rest of Europe	Poland, Lithuania, Romania, Cyprus, Bulgaria, Slovakia, Hungary, Latvia, Russia, Malta, Czech Republic
East Asia and Pacific	China, Philippines, Hong Kong, Malaysia, Singapore, Japan, Thailand
English-speaking Dev. Countries	United States, Australia, Canada, New Zealand
Middle East and North Africa	Turkey, Iraq, Iran, Afghanistan, Egypt, Saudi Arabia, Yemen
Latin America and Caribbean	Jamaica, Brazil, Trinidad And Tobago, Colombia

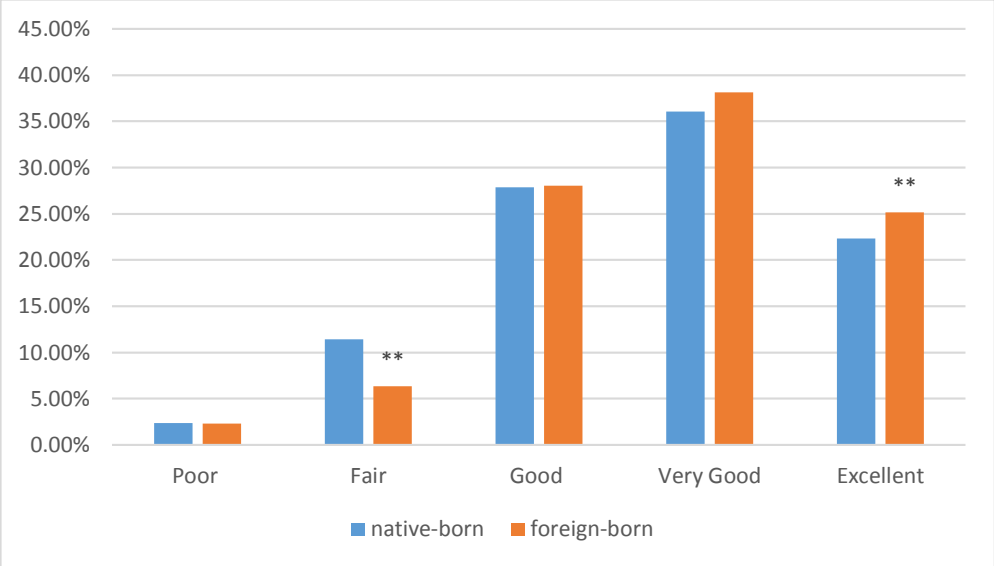
Author´s own classification for the Analysis of the Migration in the UK in Section 4.Only data about the 60 most important countries in terms of immigration was available. Source: 0NS

Table 12- DESCRIPTION OF THE VARIABLES

Variable	Description
SRH	Self-reported Health Status {=5 "excellent", =4 "very good", = 3 "good", =2 "fair", =1 "poor"}
Health	=1 good health { SRH=3,4,5 }, = 0 bad health { SRH=3,4,5 }
Immigrant	=1 if foreign-born ; = 0 if native-born
Years in UK	number of years since first arrived to the UK (= 0 for the native-born)
Males	=1 if male, =0 if female
Age	age
Excellent SRH	=1 if SRH_1=5 "excellent", =0 otherwise
Poor SRH	=1 if SRH_1=1 "poor", =0 otherwise
English Difficulties	=1 if the individual declared to have difficulties speaking day to day English
EDUCATION DUMMIES (highest educational qualification achieved)	
High Education	High education
A level	A level
GCSE	General Certificate of Secondary Education (GCSE)
Other Education	Other qualification
No Education	No educational qualification
SOCIO-ECONOMIC STATUS DUMMIES	
Unemployed	Unemployed
NS-SEC 5	Working: Management & professional
NS-SEC 4	Working: Intermediate
NS-SEC 3	Working: Small employers & own account
NS-SEC 2	Working: Lower supervisory & technical
NS-SEC 1	Working: Semi-routine, routine & never worked or long-term unemployed

