Essays on the effect of immigration and assimilation on immigrants' health and health behaviours: evidence from the United Kingdom and Russian Federation

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Abstract

This thesis investigates the effects of immigration and assimilation on immigrants' health and health behaviours in the United Kingdom and Russian Federation. By using longitudinal survey data from both countries, we test the hypotheses that whether immigrants are more willing to take risk than the native population and if this is the case whether it leads them to be more likely to engage in potentially risky health behaviours (e.g. smoking, regular alcohol drinking, eating fast food). Our results show that even though immigrants are more willing to take risks and are more likely to engage in certain health behaviours, with respect to others they have some protective factors and they never converge to the health level of natives. We show that the reason for immigration (political vs. economic) and the cultural distance determine the health assimilation process to a large extent.

The first chapter explores general and domain-specific risk preferences of immigrant population in the United Kingdom (UK) and provides a comparison with the native population. We also aim to investigate how immigrants' engagement in potentially risky health behaviours is different from native UK population and whether it can be explained by the difference in risk and/or time preferences. We exploit wave 6 of the Innovation Panel that is a part of the UK Household Longitudinal Study to answer the questions of interest. We apply interval regression model to study the effect of immigrant status on risk and time preferences. OLS and probit models are also estimated as a robustness check. We find that, despite being more risk loving, immigrants are less engaged in some potentially risky health behaviours (binge drinking and eating fast food) than native individuals and they also arrive with lower discount rate than natives have.

The second chapter explores the effect of acculturation on immigrants'

health behaviours and lifestyle choices such as smoking, alcohol consumption, physical activity and diet. We exploit the UK Household Longitudinal Study, waves 1-7 (2009-2016). The panel nature of the data allows us to specify a correlated random effects linear probability model. We use length of stay in the UK and national identity as proxies for acculturation. We also allow for different acculturation trajectories based on the factors that are believed to affect the acculturation process, such as social support, family background, life satisfaction and mental health condition. Most importantly, we introduce a measure of cultural distance as we believe that acculturation trajectories will differ for immigrants with different cultural proximity to the UK. Our results indicate that length of stay is associated with lower rates of smoking, higher probability of consuming a healthy diet and regular physical activity. Identifying yourself as British is associated with lower rate of smoking, but lower probability of following a healthy diet and, for female immigrants, more alcohol units consumed over time. We find that immigrants, whose culture is close to the British one, do not change their behaviours almost at all over time and if they do, this change is towards less healthy lifestyle such as lower levels of physical activity and unhealthier diets. In contrast, those with distant cultures experience a considerable change in health behaviours towards healthier lifestyles.

In the third chapter we explore the existence of the healthy immigrant effect (HIE) for Russian immigrants, who arrived after the collapse of the Soviet Union. These immigrants tend to be ethnically Russian and mostly arrived from former Soviet Union republics due to exogenous political reasons. This allows us to isolate the effect of immigration on immigrants' health abstracting from often unobserved characteristics such as cultural background, health perception, language proficiency etc. We compare their health assimilation with that of economically motivated immigrants, who arrived in Russia before 1989. To answer the question of interest we exploit the panel component of the Russian Longitudinal Monitoring Survey from 2010 to 2016. We make use of linear probability model (LPM) with correlated random effects, pooled LPM and standard random effects LPM. As a robustness check we specify the same set of probit models. We find support of HIE in the economic immigrant sub-sample and a partial support for the effect in the political immigrant sub-sample. In political immigrants, young age at arrival and Islamic

country of origin have a protective effect because they are associated with change towards healthier lifestyle over time. The greatest deterioration in health is experienced by political immigrants, who arrived in Russia later in their life (after 30 years old).

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CHAPTER 1

INTRODUCTION

Migration and the permanent movement of people across countries due to both economic (like to find higher-paying jobs or to have better investment opportunities) and non-economic factors (like wars or political conflicts) have been a defining feature of global economy for centuries. Given the substantial social and economic impact of migration both on host country and the immigrants themselves, there has been continued academic interest in different dimensions of migration. In the economics field, some common research areas have been the impact of immigration on labour market outcomes (Borjas, 1985; Borjas, 2015; Dustmann & Fabbri, 2003; Dustmann & Frattini, 2014), housing (Battiston et al., 2014; Sá, 2015) and education (Tanaka, Farre & Ortega, 2018). Recently, healthiness of immigrants and their health-related behaviours attracted attention of researches as well (Akbulut-Yuksel and Kugler, 2016). In this context, many papers examine health-related issues for immigrants and whether their health status converges to the status of natives (Antecol & Bedard, 2006; Biddle, Kennedy & McDonald, 2007; Chiswick, Lee & Miller, 2008; Constant et al., 2014; McDonald & Kennedy, 2005). In order to contribute to this growing literature on several dimen-

sions, this thesis investigates the effects of immigration and assimilation on immigrants' health and health behaviours in the United Kingdom (UK) and Russian Federation (RF). Towards this aim, the thesis contains three chapters that study native-immigrant differences in risk and time preferences (Chapter 1), the effect of acculturation of immigrants' health behaviours (Chapter 2) and the healthy immigrant effect (HIE) in the sample of political immigrants in comparison with the sample of economic immigrants and native individuals (Chapter 3).

Existing studies have shown that immigrants arrive being healthier compared to the native population (Marmot et al., 1984; Rechel et al., 2013). Nevertheless, their health deteriorates over time and at a faster speed than health of natives (Ronellenfitsch & Rasum, 2004; Rechel et al., 2013). It is important to understand the differences between immigrants and natives, and immigrants' health assimilation process to ensure that there are public health programmes designed specifically for immigrants. Also, it is important to target correct groups of immigrants for the health behaviours in which immigrants experience unhealthy assimilation.

Throughout the thesis, we test the hypothesis if immigrants are more willing to take risks than the native population and if this leads them to be more likely to engage in potentially risky health behaviours (e.g. smoking, regular alcohol drinking, eating fast food). So, we fill important gaps in the literature by comparing risk and time preference of immigrants and natives in the UK, using longitudinal dataset to study the effect of acculturation on immigrants' health behaviours and allowing for different acculturation trajectories by cultural distance. We also design a quasi-experiment to estimate the effect of immigration on health.

Our results show that even though immigrants are more willing to take risks and are more likely to engage in certain health behaviours, with respect to others they have some protective factors and they never converge to the health levels of natives. We show that the reasons for immigration (political vs. economic) and the cultural distances determine

the health assimilation process to a large extent.

The first chapter explores general and domain-specific risk preferences of immigrant population in the UK and provides a comparison with the native population. We also aim to investigate how immigrants' engagement in potentially risky health behaviours is different from native UK population and whether it can be explained by the differences in risk and/or time preferences. We exploit wave 6 of the Innovation Panel that is a part of the UK Household Longitudinal Study to answer the questions of interest. Risk preferences are elicited using two methods widely used in the literature: multiple price list method based on Holt & Laury (2002) and self-assessed scale-based questions based on Dohmen et al. (2011). Time preferences are elicited using multiple price list method based on Coller & Williams (1999). We apply interval regression model to study the effect of immigrant status on risk and time preferences. OLS and probit models are also estimated as a robustness check. Our result is in line with the literature: immigrants are more willing to take risks than natives. However, it is also important to distinguish by immigrants' country of origin, length of stay in the UK and citizenship status. Non-European Union (EU) immigrants are more willing to take risks than native UK citizens, whereas EU immigrants are even more risk averse than natives. Immigrants who are non-UK citizens are less risk averse and immigrants who are UK citizens are more risk averse than natives. Those who spent more time in the UK and those who are UK citizens are more willing to take health risks than natives. Immigrants, who arrived recently, have lower discount rate than native individuals but their discount rate increases with time spent in the UK. We also study the effect of risk attitude on health behaviours using a probit model and allowing for an interaction between an immigrant status and risk and time preferences. We find that immigrants smoke more than natives, specifically immigrants from the EU. Higher willingness to take health risks is associated with higher probability of smoking. Risk loving is associated with higher probability

of drinking. Non-EU immigrants are less likely to binge drink and to eat fast food than native UK citizens. High discount rate is associated with higher probability of smoking and eating fast food. To sum up, despite being more risk loving, immigrants are less engaged in some potentially risky health behaviours (binge drinking and eating fast food) and they also arrive with lower discount rate than native individuals have.

The second chapter explores the effect of acculturation on immigrants' health behaviours and lifestyle choices such as smoking, alcohol consumption, physical activity and diet. Health is a key indicator of assimilation of immigrants into receiving societies, alongside their levels of employment, acquisition of education and access to housing. Part of the process of assimilation is the adoption of behaviours from new culture by immigrants called acculturation. The effect of migrants' acculturation in terms of health behaviours has been studied in countries with considerable immigrant population: United States (US), Australia and Canada. However, there is little evidence for the UK and the few existing studies have suffered from the limitation of having to rely on cross-sectional data. Researchers highlight the need to study acculturation using longitudinal data. We exploit the main survey of the UK Household Longitudinal Study, wave 1-7 (2009-2016). The panel nature of the data allows us to specify a correlated random effects linear probability model. We use length of stay in the UK and national identity as proxies for acculturation. We also allow for different acculturation trajectories based on the factors that are believed to affect the acculturation process, such as social support, family background, life satisfaction and mental health condition. Most importantly, we include a measure of cultural distance in the model as we believe that acculturation trajectories will differ for immigrants from the countries culturally close to the UK and for immigrants, whose original culture differs considerably from the British one. Our results indicate that length of stay is associated with lower rates of smoking and smoking intensity, higher probability of consuming a healthy diet and regular

physical activity. Identifying yourself as British is associated with lower rate of smoking and smoking intensity, but lower probability of following a healthy diet and, for female immigrants, more alcohol units consumed over time. We find that immigrants, whose culture is close to the British one, do not change their behaviours almost at all over time and if they do, this change is towards less healthy lifestyle such as lower levels of physical activity and unhealthier diets. In contrast, those with distant cultures experience a considerable change in health behaviours towards healthier lifestyles. The adoption of unhealthy behaviours by immigrants may lead to increase in morbidity and mortality. Public health policies targeted towards specific groups of immigrants based on their acculturation level are expected to save future health care costs and individuals' well-being.