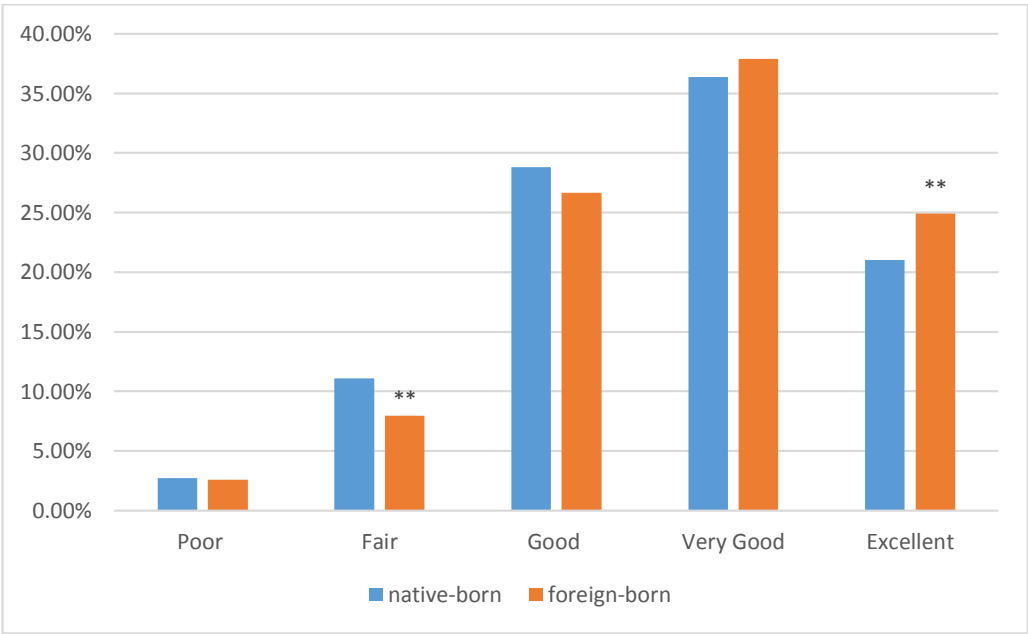
Source: UK Household Longitudinal Survey (UKHLS)

Figure 10- HEALTH STATUS DISTRIBUTION IN WAVE 1(MALES)



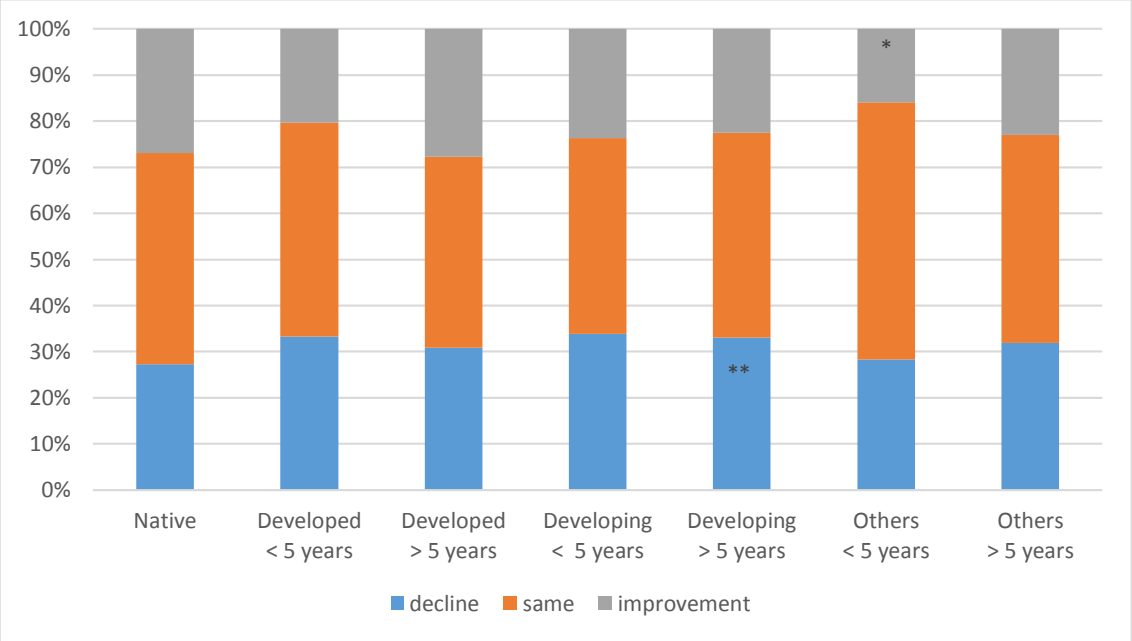
**p<0.05, p<0.1 of Adjusted Wald test for the difference in means between the native-born and the foreign-born. Weighted means with Wave 1 cross-section weights.

Figure 11- HEALTH STATUS DISTRIBUTION IN WAVE 1 (FEMALES)



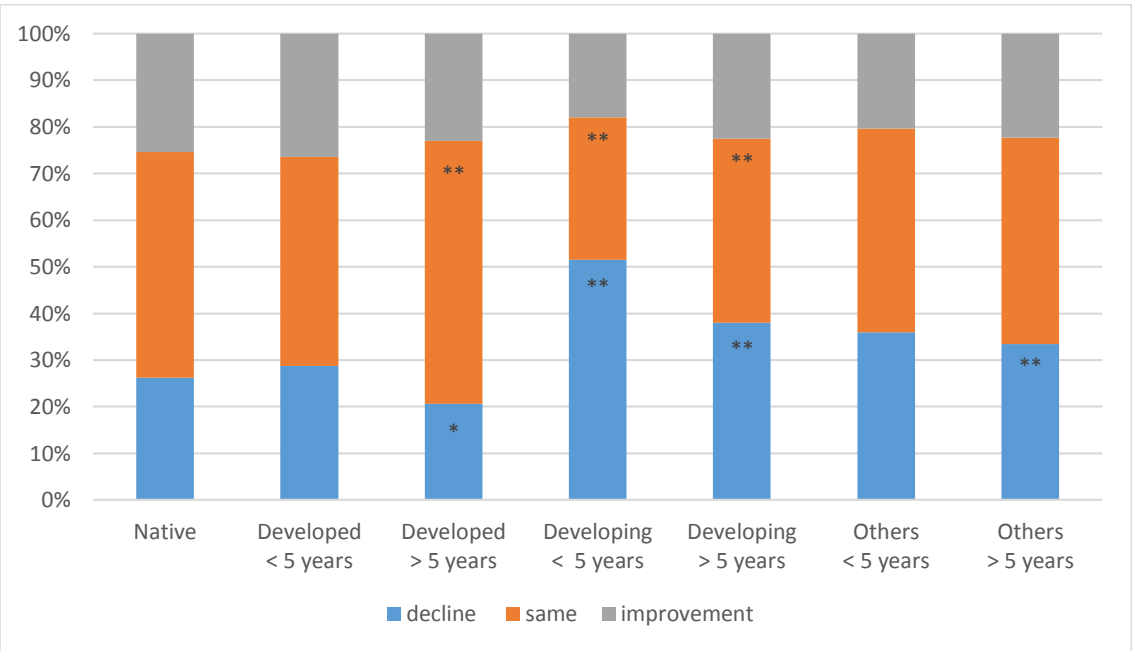
**p<0.05, p<0.1 of Adjusted Wald test for the difference in means between the native-born and the foreign-born. Weighted means with Wave 1 cross-section weights.

Figure 12- HEALTH TRAJECTORIES BY REGION OF ORIGIN AND LENGH OF STAY (MALES)



**p<0.05, p<0.1 of Adjusted Wald test for the difference in means between every immigrant group and the native-born population. Weighted means with longitudinal weights.

Figure 13- HEALTH TRAJECTORIES BY REGION OF ORIGIN AND LENGH OF STAY (FEMALES)



**p<0.05, p<0.1 of Adjusted Wald test for the difference in means between every immigrant group and the native-born population. Weighted means with longitudinal weights

Table 13- MULTINOMIAL LOGIT MODEL (2):
MARG. EFFECTS FOR THE PROBABILITY OF REPORTING AN IMPROVEMENT IN HEALTH

VARIABLES	(1) All	(2) All	(3) Males	(4) Females	(5) All	(6) Males	(7) Females
Developed Countries	-0.014	-0.070**	-0.067*	-0.069*	-0.068**	-0.066	-0.065
	(0.02)	(0.03)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)
Developing Countries	-0.039**	-0.091***	-0.089**	-0.099***	-0.087***	-0.089**	-0.091**
	(0.02)	(0.02)	(0.04)	(0.03)	(0.03)	(0.04)	(0.04)
Other Countries	-0.045**	-0.097***	-0.105***	-0.090**	-0.096***	-0.108***	-0.085**
	(0.02)	(0.02)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)
Years in UK		0.006**	0.006	0.006	0.006*	0.006	0.005
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Years in UK²		-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Males		0.012			0.016*		
		(0.01)			(0.01)		
Age		-0.002***	-0.002***	-0.002***	-0.003***	-0.003***	-0.003***
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Poor SRH					0.308***	0.328***	0.287***
					(0.03)	(0.04)	(0.04)
Observations	18,209	18,203	8,668	9,433	18,203	8,668	9,433

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Weighted estimations with longitudinal weights.