In the third chapter we explore the existence of HIE in Russian immigrants, who arrived after the collapse of the Soviet Union. These immigrants tend to be ethnically Russian and mostly arrived from former Soviet Union republics due to exogenous political reasons. Thanks to very similar educational standards across the Soviet Union, immigrants are not different from natives with respect to language proficiency and educational attainment. This allows us to isolate the effect of immigration on immigrants' health abstracting from often unobserved characteristics such as cultural background, health perception, language proficiency etc. We compare their health assimilation with that of economically motivated immigrants, who arrived in Russia before 1989. To answer the question of interest we exploit Russian Longitudinal Monitoring Survey, a panel household survey of over 10,000 people annually. We exploit the panel component of the survey from 2010 to 2016. We extract data on health outcomes and socio-economic characteristics, besides the immigrants' country of origin, length of stay and age at arrival. We specify three cohorts of individuals: native-born, foreign-born arrived before the collapse of the Soviet Union (economic immigrants) and those who arrived after the

collapse (political immigrants). We control for two processes that take place simultaneously: aging of immigrants and natives and the increasing duration of immigrants' stay in the RF. We make use of linear probability model (LPM) with correlated random effects, pooled LPM and standard random effects LPM. As a robustness check we specify the same set of probit models. Political and economic immigrants arrived from former Soviet Union republics and are similar to natives with respect to education and income levels, however are different in other characteristics such as age, marital and employment status, and nationality. We find support for HIE in the economic immigrant sub-sample and a partial support for the effect in the political immigrant sub-sample. In political immigrants, young age at arrival and Islamic country of origin have a protective effect on assimilation process because they are associated with transition towards healthier lifestyle over time. The largest deterioration is experienced by political immigrants, who arrived in Russia later in their life (after 30 years old). To sum up, we use the collapse of the Soviet Union as a quasi-experiment and show that political immigrants, who have exogenous reasons for immigration and are very similar to native population, have a different assimilation process from economic immigrants that are commonly studied in the existing literature.

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CHAPTER 2

Native-immigrant Differences in Risk and Time Preferences and their Association with Health Behaviours: Evidence from the United Kingdom

2.1 Introduction

Decision to immigrate involves risk and uncertainty. Consequently, immigrants are commonly perceived as risk takers. They have imperfect information on labour market characteristics including wages, unemployment benefits; opportunities to spend their leisure time; social mobility and the general environment in the destination country. They also have to give up of close relationship with family and friends they leave behind. Hence, a rational individual would decide to immigrate only if his or her willingness to take risks is significantly high (Akguc et al. 2015; Balaz & Williams, 2011). Immigrant population accounted for 13.5% of the total population in the United Kingdom (UK) in 2015 (Vargas-Silva & Rienzo, 2016). Specifically for Inner London, it accounted for striking 36.8% in 2015. The immigrant population is diverse with

people coming from all over the world. The top three countries of origin are Poland, India and Pakistan (ONS, 2015; Vargas-Silva & Rienzo, 2016). They are followed by two European countries, i.e. Ireland and Germany. South Africa, Nigeria, Bangladesh and Romania comprise about 2% of immigrant population in the UK.

Despite a common stereotype, the majority of immigrants in the UK are women and not men. This fact is true since 1993 (Vargas-Silva & Rienzo, 2016). This makes the UK different from other developed countries' immigrant populations, e.g. Germany, where there is lower share of women in the immigrant population compared to the native population (Bonin et al., 2012). The most common reason to immigrate is work, with formal studies being the second most common (Blinder, 2016). The eligibility of immigrants for unemployment benefits, social housing and health care access is largely determined by whether a person comes from a member country of the EU[1] or not. EU nationals classified as workers are eligible for the same welfare benefits (tax credits, housing benefits) as UK nationals. EU nationals, who are long-term UK residents, have free access to the National Health Service (NHS). They also have free access if their country of citizenship has reciprocal health care agreement with the UK. Such agreements are made with all European Economic Area (EEA) countries, which include all EU countries and, in addition, Iceland, Lichtenstein and Norway. Based on these differences it is likely that EU nationals have lower uncertainty when making decision to immigrate compared to non-EU nationals.

The eligibility for free access to the NHS used to be the same for non-EU nationals ordinarily resident in the UK. Department of Health estimated cost of services provided to immigrants and visitors in 2013. The total gross estimate was £2 billion a year, however it included EU nationals as well (The King's Fund, 2015). The cost of so-called 'health

[1]The full list of member countries of the EU is available at: https://europa.eu/european-union/about-eu/countries_en

tourism' was estimated between £60 and £80 million a year. In order to recover costs from visitors and immigrants, the NHS surcharge was introduced in April 2015. Now each non-EU national has to pay £200 per year [2] together with his or her application for a long-term visa.

Immigrants also differ with respect to their health behaviours. They tend to use less health care services compared to native UK citizens (Jayaweera & Quingley, 2010; The King's Fund, 2015). Immigrants in the UK report poorer general health but they are less likely to smoke and consume alcohol (Jayweera & Quingley, 2010). Immigrants living in London tend to engage in risky sexual behaviours more than native-born individuals (Burns et al., 2011). Hence, foreign-born individuals have different behaviours than native-born and some may incur high costs to the NHS.

The objective of this chapter is to explore general and domain-specific risk preferences as well as time preferences of immigrant population in the UK, and make a comparison with the native population. We also aim to investigate how immigrants' engagement in risky health behaviours is different from that of native UK population and whether it can be explained by the difference in risk attitudes. Understanding the above differences in risk attitudes and health behaviours will contribute to the design of public health programmes targeted specifically towards the UK immigrant population. Such programmes could save future health care costs and well-being by promoting prevention and healthy lifestyle among immigrants.

We exploit the UK Household Longitudinal Study (UKHLS) Innovation Panel, which includes information on risk, time preferences and health behaviours, to answer the questions of interest. To our best knowledge, this is the first study comparing risk preferences of the UK native and immigrant population. The existing literature on native-migrant differ-

[2] Discounts apply to some categories of applicants. Full information is available at: https://www.gov.uk/healthcare-immigration-application/how-much-pay

ence in risk attitude is scarce and does not provide consistent results. The studies mainly focus on risks in general despite the recent empirical evidence on risk attitude being domain-specific. We benefit from a unique dataset that incorporates different risk measures and a wide profile of potentially risky health behaviours such as smoking, alcohol consumption and poor diet.

Risk preferences are elicited using two methods widely used in the literature: multiple price list method based on Holt & Laury (2002) and self-assessed scale-based questions based on Dohmen et al. (2011). Time preferences are elicited using multiple price list method based on Coller & Williams (1999). We apply interval regression models to study the effect of immigrant status on risk and time preferences. OLS and probit models are also estimated as robustness checks. Probit models are then used to study the association between risk or time preferences and health behaviours, which we allow to differ for immigrants and natives.

In line with the literature, we find that immigrants are more willing to take risks than natives. This is true for all risk measures except self-assessed risk in the financial domain. However, it is also important to distinguish by immigrants' country of origin, length of stay in the UK and citizenship status. Non-EU immigrants are more willing to take risks than native UK citizens, whereas EU immigrants are more risk averse than natives. Immigrants, who did not get the UK citizenship, are less risk averse than natives, whereas immigrants, who are UK citizens, are more risk averse than natives. Those who spent more time in the UK and those who are UK citizens are more willing to take health risks than natives. Immigrants, who arrived recently, have lower discount rates than native individuals but this difference is attenuated with time spent in the UK.

We find that immigrants smoke more than natives, specifically immigrants from the EU. Higher willingness to take health risks is associated with higher probability of smoking. Non-EU immigrants are less likely to

binge drink than native UK citizens. Immigrants, who arrived recently in the UK (after 2003), are more likely to eat fast food regularly but this probability is decreasing with time spent in the UK. High discount rate is associated with higher probability of smoking and eating fast food.

The paper is organised as follows. Section 2 provides a short review of literature. Section 3 describes the data and provides its descriptive analysis. Section 4 presents the empirical strategy, Section 5 presents the results before concluding in section 6.

2.2 Related Literature

The existing studies exploring the relationship between risk attitude and decision to migrate generally confirm the conventional belief that immigrants are risk loving. Jaeger et al. (2010) show that internal German migrants are more risk tolerant than stayers. Importantly, they consider the relationship between risk aversion and migration ambiguous. Risk averse individuals may migrate to an area with lower variance of income distribution compared to their home country, whereas risk lovers may be seeking for higher wage rates in the destination country. Another crucial conclusion is that risk attitude determines migration and not the opposite (using reverse causality test). Similarly, Akgüc et al. (2015) and Dustmann et al. (2017) provide support for conventional belief in the population of internal migrants in China. Akgüc et al. (2015) show that risk attitude correlates across generations. Dustmann et al. (2017) point out that it is important to account for risk attitude of all household members as decision of internal migration in China is undoubtedly made on the household level.

Gibson & McKenzie (2011) find that the more risk loving individuals are, the more likely they are to move to a different country. They consider specifically highly skilled individuals from three countries of the Pacific

region: Tonga, Papua New Guinea and New Zealand. Nowotny et al. (2014) study international migration decisions taking into account cross-border commuting as an alternative option. Risk aversion has negative effect on willingness both to migrate and to commute. Balaz & Williams (2011) find out that female students who had migration experience of at least 3 months are more risk loving than those without such experience.

In contrast, Conroy (2009) shows that internal migrant women in Mexico are more risk averse than those who did not migrate. Migration is a way to avoid high volatility of income. The result is consistent with the hypothesis of Jaeger et al. (2010). Umblijs (2012) explores the effect of networks on the decision to migrate. The size of network is proved to have a positive effect on the level of risk aversion. Hence, migrants with considerable network in the destination country can be significantly risk averse and potentially even more risk averse than natives.

Similarly, the studies exploring the differences in risk attitude between immigrants and natives provide inconsistent results. Hao et al. (2014) in their experiment do not find any differences in risk attitude between immigrants and natives. Halek & Eisenhauer (2001) study the demography of risk aversion and among others include immigrant status as an explanatory variable. Migrants are shown to be more risk loving than the native population. However, Bonin et al. (2006) and Fang et al. (2013) obtain the opposite conclusion. The first study finds German immigrants to be more risk averse than native population, which can be explained by the guest worker programme. The latter reports Hispanic immigrants having lower risk tolerance than non-immigrant Whites. The literature search does not identify any similar studies conducted in the UK. Williams & Balaz (2014) conduct a survey of UK population but they focus their analysis on mobility profiles and their association with risk attitude. The most mobile individuals are shown to be prone to high risk taking, especially with respect to mobility risks.

The process of assimilation has a strong influence on individuals'

behaviour and there is a growing literature on the association between length of residence and immigrants' risk attitude as well as comparing first and second-generation migrants. Constant et al. (2010) find that second-generation immigrants are less risk averse than natives but not different in the probability of being employed. Bonin et al. (2012), similar to their earlier study, find German immigrants are more risk averse compared to native population. However, second generation immigrants are less risk averse than those of first generation and not significantly different from native population. Ethnic persistence has positive effect on risk aversion and when included as a covariate makes the difference between first and second-generation immigrants not significant. This is an argument in favour of personal traits being inherited from parents is more important than country of birth.

There is an on-going debate whether risk attitude is generic or domain-specific. Warshawsky-Livne et al. (2012) do not observe any inconsistencies between money and health domains and claim that it is possible to predict health-risk attitude based on monetary-risk attitude. In contrast, Prosser & Wittenberg (2007) find that patients and community members were predominantly risk neutral with respect to health outcomes and risk averse with respect to money. Galizzi, Miraldo & Stavropoulou (2016) show that people exposed to both health and financial distress tend to be less risk averse in the financial than in the health domain. Van der Pol & Ruggeri (2008) find out that general public (university students) is risk averse with respect to financial matters and life years lottery involving risk of immediate death. But the majority of them are risk seeking with respect to other health lotteries, including the one incorporating quality of life.

Risk attitude is likely to affect individual's health behaviour. There is empirical evidence in the literature that immigrants engage in risky health behaviours. For example, Burns et al. (2011) find that Central and Eastern European immigrants in London tend to engage in behaviours as-

sociated with substantial risk of HIV transmission. Pylypchuk & Hudson (2009) observe that immigrants are less likely to use preventive care than native US population. But studies of UK immigrants provide evidence of immigrants being less likely to smoke or consume alcohol than the general population (Jayaweera & Quingley, 2010). Immigrant mothers are also more likely to initiate breast feeding and less likely to smoke and drink alcohol during pregnancy. This supports a phenomenon known as "healthy immigrant" effect, although Jayaweera & Quingley (2010) observe immigrant mothers reporting poorer general health than UK mothers. With respect to assimilation, the probability of smoking during pregnancy increases and the duration of breast-feeding decreases with the length of residence (Hawkins et al., 2008). Nevertheless, immigrants are shown to use less health care than the native population (Jayaweera & Quingley, 2010). The evidence is based on immigrant mothers having less antenatal care and being less likely to attend antenatal classes.

The relationship between time preferences and health behaviours was first studied by Victor Fuchs (Fuchs, 1982). He hypothesized that the positive correlation between education and health is partly due to individuals' time preferences. Becker & Mulligan (1997) provide support for this hypothesis. Individuals, who do not discount the future heavily and are ready to exchange current utility for benefits in the future, are considered patient and they are more likely to invest in healthy behaviours, e.g. regular physical exercise and healthy diet (Cawley & Ruhm, 2011). Some empirical studies, however, fail to support the relationship between time discounting and health behaviours, in particular smoking (Khwaja et al., 2007). There is also evidence in favour of time preferences being domain-specific. Some individuals are patient to save money but are not prepared to feel physical pain and prefer to experience it later (Cawley & Ruhm, 2011).

2.3 Data

To answer the questions of interest, we exploit the UKHLS Innovation Panel (University of Essex, 2016). This is a household longitudinal study started in 2010 aimed at developing further its predecessor, the British Household Panel Survey (BHPS), in some research areas. The Innovation Panel (IP) collects data on all major aspects of individuals' life as well as incorporating various experiments across the waves. The IP is a stratified, clustered, equal probability sample of residential addresses. It was drawn from the whole UK, excluding the Northern Ireland and Scotland north of the Caledonian Canal (Buck & McFall, 2012). Data were collected using computer assisted personal interviewing. The two major parts of the survey are a household interview and individual interview. One member of the household completes the household interview, while all members 16 years and older complete the individual adult interview and self-completed questionnaire.

Wave 6 includes the module on risk and time preferences[3]. A target sample of around 580 respondents was selected such that only one respondent participated per household. Households were randomly selected and then selection of respondents within households was made with a Kish grid of enumerated adults.

Wave 6 also contains information on health behaviours: smoking, alcohol consumption, diet and physical activity. In this chapter we focus on potentially risky health behaviours and, therefore, only include variables for smoking, alcohol consumption and eating fast food regularly in the final dataset. We aim to look at the probability of engaging in potentially risky health behaviours and do not aim to consider the intensity of such engagement (e.g. number of cigarettes smoked per day, light/moderate/heavy

[3]The data were collected under the Future Research Leader project titled "Linking Experimental and Survey Data: Behavioural Experiments in Health and Wellbeing" funded by ESRC.

drinker etc).

2.3.1 Risk preferences measure

The dataset contains two measures of risk preferences: multiple price list method based on Holt & Laury (2002) and self-assessed scale-based questions on willingness to take risks introduced in German Socio-Economic Panel (SOEP) and validated by Dohmen et al. (2011). Multiple price list method is widely applied in experimental studies (e.g. Schram & Sonnemans, 2011; Krieger & Felder, 2013). The experiment includes two parts: the first one with low payoffs and the second one with high payoffs. Each part required 9 choices to be made between two lotteries. The lottery options with expected payoffs are shown in Table 2.1.

One-tenth of selected participants were given a payment upon completion of the questions. Among those selected to receive a payment, the amount was based on one of the choices they made. Theory assumes that a risk neutral individual would choose option A four times before switching to option B in case of low payoffs and three times in case of high payoffs. Consequently, if an individual makes less (more) safe choices, he/she is classified as risk loving (risk averse). Because the method involves real monetary stakes, it is likely to reflect people's true preferences. Similarly to Holt & Laury (2002), we use the total number of safe choices (Option A) as an indicator of risk aversion. The information about the switching point is also used to calculate the coefficient of relative risk aversion (CRRA). We follow the Expected Utility Theory and assume that respondents use a utility function as follows:

$$(U_{M_\tau}, W) = \frac{(W + M_\tau)^{1-r}}{1-r} \; for \; r \neq 1 \tag{2.1}$$

where r is the CRRA coefficient, M_τ is the monetary prize and W is the background income (Galizzi, Machado & Miniaci, 2016). If $r = 0$, an individual is classified as risk neutral, if $r > 0$ – risk averse and if $r < 0$ –

Table 2.1: Multiple price list method (risk preferences)

Choice	Option A				Option B				ΔE	CRRA	
	Pr	Payoff	Pr	Payoff	Pr	Payoff	Pr	Payoff			
					Low payoff						
1	0.1	40	0.9	32	0.1	77	0.9	2	23.3	$-\infty$	-1.71
2	0.2	40	0.8	32	0.2	77	0.8	2	16.6	-1.71	-0.95
3	0.3	40	0.7	32	0.3	77	0.7	2	9.9	-0.95	-0.49
4	0.4	40	0.6	32	0.4	77	0.6	2	3.2	-0.49	-0.14
5	0.5	40	0.5	32	0.5	77	0.5	2	-3.5	-0.14	0.15
6	0.6	40	0.4	32	0.6	77	0.4	2	-10.2	0.15	0.41
7	0.7	40	0.3	32	0.7	77	0.3	2	-16.9	0.41	0.68
8	0.8	40	0.2	32	0.8	77	0.2	2	-23.6	0.68	0.97
9	0.9	40	0.1	32	0.9	77	0.1	2	-30.3	0.97	1.37
					High payoff						
1	0.1	100	0.9	40	0.1	180	0.9	2	26.2	$-\infty$	-0.75
2	0.2	100	0.8	40	0.2	180	0.8	2	14.4	-0.75	-0.32
3	0.3	100	0.7	40	0.3	180	0.7	2	2.6	-0.32	-0.05
4	0.4	100	0.6	40	0.4	180	0.6	2	-9.2	-0.05	0.16
5	0.5	100	0.5	40	0.5	180	0.5	2	-21	0.16	0.34
6	0.6	100	0.4	40	0.6	180	0.4	2	-32.8	0.34	0.52
7	0.7	100	0.3	40	0.7	180	0.3	2	-44.6	0.52	0.7
8	0.8	100	0.2	40	0.8	180	0.2	2	-56.4	0.7	0.91
9	0.9	100	0.1	40	0.9	180	0.1	2	-68.2	0.91	1.2

CRRA - coefficient of relative risk aversion (the table shows lower and upper bound of CRRA intervals). Pr - probability. ΔE - expected payoff difference. Expected payoff difference and CRRA range were not shown to the participants.

risk loving. The last two columns of Table 1 report the values of the CRRA. One can read about theoretical background in more detail in the paper that is the outcome of the data collection mentioned above by Galizzi, Machado & Miniaci (2016).

Risk and time preference module also includes three self-assessed questions: on general and domain-specific (finance and health) risk attitudes. The respondents have to indicate their willingness to take risks on a Likert scale from 0 (unwilling to take risks) to 10 (fully prepared to take risks). The exact wording of the questions is shown in Figure 2.1. The reported value (from 0 to 10) is referred to as the level of risk loving. Dohmen et al. (2011) validated the self-assessed questions experimentally and proved that the responses to general questions are the best predictors

Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?