Table 14- MULTINOMIAL LOGIT MODEL (2): MARG. EFFECTS FOR THE PROBABILITY OF REPORTING AN IMPROVEMENT IN HEALTH WITH REGION OF BIRTH

VARIABLES	(1) All	(2) Males	(3) Females	(4) All	(5) Males	(6) Females
Developed Countries	-0.064**	-0.057	-0.066	-0.066*	-0.051	-0.075*
	(0.03)	(0.05)	(0.04)	(0.03)	(0.05)	(0.04)
Developing Countries	-0.088***	-0.086**	-0.093**	-0.097***	-0.090**	-0.108***
	(0.03)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)
Other Countries	-0.094***	-0.099**	-0.087**	-0.107***	-0.116***	-0.097**
	(0.03)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)
Years in UK	0.007*	0.006	0.006	0.007**	0.007	0.007
	(0.00)	(0.01)	(0.00)	(0.00)	(0.01)	(0.00)
Years in UK²	-0.000*	-0.000	-0.000	-0.000*	-0.000	-0.000
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Males	0.015*			0.018**		
	(0.01)			(0.01)		
Age	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Poor SRH	0.303***	0.327***	0.274***	0.299***	0.322***	0.272***
	(0.03)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)
EDUCATION						
High Education	-0.043**	-0.038	-0.052*	-0.034*	-0.023	-0.048*
	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)
A level	0.003	0.025	-0.027	0.011	0.041	-0.023
	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)
GCSE	-0.010	0.016	-0.041	-0.007	0.024	-0.039
	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)
Other Education	-0.013	-0.013	-0.009	-0.005	-0.001	-0.004
	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)
SOCIOECONOMIC STATUS						
Unemployed	-0.016	-0.004	-0.028	-0.012	0.010	-0.033
	(0.02)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)
NS-SEC 5	0.010	0.034*	-0.014	0.009	0.037*	-0.016
	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
NS-SEC 4	0.023	0.040	0.013	0.024*	0.053*	0.008
	(0.01)	(0.03)	(0.02)	(0.01)	(0.03)	(0.02)
NS-SEC 3	-0.001	0.009	-0.011	-0.003	0.013	-0.018
	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.03)
NS-SEC 2	0.030	0.021	0.059**	0.029	0.021	0.058*
	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)
English Difficulties				0.051	0.024	0.115
				(0.05)	(0.06)	(0.07)
Observations	17,981	8,558	9,317	17,344	8,062	9,171

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Weighted estimations with longitudinal weights

Table 15- DEPENDENT VARIABLE ROBUSTENESS CHECKS: COEFFICIENTS OF THE IMMIGRANT VARIABLE IN LOGIT MODEL (1) USING THE PRESENCE OF EACH HEALTH CONDITION AS DEPENDENT VARIABLES

VARIABLES	(1) All	(2) All	(3) Males	(4) Females	(5) All	(6) Males	(7) Females
Immigrant Asthma	-0.058***	-0.058***	-0.054***	-0.063***	-0.132***	-0.131***	-0.134***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.04)	(0.03)
Immigrant High Blood Pressure	0.009**	0.011**	0.008	0.016**	-0.014	-0.023	-0.003
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
Immigrant Arthritis	-0.015***	-0.015***	-0.017***	-0.013	-0.059***	-0.069***	-0.049
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.04)
Immigrant Depression	-0.025***	-0.026***	-0.017***	-0.037***	-0.054***	-0.040**	-0.074***
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
Immigrant Diabetes	0.013***	0.013***	0.017***	0.008**	-0.013*	-0.014	-0.011
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)
Immigrant Hypothyroidism	-0.011***	-0.011***	-0.003	-0.020***	-0.016**	-0.005	-0.030*
	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)	(0.02)
CONTROL VARIABLES							
Age and sex	x	x	x	x	x	x	x
Education		x	x	x	x	x	x
Socioeconomic Status		x	x	x	x	x	x
Years in UK					x	x	x
Observations	29,904	29,357	14,524	14,815	29,326	14,505	14,803

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. This table replicates estimations of Table 6, but using the presence of health conditions as a dependent variable. The health condition used as a dependent variable in each row is reported. Only the coefficient of the variable of interest, (Immigrant) are reported for space reasons. Wave 1 cross-section weights were used.