Unwilling to take risks										**Fully prepared to take risks**
0	1	2	3	4	5	6	7	8	9	10

Are you generally a person who is fully prepared to take risks in health or do you try to avoid taking risks?

Unwilling to take risks										**Fully prepared to take risks**
0	1	2	3	4	5	6	7	8	9	10

Are you generally a person who is fully prepared to take risks in financial matters or do you try to avoid taking risks?

Unwilling to take risks										**Fully prepared to take risks**
0	1	2	3	4	5	6	7	8	9	10

Figure 2.1: Self-assessed scale-based questions on risk attitude

of individuals' actual behaviour. This provides a highly cost-effective way to elicit risk preferences. The questions can be easily included in questionnaires without any monetary incentives required. The domain-specific questions were also able to predict people's financial behaviour (based on portfolio choice) and health behaviour (based on smoking).

2.3.2 Time preferences measure

A lot of decisions involve consideration of prospective duration. It applies both to financial and health decisions. Negative consequences of unhealthy behaviour are usually realised with a great delay - years after lifestyle choices are made. Therefore, to explain individual's behaviour and native-immigrant differences, it is important to explore individuals' time preferences and how they vary between immigrant and native groups. The rate of time preference is defined as discount rate. Wave 6 of the IP includes questions on subjective time preference that allow to estimate individual's subjective time horizon and also questions that allow to elicit individual's discount rate. The latter is elicited using multiple price list method, first proposed by Coller & Williams (1999) to be used for time discounting. The detailed information on how we estimated subjective time horizon and its growth are presented in the Appendix A. The main conclusion we make is that subjective time horizon is more compressed than objective time horizon. Immigrants see 3 months as more distant future compared to natives but there is no difference in the growth from 3 months to 12 months. It is important to account for people's time perception as it can be a driver of hyperbolic time discounting (Zauberman et al., 2009).

To elicit individual discount rates, individuals were asked a series of questions formulated as follows: "do you prefer £100 today or £100+x in 1 month (3 months, 12 months)?", where x there is some positive amount. All 12 questions and corresponding amounts are shown in Table 2.2.

Table 2.2: Payoff table (time preferences)

Payoff alternative	1 month		3 months		12 months	
	Option A	Option B	Option A	Option B	Option A	Option B
1	£100.00	£100.00	£100.00	£101.25	£100.00	£105.00
2	£100.00	£100.83	£100.00	£102.50	£100.00	£110.00
3	£100.00	£101.25	£100.00	£103.75	£100.00	£115.00
4	£100.00	£101.67	£100.00	£105.00	£100.00	£120.00
5	£100.00	£102.08	£100.00	£106.25	£100.00	£125.00
6	£100.00	£102.50	£100.00	£107.50	£100.00	£130.00
7	£100.00	£103.33	£100.00	£110.00	£100.00	£140.00
8	£100.00	£104.17	£100.00	£112.50	£100.00	£150.00
9	£100.00	£105.00	£100.00	£115.00	£100.00	£160.00
10	£100.00	£106.67	£100.00	£120.00	£100.00	£180.00
11	£100.00	£108.33	£100.00	£125.00	£100.00	£200.00
12	£100.00	£112.50	£100.00	£137.50	£100.00	£250.00

The switching point provides an interval where the discount rate lies. Andersen et al. (2006) provide a simple example: "If an individual takes the current income option for all x from 0 to 10, then takes the future income option for all x from 11 up to 100, we can infer that their discount rate lies between 10% and 11% for this time interval". Discount rates are calculated using the formula from Thaler (1981) as shown below.

$$r = ln(X_t + \frac{k}{X_t})/k \tag{2.2}$$

where X represents income and k is the time horizon (1, 3 or 12 months).

2.3.3 Descriptive analysis

The sample of wave 6 is treated as a cross-section for the purpose of the analysis. The total sample includes 2,149 individuals. 175 (8.14%) of them are foreign-born individuals. So the term 'immigrant' is used here as a synonym for a foreign-born individual. Initially, 809 individuals were eligible for the risk and time preference module. However, 746 individuals actually participated in the experiment (61 foreign-born), which consists of lottery questions, self-assessed risk preference and questions on risky

health-related behaviours. The further analysis is based on this sample of participants. We exclude individuals with missing information about their risk preferences, hence the analytic sample contains 661 individuals (54 foreign-born).

The variables forming the final dataset are described in Appendix B (Table B1). The first panel of the table shows the dependent variables (risk, time preferences and health behaviours), the second panel the immigrant characteristics and the last panel – socio-economic characteristics. The statistical analysis is conducted using STATA version 13.0.

In the overall sample 8.2% are immigrants, 18% of them are from EU and 82% are from other countries. On average immigrants spent 26 years in the UK. The majority of immigrants arrived before 2003, altogether this group accounts for 85% of immigrants (compared to 15%, who arrived after 2003). 64% have already become UK citizens.

2.3.3.1 Dependent variables

We have three groups of dependent variables we are interested in. The first one is the risk preference measured using two instruments: multiple price list method and self-assessed scale based questions. Variables *risk aversion (low payoff)* and *risk aversion (high payoff)* contain the number of safe choices for two types of payoff. Self-assessed questions measure risk loving in general, in the financial and health domain (see Table B1). The second group is time preferences. Discount rates are calculated using both objective (3 months and 12 months) and subjective time horizon. The third group of outcomes is potentially risky health behaviours: smoking, alcohol consumption and eating fast food. Specifically, we have information about whether an individual is currently smoking; whether a respondent was drinking regularly (most days) within last month; whether a respondent had 5 or more drinks on one occasion (binge drinking) more than twice within last 4 weeks; whether a person eats fast food every day

Table 2.3: Summary statistics (dependent variables)

Dependent variable	Immigrants Mean (SD)	Natives Mean (SD)	t-test (p-values)
Risk aversion (low payoff)	4.1 (0.43)	4.7 (0.13)	0.14
Risk aversion (high payoff)	3.8 (0.42)	4.3 (0.13)	0.29
Risk loving (general)	5 (0.33)	4.4 (0.09)	0.09*
Risk loving (finance)	3.4 (0.33)	3.1 (0.09)	0.37
Risk loving (health)	3.2 (0.35)	3.1 (0.09)	0.90
Discount rate (3 month)	11.8% (4.2)	11.4% (4.2)	0.43
Discount rate (3 month subjective)	20.7% (7.4)	19.9% (7.4)	0.43
Discount rate (12 month)	4.1% (1.2)	3.8% (1.3)	0.08*
Discount rate (12 month subjective)	18.8% (5.7)	17.5% (5.8)	0.08*
Smoking	0.21 (0.05)	0.18 (0.02)	0.68
Alcohol drinking	0.10 (0.04)	0.15 (0.01)	0.29
Binge drinking	0.13 (0.05)	0.23 (0.02)	0.047*
Fast food	0.17 (0.05)	0.22 (0.02)	0.32

*, ** and *** indicate significance at 10%, 5% and 1% respectively.

(see Table B1). The comparison of immigrant and native groups is represented in Table 2.3. The third column shows the p-values of two-group mean-comparison tests.

Immigrants are consistently less risk averse than natives based on lottery measure of risk preferences but these differences are not statistically significant. Immigrants are also more risk loving than natives based on self-assessed measure. Although, only the difference in general risk loving is statistically significant (at 10% significance level). Immigrants are more likely to smoke (21% vs. 18%). In contrast, smaller percentage of individuals in immigrant group eat fast food regularly, engage in regular and binge drinking than native-born individuals. The difference in the rate of binge drinking is statistically significant at 10% level.

Discount rates decrease as time horizon increases (see Table 2.3). For natives the average discount rate decreases from approximately 11% for the 3-month horizon to about 4% for the 12-month horizon. This observation supports the existence of phenomenon called hyperbolic discounting or "present bias" (O'Donogue & Rabin 1999; Thaler 1981).

Immigrants have almost the same discount rates as the native UK

citizens for the 3-month time horizon. The difference for the 12-month horizon is significant at 10% significance level.

When subjective time horizon is taken into account, discount rates still decrease as the time horizon increases but at a significantly lower extent. This result supports the argument of Zauberman et al. (2009) that hyperbolic discounting can be explained by people's (in)sensitivity to prospective duration. However, immigrants still reveal higher discount rates compared to native citizens.

2.3.3.2 Socio-economic characteristics

The comparison of immigrants with natives with respect to socio-economic characteristics is presented in Table 2.4. The third column shows the p-values of two-group mean-comparison test. Immigrants are significantly younger than native citizens (average age 45 vs. 52 years old) and more likely to have children (statistically significant at 10% level). There are consequently more members of immigrants' households. Foreign-born individuals have lower household income than native-born ones but this difference is not statistically significant. Based on the socio-economic status variables, we observe that immigrants are less likely to be unemployed and are more likely to be in managerial positions (but both are not statistically significant). This difference can be explained by the difference in education level as we see from Table 2.4 that immigrants are more likely to have higher education (29.5%) than natives (23.2%). Although this difference is not also statistically significant.

We do not find statistically significant differences in self-assessed health between immigrants and natives. It can be potentially explained by health assimilation (immigrants spent on average 26 years in the UK). The vast majority of natives are of white background. In contrast, there are significantly more individuals of some other background other than white in the foreign-born group compared to native-born group, namely

Table 2.4: Summary statistics (socio-economic characteristics)

Socio-economic characteristics	Immigrants Mean (SD)	Natives Mean (SD)	t-test (p-values)
Age	45 (17-89)	52 (16-97)	0.003***
Female	62% (48.9%)	54% (49.8%)	0.22
Height	167.1 (9.69)	169.3 (10.18)	0.10
Married	49.2% (50.4%)	45.9% (49.9%)	0.63
Kids	37.7% (48.9%)	26.7% (44.3%)	0.09*
University	29.5% (45.9%)	23.2% (42.3%)	0.30
Household income	4399.32 (7565.14)	5093.58 (26741.37)	0.62
Household size	2.77 (1.59)	2.4 (1.30)	0.09*
SES_unemployed	41.4% (49.6%)	48% (49.9%)	0.33
SES_low	15.5% (36.5%)	17.2% (37.8%)	0.74
SES_intermediate	12.1% (32.9%)	14% (34.7%)	0.66
SES_management	31% (46.7%)	20.6% (40.5%)	0.10
Self-assessed health			
Excellent	21.3% (41.2%)	14.1% (34.7%)	0.19
Very good	34.4% (47.9%)	34.5% (47.6%)	0.98
Good	24.5% (43.4%)	31.7% (46.6%)	0.22
Fair	11.5% (32.1%)	15% (35.7%)	0.42
Poor	8.2% (27.6%)	4.6% (20.8%)	0.32
Ethnicity			
White	49.1% (50.4%)	97.2% (16.5%)	0.00***
Asian	31.1% (46.7%)	1.02% (10.1%)	0.00***
African	13.1% (34.0%)	0.59% (7.6%)	0.01**
Mixed	3.3% (17.9%)	0.59% (7.6%)	0.25
Other	3.3% (17.9%)	0.6% (7.6%)	0.25

*, ** and *** indicate significance at 10%, 5% and 1% respectively.

Asian and African background. In many cases ethnicity has a greater impact on individual's behaviour than immigration status (Jayaweera and Quingley, 2010; Bonin et al., 2012). As we progress with the analysis, it will be important to check whether the effect of immigrant status changes when controlling for ethnicity. Approximately 73% of immigrants were born in non-EU countries.

2.3.3.3 EU vs. non-EU immigrants

Based on the discussion in the introduction, we expect EU and non-EU immigrants to be different in their risk and time preferences. Being eligi-

ble for unemployment benefits, social housing and free health care access, EU nationals have lower uncertainty when making decision to immigrate compared to non-EU nationals. Therefore, it is reasonable to suggest that EU immigrants' willingness to take risks will be lower than that of non-EU immigrants. Table 2.5 presents the summary statistics comparing EU and non-EU immigrants. The difference in immigration policy for EU and non-EU nationals is indeed reflected in risk preferences and socio-demographic characteristics. Non-EU immigrants are less risk averse and more risk loving based on both instruments but only the difference for *risk aversion (low payoff)* is statistically significant at 5% level. Non-EU immigrants discount time more than EU immigrants and, therefore, are more impatient.

Apart from immigration status, risk preferences can be explained by education level. Existing studies have shown that higher education level is associated with greater risk aversion (Harrison, Lau & Rutström, 2007; Jung, 2015). However, we find that immigrant group has significantly higher share of individuals with university degree and higher (40% vs. 9%, significant at 10% level) than natives but they are also less risk averse (more risk loving).

Higher education level of non-EU immigrants can be also explained by competition with EU nationals. To secure a job in the UK, non-EU nationals have to be issued a certificate of sponsorship by an employer that has a license to hire international workers. There are also restrictions with respect to salary (it has to be above certain amount, currently above £30,000) and only limited number of non-EU immigrants can be hired each year. In contrast, EU nationals are free to apply for any job in the UK. Therefore, to successfully compete with EU nationals, non-EU individuals have to stand out by means of education.

Even though surprising at the first glance, lower share of unemployed

Table 2.5: Summary statistics (EU vs. non-EU immigrants)

Individual characteristics	EU immigrants	Non-EU immigrants	t-test (p-values)
Dependent variables			
Risk aversion (low payoff)	4.5 (3.2)	2.1 (2.3)	0.04**
Risk aversion (high payoff)	3.8 (2.9)	3.5 (3.4)	0.64
Risk loving (general)	4.7 (2.5)	5.6 (2.6)	0.31
Risk loving (finance)	2.5 (2.1)	3.9 (2.8)	0.18
Risk loving (health)	2.4 (2.6)	3.2 (2.8)	0.42
Discount rate (3 months)	11.5 (3.9)	11.9 (4.3)	0.53
Discount rate (3 months subjective)	20.0 (6.9)	20.9 (7.5)	0.53
Discount rate (12 months)	3.8 (1.3)	4.1 (1.2)	0.45
Discount rate (12 months subjective)	17.8 (5.8)	19.0 (5.8)	0.45
Smoking	40% (51.6%)	13.8% (35.1%)	0.09*
Alcohol drinking	0% (0.0)	17.2% (38.4%)	0.30
Binge drinking	0% (0.0)	10.7% (31.5%)	1.00
Fast food	10% (31.6%)	13.7% (35.1%)	1.00
Immigrant characteristic			
YSM	27.8 (15.9)	25.9 (16.8)	0.71
before_1990	54.5% (52.2%)	42.0% (49.9%)	0.51
1990-2003	27.3% (46.7%)	44.0% (50%)	0.50
after_2003	18.2% (40.5%)	14.0% (35.0%)	0.66
UK citizen	27.3% (46.7%)	72.0% (45.0%)	0.012**
Non-UK citizen	72.3% (46.7%)	28.0% (45.4%)	0.012**
Socio-economic characteristics			
Age	46.3 (14.9)	45.1 (15.9)	0.84
Female	64% (50.5%)	56.7% (50.4%)	0.74
Height	168 (10.0)	168.1 (9.5)	0.96
Married	18.2% (40.5%)	53.3% (50.7%)	0.04**
Kids	54.5% (52.2%)	43.3% (50.4%)	0.73
University	9.1% (30.2%)	40.0% (49.8%)	0.06*
Household income	2936.23 (1153.03)	3833.41 (2450.20)	0.48
Household size	2.6 (1.5)	3.1 (1.9)	0.5
SES_unemployed	54.5% (52.2%)	33.3% (48.0%)	0.29
SES_low	0.91% (30.2%)	11.1% (32.0%)	1.00
SES_intermediate	0.91% (30.2%)	11.1% (32.0%)	1.00
SES_management	27.3% (46.7%)	44.4% (50.6%)	0.47
Self-assessed health			
Excellent	18.2% (40.5%)	16.7% (37.9%)	1.00
Very good	36.4% (50.5%)	40% (49.8%)	1.00
Good	18.2% (40.5%)	30% (46.6%)	0.69
Fair	9.1% (30.2%)	3.3% (18.3%)	0.47
Poor	18.2% (40.5%)	10% (30.5%)	0.60
Ethnicity			
White	100% (0.0)	16.7% (37.9%)	0.00***
Asian	0% (0.0)	56.7% (40.7%)	0.00***
African	0% (0.0)	20% (40.6%)	0.17
Mixed	0% (0.0)	7.0% (25.3%)	1.00
Other	0% (0.0)	0% (0.0)	NA

individuals among non-EU immigrants[4] (33.3% vs. 54.5%) can be explained in a similar way. In order to legally stay in the UK, non-EU nationals have to secure a job and, as it has been mentioned above, work is the most common reason for immigration. Higher employment rate can partially contribute to differences in income level, which is higher for non-EU immigrants than for EU immigrants.

Non-EU immigrants are more likely to be married than EU immigrants. This can be another legal channel of immigration - marriage with EU or UK nationals. Marriage would also simplify immigration for non-EU nationals because if one spouse receives a job offer, the second spouse can also move to the UK as a dependant. Last but not least, cultural differences can explain higher marriage rate among non-EU nationals.

Considerable difference in the proportion of individuals of white background between two groups highlights the importance of considering ethnicity as a factor contributing to the difference in risk preferences between immigrants and natives. It is also likely to play a role in explaining immigrants' health behaviours as existing research indicates that ethnicity is a better predictor of health behaviours than other characteristics, e.g. the immigrants' length of stay in the destination country. With regards to other socio-economic characteristics, such as age, height, gender distribution and probability of having children, EU and non-EU nationals are similar. The distribution of self-reported health is largely similar for the two groups. Non-EU nationals are significantly less likely to smoke (significant at 10% level) than EU immigrants.

Based on the review of the literature and results of the descriptive analysis above, we can expect immigrants to be riskier in general, in the financial and health domain. Interestingly, descriptive analysis shows that immigrants tend to engage less in potentially risky health behaviour such as alcohol consumption and eating fast food regularly. This observation is

[4]The difference is not statistically significant that may be due to lack of power.

in accordance with the existing evidence (Jayaweera & Quingley, 2010; Hawkins et al., 2008). However, the vast majority of immigrants have been living in the UK for over 15 years and assimilation is likely to affect their health behaviour as well. Another proxy that is often used for immigrants' assimilation is a citizenship status and we control for it in our analysis. The country of origin (EU vs. non-EU) and individuals' ethnicity are shown to have impact on their risk and time preferences. Therefore, we carefully control for these characteristics in the regression analysis.

2.4 Empirical strategy

Our analysis includes two stages: first, we explore the difference in risk and time preferences between immigrants and natives and then we study how this difference affects individuals' health behaviours.

2.4.1 Native-immigrant differences in risk and time preferences

Our aim is to estimate the association between risk preference and immigrant status. To do so we specify the following model:

$$Risk_i = \alpha_0 + \alpha_1 \cdot immigrant_i + \alpha_2 \cdot X_i + \epsilon_i \tag{2.3}$$

where $Risk_i$ is risk attitude measure (variables *risk aversion (low payoff), risk aversion (high payoff), risk loving (general), risk loving (finance)* and *risk loving (health)*)[5]; $immigrant_i$ is a binary variable that equals one if an individual is foreign-born and zero if native-born; X_i is a vector of controls (*female, age, married, kids, uni, SES*, logarithm of *income* and *interview mode*); ϵ_i is an error term.

[5]See variable description in Table B1

Immigrant population is highly heterogeneous. Different subgroups of immigrants are likely to have different risk attitude compared to natives. To account for this heterogeneity, we break down the foreign-born group by a number of characteristics: country of origin, arrival cohort and citizenship status.

Firstly, we replace variable $immigrant$ in the equation 2.3 with two variables: *EU* and *non-EU* (equals 1 if born in EU/non-EU country and 0 otherwise). Born in the UK is a reference category and excluded from the regression to avoid multicollinearity. As we have discussed in section 2.1, immigrants from EU countries face less uncertainty when moving to the UK. Therefore, we expect immigrants from the EU to be similar to natives. In turn, immigrants from non-EU countries - to be more risk loving (less risk averse) than native population.