Table 16- ATTRITION CHECK 1: ESTIMATION RESULTS OF LOGIT MODEL (1) USING RESPONDENTS OF BOTH WAVE 1 AND WAVE 4

VARIABLES	(1) All	(2) All	(3) Males	(4) Females	(5) All	(6) Males	(7) Females
Immigrant	0.040***	0.037***	0.056***	0.016	0.160***	0.217***	0.110**
	(0.01)	(0.01)	(0.02)	(0.01)	(0.03)	(0.04)	(0.04)
Years in UK					-0.009***	-0.013***	-0.007*
					(0.00)	(0.00)	(0.00)
Years in UK²					0.000**	0.000***	0.000
					(0.00)	(0.00)	(0.00)
Age	-0.002***	-0.003***	-0.003***	-0.002***	-0.002***	-0.003***	-0.002***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Males	-0.000	0.003			0.003		
	(0.01)	(0.01)			(0.01)		
EDUCATION							
High Education		0.075***	0.078***	0.076***	0.074***	0.075***	0.077***
		(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
A level		0.022*	0.009	0.043**	0.025**	0.009	0.047***
		(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
GCSE		0.023**	0.013	0.035**	0.025**	0.014	0.039**
		(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
Other Education		0.006	0.016	-0.005	0.004	0.011	-0.004
		(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
SOCIOECONOMIC STATUS							
Unemployed		-0.072***	-0.067***	-0.077***	-0.070***	-0.064***	-0.076***
		(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)
NS-SEC 5		0.055***	0.050***	0.062***	0.056***	0.052***	0.063***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
NS-SEC 4		0.036***	0.031	0.036***	0.038***	0.034*	0.037***
		(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)
NS-SEC 3		0.046***	0.050***	0.040**	0.048***	0.053***	0.040**
		(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
NS-SEC		0.030**	0.044**	0.005	0.031**	0.046**	0.005
		(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
Observations	18,213	17,931	8,527	9,304	17,922	8,523	9,297

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Weighted analysis with longitudinal weights

Table 17- ATTRITION CHECK 2: ESTIMATION RESULTS OF MODEL (1) WITH REGION OF BIRTH USING RESPONDENTS OF BOTH WAVE 1 AND WAVE 4

VARIABLES	(1) All	(2) All	(3) Males	(4) Females	(5) All	(6) Males	(7) Females
Europe	0.036	0.020	0.009	0.036	0.112***	0.126***	0.104***
	(0.03)	(0.03)	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)
Poland	0.103***	0.104***	0.112***	0.093***	0.128***	0.142***	0.113***
	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)
English-Speaking Countries	0.069***	0.052*	0.093**	0.019	0.127***	0.155***	0.094***
	(0.03)	(0.03)	(0.04)	(0.05)	(0.02)	(0.02)	(0.04)
India	0.033	0.037*	0.061**	-0.001	0.110***	0.137***	0.073*
	(0.02)	(0.02)	(0.03)	(0.04)	(0.02)	(0.02)	(0.04)
Developing Asia	-0.017	-0.013	-0.022	0.003	0.087***	0.104***	0.078**
	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)	(0.03)
Africa	0.050***	0.040**	0.073***	0.009	0.117***	0.146***	0.083**
	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)	(0.01)	(0.04)
Other Countries	0.028**	0.033**	0.066***	-0.000	0.109***	0.139***	0.074**
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Years in UK					-0.009***	-0.012***	-0.006
					(0.00)	(0.00)	(0.00)
Years in UK²					0.000**	0.000**	0.000
					(0.00)	(0.00)	(0.00)
Age	-0.002***	-0.003***	-0.003***	-0.002***	-0.002***	-0.003***	-0.002***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
EDUCATION							
High Education		0.075***	0.077***	0.075***	0.073***	0.073***	0.077***
		(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
A level		0.022*	0.009	0.043**	0.024*	0.008	0.047***
		(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
GCSE		0.023**	0.013	0.035**	0.024**	0.013	0.039**
		(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
Other Education		0.004	0.012	-0.006	0.002	0.009	-0.005
		(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
SOCIECONOMIC STATUS							
Unemployed		-0.070***	-0.065***	-0.076***	-0.070***	-0.064***	-0.075***
		(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)
NS-SEC 5		0.055***	0.050***	0.062***	0.056***	0.051***	0.063***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
NS-SEC 4		0.037***	0.033	0.036***	0.038***	0.033	0.037***
		(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)
NS-SEC 3		0.046***	0.051***	0.040**	0.048***	0.053***	0.040**
		(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
NS-SEC 3		0.029**	0.044**	0.003	0.030**	0.044**	0.004
		(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
Observations	18,211	17,929	8,526	9,303	17,920	8,522	9,296

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Weighted analysis with longitudinal weights.