Secondly, we replace $immigrant$ variable in equation 2.3 with arrival cohorts: *before 1990, 1990-2003* and *after 2003*. The last group includes the A8 countries that joined the EU in 2004 [6]. Native-born is a reference category. This model allows for a non-linear effect of length of stay in the UK. We expect that those, who stayed in the UK longer, will be assimilated to the native population and may not be significantly different from the natives, whereas those, who arrived recently, are expected to be more risk loving (less risk averse).

Thirdly, we replace $immigrant$ variable with *UK citizen* (1 if foreign-born and UK citizen) and *non-UK citizen* (1 if foreign-born and non-UK-citizen). UK-born is a reference category. Holding a UK passport is a proxy for assimilation. Highly assimilated immigrants are not expected to be different from the native population. Not having a UK passport reflects a certain choice especially from the point of view of EU citizens, who are free to stay in the UK with the citizenship of origin. They are likely to be different from the native population.

[6] A8 countries: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia.

Age, gender, height, income and parental education level are shown by Dohmen et al. (2011) to be exogenous determinants of risk preferences. Unfortunately, we are not able to control for parental education level as the majority of individuals in the sample have missing values for this variable. Following Galizzi, Machado & Miniaci (2016) we control for the interview mode as the experimental data were collected using face-to-face, telephone interview and web questionnaire methods. They also control for marital status and socio-economic status, which are likely to determine risk preferences. Immigrants tend to be a highly selective group of individuals and unobservable characteristics such as reason for immigration, attitudes and norms in the origin country are also correlated to risk and time preferences. Due to possible endogeneity problems linked to omitted variables, the results can be only interpreted as association and not causation.

We use an interval regression model to account for the nature of the measures, which are both interval-censored. For the lottery measures we use CRRA ranges as dependent variables (see Table 2.1 columns 11 and 12). The first and the last ranges are left- and right-censored observations, all others are interval observations. With respect to self-assessed measures, they can take values between 0 and 10, therefore are interval observations. The model has been used in similar studies that used self-assessed scale-based questions to measure willingness to take risks (Dohmen et al. 2011, 2015). Interval regression model is a generalisation of tobit model. The model treats each data as point data, interval data, left-censored data or right-censored data. The four types are shown in a more intuitive way in Table 2.6:

The model is estimated using maximum likelihood method. The estimated coefficients reflect linear effects of independent variables on dependent variables, same as in OLS regression. We also estimate OLS and probit models as robustness check. For OLS models we use number of safe choices in case of lottery measures and the reported number from 0 to

Table 2.6: Types of data

Point data	a=[a,a]
Interval data	[a,b]
Left-censored data	$(-\infty, b]$
Right-censored data	$[a, +\infty]$

Source: STATA intreg article

10 in case of self-assessed measures. For binary probit model, we create binary variables for lottery risk measure (1 if CRRA is negative and an individual is risk loving and 0 otherwise) and self-assessed measure (1 if an individual reports a value above 5 and 0 otherwise). All models account for the survey type of data. The results of OLS and probit models are the same as of interval regression model. Hence, we do not present the results here.

As robustness check, we estimate four specifications of the model: the first specification is a baseline specification and includes the set of controls specified above. The second specification shows if the coefficient of interest (for variable *immigrant*) is robust to controlling for ethnicity. As foreign-born group is significantly different from the native-born group (see Table 2.4), cultural factors that may differ across ethnic groups could potentially confound the "immigrant" effect.

The third specification aims at controlling for the process of assimilation using *YSM* as a proxy. *YSM* assumes linear effect of length of stay on risk attitude. As most immigrants stayed in the UK for a long time and have probably become similar to the native population, we want to check if the coefficient of interest is robust to assimilation. We do not use this specification for the model with arrival cohorts to avoid double counting.

The final specification includes time discount rate that can be also related to risk preferences. We expect some association as literature suggests that there is a relationship between the two: when risk increases, individuals may postpone making a decision, whereas decrease in risk

may make individuals make a decision earlier (Saito, 2009). We use discount rate elicited using 12 month subjective time horizon. It is more accurate as subjective time horizon accounts for the individual's time perception. Our descriptive analysis showed that the standard assumption of inter-temporal welfare analysis does not hold and discount rate differs if we change time horizon. Thus, we use the longest time horizon available in the dataset (12 months). Harrison, Lau & Williams (2002) show that discount rate does not change from 12-month to 3-year time horizon. Therefore, even though the discount rates in our study change from 3-month to 12-month, it is possible the latter will stay stable over longer periods of time. There is likely to be a reverse causality issue as risk may explain time preferences but also the opposite may be true.

To study the difference in time preferences between immigrants and natives, we specify all the same models but with discount rate as a dependent variable. Specifically, we use discount rate calculated using time horizon 3 months (objective and subjective) and 12 months (objective and subjective). The model is estimated as interval regression model using lower and upper limit of the interval, where the discount rate lies, obtained by multiple price list method. We use the same vector of controls as for equation 2.3. Each model has the same four specifications as the model of risk preferences. The literature does not provide us with a clear hypothesis but we expect that immigrants are not only riskier but also more impatient. They decide to immigrate but do not take into account the future effect of stress on their health etc. We also break down immigrant group by country of origin, length of stay and citizenship status.

2.4.2 The effect of risk and time preferences on health behaviours

Potentially risky health behaviours include smoking, alcohol consumption in the form of binge drinking and heavy drinking, and eating fast food.

$$Health\_behaviour_i = \beta_1 \cdot immigrant_i + \beta_2 \cdot risk_i + \\ + \beta_3 \cdot (risk * immigrant) + \beta_4 \cdot X_i + \epsilon_i \tag{2.4}$$

where $Health\_behaviour_i$ is potentially risky health behaviour (smoking, binge drinking, heavy drinking and eating fast food); $risk_i$ is the effect of risk preferences on health behaviour of natives, $immigrant_i$ is a binary variable that equals 1 if an individual is foreign-born and 0 if native-born; $(risk * immigrant)$ is the effect of risk preference on health behaviour of immigrants; X_i is a vector of controls (*female, age, married, kids, uni, SES*, logarithm of *income* and *interview mode*); ϵ_i is an error term.

We expect that risk loving in health domain is the best predictor for health behaviours. As risk loving increases, individuals are expected to be more likely to smoke, drink regularly, binge drink and eat fast food regularly.

We also explore the effect of time preferences on health behaviours. We hypothesize that certain behaviours may be a result of impatience rather than risk preferences. We specify the same model as equation 2.4 but the main independent variable of interest is $discount\_rate_i$ instead of $risk_i$. We interact discount rate with immigrant variable too. We expect that discounting time more leads to greater engagement in potentially risky behaviours studied here. Immigrants are expected to discount time more than native individuals. We expect that the results will be the same for objective and subjective time horizon but the magnitude of the effect will be smaller for the subjective time horizon.

We break down immigrant group in the same fashion as in section 2.4.1. We expect that non-EU immigrants are less likely to smoke, but are more

likely to drink and eat fast food regularly based on the descriptive analysis. As length of stay in the UK increases, immigrants assimilate more to the natives and are not expected to be different from them in their behaviour. More recent immigrants are expected to be younger and more risk loving and, therefore, more engaged in potentially risky health behaviours. We expect that immigrants with UK citizenship are not significantly different from their native counterparts with respect to health behaviours.

As all the above models are probit models, we will report marginal effects as main results. We also plot the graphs for predicted probabilities of health behaviours to present the effect of interactions in a more intuitive way.

To test the robustness of the results, the model with risk measure has five specifications that use risk aversion elicited using multiple price list method with low and high payoffs, risk loving elicited using self-assessed scale-based questions (in general, in financial and health domain). In turn, the model with discount rate has four specifications that use discount rates elicited at 3 and 12 months, and calculated using objective and subjective time horizon.

2.5 Results

We present the results in three sections: native-immigrant differences in risk references, native-immigrant differences in time preferences and the effect of risk and time preferences on health behaviours.

2.5.1 Native-immigrant differences in risk preferences

In this section we explore if immigrant status is associated with higher risk taking. We estimate models with five different risk measures as dependent variables and present the results below.

Immigrants are less risk averse (more risk loving) than native-born individuals. Immigrants have CRRA by almost 1 unit lower than natives (see Table 2.11). This result is statistically significant only when we measure risk preference using multiple price list method with high payoff (see Table 2.1).

As expected, non-EU immigrants are more risk loving than native individuals. Specifically, immigrants from non-EU countries report their willingness to take risks 2 points higher than native-born (see Table 2.7). In turn, EU immigrants are not statistically significantly different from natives when risk is measured using lottery questions (see Table 2.10). Interestingly, EU immigrants are less risk loving than natives if risk is self-assessed (in general).

Length of stay is associated with increased risk aversion. Recent immigrants are less risk averse than native-born, whereas early cohort of immigrants (before 1990) are more risk averse than native-born (see Table 2.11). Using UK citizenship as a different proxy for assimilation in the destination country supports the above conclusion. Immigrants who have not received their UK citizenship yet (less assimilated) are more risk loving than their naive counterparts (see Table 2.10 and 2.11).

Interestingly, length of stay has the opposite effect in the health domain. Increased length of stay is associated with higher risk taking in the health domain (see Table 2.9). UK citizenship indicating a high level of assimilation to the UK culture, is associated with high risk taking in health too (see Table 2.9).

We do not find any effect of immigrant status on risk loving. However, we find that Non-EU immigrants are more risk loving than native UK citizens. They report willingness to take risks up to 2 points higher than natives. These results are robust to our different specifications, i.e. controlling for ethnicity, self-assessed health, YSM and time preferences. We find that EU immigrants are less risk loving than native individuals but this result is not robust as when we control for YSM and discount

rate, the coefficient becomes insignificant. Therefore, this difference is probably explained by how long individuals stay in the country and their time preferences. Other controls that have been suggested as possible explanations of native-immigrant differences in risk preferences are not statistically significant at any conventional level.

We do not find any significant difference between immigrants and natives in risk loving in financial matters (see Table 2.8). However, we can notice that discount rate has a significant (at 10% level) effect on risk preferences. As discount rate increases, risk loving (finance) goes down by 0.03 units. If individual is impatient, he/she is less risk loving in the financial domain.

Risk aversion elicited using multiple price list method is strongly associated with risk preferences elicited using self-assessed questions (the coefficient for risk index is consistently significant at 5% level - see Table 2.10 and 2.11). We find support of the results in Dohmen et al. (2011), general risk question is a good predictor of the experimental risk measure and is a more cost-effective way to elicit risk preferences.

Table 2.7: The effect of immigrant status on willingness to take risks in general: interval regression model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
immigrant	-0.27	-0.39	-0.49	-0.53											
	(0.43)	(0.48)	(0.83)	(0.83)											
Non-EU					0.80	1.64**	1.92***	1.90***							
					(0.53)	(0.63)	(0.71)	(0.71)							
EU					-1.49**	-1.56**	-1.17	-1.22							
					(0.66)	(0.68)	(0.75)	(0.76)							
before 1990									-0.19	-0.32	-0.29				
									(0.53)	(0.57)	(0.58)				
1990-2003									-0.34	-0.44	-0.42				
									(0.76)	(0.77)	(0.78)				
after 2003									-0.31	-0.42	-0.52				
									(0.84)	(0.84)	(0.85)				
UK citizen												-0.16	-0.28	-0.33	-0.38
												(0.45)	(0.54)	(0.89)	(0.89)
Non-UK citizen												-0.41	-0.50	-0.53	-0.55
												(0.72)	(0.69)	(0.87)	(0.87)
white		-0.22	-0.22	-0.27		0.95*	0.87	0.83		-0.21	-0.26		-0.20	-0.20	-0.26
		(0.53)	(0.53)	(0.52)		(0.55)	(0.55)	(0.55)		(0.53)	(0.52)		(0.54)	(0.55)	(0.54)
YSM			0.004	0.005			-0.01	-0.01			NA			0.002	0.003
			(0.02)	(0.02)			(0.01)	(0.01)			NA			(0.02)	(0.02)
discount rate				-0.02				-0.02			-0.02				-0.02
				(0.02)				(0.02)			(0.02)				(0.02)
constant	4.45	4.66	4.64	5.24	4.30	3.60	3.84	4.44	4.43	4.63	5.21	4.46	4.65	4.65	5.24
	(3.47)	(3.61)	(3.63)	(3.56)	(3.47)	(3.53)	(3.59)	(3.52)	(3.50)	(3.65)	(3.59)	(3.46)	(3.62)	(3.64)	(3.57)
lnsigma	0.69***	0.69***	0.69***	0.69***	0.68***	0.68***	0.68***	0.68***	0.69***	0.69***	0.69***	0.69***	0.69***	0.69***	0.69***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
N	661	661	661	661	661	661	661	661	661	661	661	661	661	661	661

Standard errors are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for gender, age, height, marital status, having children, education level, socio-economic status, income per capita and interview mode.

Table 2.8: The effect of immigrant status on willingness to take financial risks: interval regression model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
immigrant	0.19	0.17	0.47	0.42											
	(0.38)	(0.36)	(0.75)	(0.75)											
Non-EU					0.49	0.74	0.81	0.79							
					(0.57)	(0.72)	(0.87)	(0.85)							
EU					-0.46	-0.48	-0.37	-0.48							
					(0.63)	(0.64)	(0.84)	(0.84)							
before 1990									0.06	0.05	0.09				
									(0.45)	(0.41)	(0.40)				
1990-2003									0.05	0.04	0.08				
									(0.71)	(0.71)	(0.72)				
after 2003									0.81	0.80	0.63				
									(0.85)	(0.84)	(0.86)				
UK citizen												0.52	0.54	1.38	1.31
												(0.48)	(0.50)	(0.97)	(0.98)
Non-UK citizen												-0.25	-0.23	0.28	0.23
												(0.68)	(0.61)	(0.78)	(0.78)
white		-0.02	0.0006	-0.09		0.29	0.27	0.19		-0.01	-0.10		0.03	0.11	0.02
		(0.45)	(0.45)	(0.46)		(0.55)	(0.55)	(0.53)		(0.45)	(0.46)		(0.46)	(0.46)	(0.47***)
YSM			-0.01	-0.01			-0.004	-0.002			NA			-0.02	-0.02
			(0.02)	(0.02)			(0.01)	(0.01)			NA			(0.02)	(0.02)
discount rate				-0.03*				-0.03**			-0.03*				-0.03*
				(0.02)				(0.02)			(0.02)				(0.02)
constant	3.64	3.65	3.69	4.86	3.75	3.56	3.63	4.82	3.83	3.84	4.93	3.69	3.66	3.73	4.88
	(3.04)	(3.11)	(3.11)	(3.03)	(2.99)	(3.08)	(3.07)	(2.99)	(3.02)	(3.09)	(3.01)	(3.01)	(3.09)	(3.09)	(3.00)
lnsigma	0.49***	0.49***	0.49***	0.48***	0.48***	0.48***	0.48***	0.48***	0.48***	0.48***	0.48***	0.48***	0.48***	0.48***	0.48***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
N	660	660	660	660	660	660	660	660	660	660	660	660	660	660	660

Standard errors are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for gender, age, height, marital status, having children, education level, socio-economic status, income per capita and interview mode.

Table 2.9: The effect of immigrant status on willingness to take health risks: interval regression model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
immigrant	0.48	0.32	0.62	0.65											
	(0.39)	(0.52)	(0.73)	(0.74)											
Non-EU					0.34	-0.14	-0.39	-0.38							
					(0.54)	(0.81)	(0.78)	(0.78)							
EU					-0.64	-0.59	-0.97	-0.94							
					(0.66)	(0.66)	(0.74)	(0.73)							
before 1990									0.69	0.53	0.51				
									(0.50)	(0.58)	(0.58)				
1990-2003									-0.1	-0.2	-0.23				
									(0.62)	(0.78)	(0.77)				
after 2003									1.15	1.03	1.11				
									(0.92)	(0.87)	(0.89)				
UK citizen												0.92*	0.80	1.78*	1.82*
												(0.47)	(0.59)	(0.90)	(0.92)
Non-UK citizen												-0.12	-0.20	0.38	0.41
												(0.58)	(0.72)	(0.77)	(0.78)
white		-0.29	-0.29	-0.24		-0.55	-0.47	-0.44		-0.25	-0.21		-0.19	-0.13	-0.09
		(0.61)	(0.60)	(0.62)		(0.68)	(0.69)	(0.70)		(0.59)	(0.59)		(0.63)	(0.62)	(0.64)
YSM			-0.01	-0.01			0.01	0.01			NA			-0.03	-0.03
			(0.02)	(0.02)			(0.01)	(0.01)			NA			(0.02)	(0.02)
discount rate				0.01				0.01			0.01				0.01
				(0.02)				(0.02)			(0.02)				(0.02)
constant	3.11	3.40	3.46	3.01	3.55	3.94	3.66	3.30	3.22	3.47	2.98	3.18	3.36	3.48	2.99
	(2.64)	(2.69)	(2.69)	(2.77)	(2.59)	(2.65)	(2.69)	(2.74)	(2.66)	(2.72)	(2.77)	(2.63)	(2.68)	(2.69)	(2.75)
lnsigma	0.55***	0.55***	0.55***	0.55***	0.55***	0.55***	0.55***	0.55***	0.54***	0.54***	0.54***	0.54***	0.54***	0.54***	0.54***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
N	660	660	660	660	660	660	660	660	660	660	660	660	660	660	660

Standard errors are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for gender, age, height, marital status, having children, education level, socio-economic status, income per capita and interview mode.

Table 2.10: The effect of immigrant status on risk aversion (low payoff) - interval regression model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
immigrant	-0.35	-0.59	-0.86	-0.81											
	(0.25)	(0.38)	(0.59)	(0.58)											
Non-EU					-2.48***	-2.49***	-2.52***	-2.38**							
					(0.86)	(0.85)	(0.94)	(0.97)							
EU					0.34	0.43	0.41	0.39							
					(0.33)	(0.45)	(0.48)	(0.50)							
before 1990									-0.09	-0.35	-0.39				
									(0.39)	(0.45)	(0.46)				
1990-2003									-0.34	-0.56	-0.62				
									(0.42)	(0.45)	(0.46)				
after 2003									-0.80	-1.05	-0.90				
									(0.60)	(0.70)	(0.68)				
UK citizen												0.22	-0.03	0.21	0.33
												(0.37)	(0.46)	(0.68)	(0.68)
Non-UK citizen												-0.92**	-1.13**	-1.01*	-0.98*
												(0.40)	(0.47)	(0.57)	(0.57)
risk index	-0.10**	-0.10**	-0.10**	-0.09**	-0.10**	-0.10**	-0.10**	-0.10**	-0.09**	-0.10**	-0.09**	-0.09**	-0.09**	-0.09**	-0.09**
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
white		-0.50	-0.51	-0.41		0.1	0.11	0.17		-0.50	-0.40		-0.47	-0.47	-0.36
		(0.46)	(0.46)	(0.46)		(0.4)	(0.40)	(0.41)		(0.46)	(0.47)		(0.44)	(0.44)	(0.45)
YSM			0.01	0.01			0.001	0.0005			NA			-0.008	-0.01
			(0.01)	(0.01)			(0.01)	(0.01)			NA			(0.01)	(0.01)
discount rate				0.04***				0.03**			0.03**				0.04***
				(0.01)				(0.01)			(0.01)				(0.01)
constant	-0.98	-0.46	-0.54	-1.88	-1.04	-1.13	-1.15	-2.35	-1.15	-0.63	-1.93	-1.03	-0.54	-0.50	-1.88
	(2.53)	(2.53)	(2.53)	(2.68)	(2.53)	(2.52)	(2.54)	(2.66)	(2.57)	(2.55)	(2.69)	(2.52)	(2.53)	(2.53)	(2.70)
lnsigma	0.47***	0.47***	0.47***	0.46***	0.45***	0.45***	0.45***	0.45***	0.47***	0.46***	0.46***	0.46***	0.46***	0.46***	0.45***
	(0.06)	(0.06)	(0.06)	(0.09)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
N	594	594	594	594	594	594	594	594	594	594	594	594	594	594	594

Standard errors are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for gender, age, height, marital status, having children, education level, socio-economic status, income per capita and interview mode.

Table 2.11: The effect of immigrant status on risk aversion (high payoff) - interval regression model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
immigrant	-0.09	-0.19	-1.00***	-0.99***											
	(0.18)	(0.19)	(0.35)	(0.34)											
Non-EU					-0.01	-0.16	-0.46	-0.47							
					(0.26)	(0.30)	(0.35)	(0.34)							
EU					-0.58	-0.57	-0.95*	-0.92*							
					(0.55)	(0.56)	(0.53)	(0.52)							
before 1990									0.73***	0.64**	0.63**				
									(0.26)	(0.28)	(0.28)				
1990-2003									-0.45**	-0.53**	-0.55**				
									(0.21)	(0.23)	(0.22)				
after 2003									-0.65	-0.73	-0.70				
									(0.48)	(0.48)	(0.47)				
UK citizen												0.55***	0.46***	-0.08	-0.05
												(0.19)	(0.17)	(0.39)	(0.38)
Non-UK citizen												-0.78***	-0.86***	-1.15***	-1.14***
												(0.24)	(0.25)	(0.34)	(0.33)
risk index	-0.10***	-0.10***	-0.09***	-0.09***	-0.10***	-0.10***	-0.10***	-0.10***	-0.09***	-0.10***	-0.09***	-0.10***	-0.10***	-0.10***	-0.09***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
white		-0.21	-0.22	-0.19		-0.17	-0.08	-0.06		-0.18	-0.15		-0.17	-0.18	-0.15
		(0.19)	(0.20)	(0.20)		(0.23)	(0.23)	(0.23)		(0.19)	(0.20)		(0.18)	(0.18)	(0.19)
YSM			0.03**	0.03**			0.02*	0.02*			NA			0.02	0.01
			(0.01)	(0.01)			(0.01)	(0.01)			NA			(0.01)	(0.01)
discount rate				0.01				0.01			0.01				0.01
				(0.01)				(0.01)			(0.01)				(0.01)
constant	-0.63	-0.41	-0.63	-1.01	-0.6	-0.47	-0.84	-1.20	-1.02	-0.82	-1.22	-0.73	-0.55	-0.64	-1.07
	(1.85)	(1.88)	(1.79)	(1.89)	(1.86)	(1.87)	(1.84)	(1.93)	(1.78)	(1.81)	(1.90)	(1.83)	(1.84)	(1.80)	(1.90)
lnsigma	0.10	0.10	0.09	0.09	0.10	0.10	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.08
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
N	591	591	591	591	591	591	591	591	591	591	591	591	591	591	591

Standard errors are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for gender, age, height, marital status, having children, education level, socio-economic status, income per capita and interview mode.

2.5.2 Native-immigrant differences in time preferences

In this section we explore if immigrants discount future more than native-born individuals. We estimate models with discount rates as dependent variables separately for objective and subjective time horizon. The models for 12-month time horizon are shown below (Table 2.12 and 2.13) and models for 3-month time horizon are used as robustness check and can be found in Appendix (Table B2 and B3).

We find similar results in the two tables below, however the values for subjective time horizon are higher. This is an expected result as we observe the same finding in the descriptive statistics as well: values for discount rate elicited using subjective time horizon were higher. We find that those immigrants, who spent the longest time in the UK, discount future more than natives, whereas those, who arrived recently, have a lower discount rate than native individuals. Being white also lowers the discount rate. Overall the results are consistent irrespective of the time horizons we use.

Table 2.12: The effect of immigrant status on discount rate (12 months) - interval regression model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
immigrant	0.37	-0.09	-0.53								
	(0.32)	(0.30)	(0.61)								
Non-EU				0.95*	0.20	-0.03					
				(0.51)	(0.65)	(0.66)					
EU				-0.76	-0.69	-0.97					
				(0.76)	(0.77)	(0.82)					
before 1990							0.51	0.08			
							(0.36)	(0.34)			
1990-2003							0.78**	0.30			
							(0.35)	(0.35)			
after 2003							-1.03	-1.54			
							(1.08)	(0.96)			
UK citizen									0.19	-0.25	-1.22
									(0.33)	(0.33)	(0.74)
Non-UK citizen									0.59	0.11	-0.39
									(0.50)	(0.45)	(0.61)
white		-1.04***	-1.07***		-0.87**	-0.84**		-1.05***		-1.03***	-1.08***
		(0.28)	(0.28)		(0.40)	(0.42)		(0.30)		(0.28)	(0.27)
YSM			0.02			0.01					0.03
			(0.02)			(0.01)					(0.02)
constant	7.93***	8.73***	8.71***	8.02***	8.61***	8.47***	7.71***	8.51***	7.92***	8.71***	8.65***
	(2.28)	(2.19)	(2.23)	(2.30)	(2.22)	(2.28)	(2.32)	(2.21)	(2.28)	(2.18)	(2.23)
lnsigma	0.50***	0.49***	0.49***	0.50***	0.49***	0.49***	0.49***	0.49***	0.50***	0.49***	0.49***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
N	672	672	672	672	672	672	672	672	672	672	672

Standard errors are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for gender, age, height, marital status, having children, education level, socio-economic status, income per capita and interview mode.

Table 2.13: The effect of immigrant status on discount rate (12 months, subjective time horizon) - interval regression model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
immigrant	1.73	-0.42	-2.46								
	(1.47)	(1.39)	(2.85)								
Non-EU				4.44*	0.91	-0.14					
				(2.38)	(3.04)	(3.08)					
EU				-3.54	-3.20	-4.49					
				(3.51)	(3.58)	(3.80)					
before 1990							2.35	0.36			
							(1.67)	(1.57)			
1990-2003							3.65**	1.38			
							(1.65)	(1.61)			
after 2003							-4.81	-7.14			
							(5.03)	(4.46)			
UK citizen									0.90	-1.17	-5.72
									(1.55)	(1.55)	(3.46)
Non-UK citizen									2.73	0.50	-1.81
									(2.32)	(2.11)	(2.84)
white		-4.83***	-4.97***		-4.05**	-3.89**		-4.87***		-4.80***	-5.03***
		(1.30)	(1.28)		(1.85)	(1.94)		(1.39)		(1.29)	(1.27)
YSM			0.08			0.05					0.14
			(0.09)			(0.05)					(0.10)
constant	36.87***	40.58***	40.50***	37.28***	40.03***	39.41***	35.87***	39.58***	36.82***	40.51***	40.26***
	(10.62)	(10.18)	(10.36)	(10.68)	(10.33)	(10.60)	(10.79)	(10.28)	(10.60)	(10.13)	(10.38)
lnsigma	2.04***	2.03***	2.03***	2.03***	2.03***	2.03***	2.03***	2.02***	2.04***	2.03***	2.03***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
N	672	672	672	672	672	672	672	672	672	672	672

Standard errors are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for gender, age, height, marital status, having children, education level, socio-economic status, income per capita and interview mode.

2.5.3 Health behaviours

In this section we present the results for the model specified in section 2.4.2. The aim is to explore if the difference in risk and time preferences explain the difference in health behaviours between immigrants and natives.

Smoking

Immigrant status is associated with higher probability of smoking (by 20 percentage points (pp)). Specifically, immigrants from the EU countries are more likely to smoke than native individuals and than non-EU immigrants (see Table 2.14). There are more smokers among more recent immigrants (1990-2003 and after 2003 cohorts) compared to natives. Both foreign-born UK citizens and non-UK citizens are more likely to smoke than natives (see 2.15).

In immigrant group, risk preferences elicited using MPL method is associated with the probability of smoking. As risk aversion increases, the probability of smoking decreases by 3.7 pp (see Table 2.14). Risk loving in health domain is associated with the probability of smoking in native group. As risk loving in health domain increases, the probability of smoking increases.

The above observation does not fully hold when we distinguish different groups of immigrants. More risk averse EU citizens and foreign-born UK citizens are less likely to smoke. Risk loving in health domain, which was expected to be the strongest predictor of health behaviours, either did not yield significant coefficients for the interaction term or the effect was counter-intuitive. For example, EU immigrants are less likely to smoke the more they are willing to take risks in health.

Figures in Appendix B show predicted probabilities based on the coefficients reported in Results section. Figure B1 shows predicted probabilities of smoking by risk and nativity. We plot the probabilities for self-assessed

risk in health domain as we expect it to have greater association with health behaviours. To compare, if the two measures have the same relationship with health behaviours, we also plot risk elicited using experimental method (with low payoffs).

Immigrants, who stayed longer in the UK and who have a UK citizenship, are more likely to smoke than natives. In contrast, recent immigrants are less likely to smoke than native individuals.

The higher is the willingness to take risk in health, the higher probability of smoking. This result is the same for risk elicited from lottery questions.

Higher discount rate is associated with higher probability of smoking (see Table 2.16 and Figure B2).

Table 2.14: The effect of immigrant status and risk attitude on smoking - probit model, marginal effects (part 1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
immigrant	0.255***	0.200*	0.190*	0.088	0.101					
	(0.083)	(0.105)	(0.111)	(0.089)	(0.082)					
non-EU						0.025	0.105	0.048	0.007	0.084
						(0.168)	(0.144)	(0.188)	(0.132)	(0.134)
EU						0.424**	0.073	0.616**	0.582**	0.292**
						(0.182)	(0.199)	(0.272)	(0.229)	(0.149)
risk aversion (LP)	0.005					0.003				
	(0.005)					(0.005)				
risk aversion (HP)		0.006					0.005			
		(0.005)					(0.006)			
risk loving			0.009					0.009		
			(0.008)					(0.008)		
risk loving (finance)				0.006					0.008	
				(0.008)					(0.008)	
risk loving (health)					0.011*					0.013**
					(0.006)					(0.006)
immigrant*RA(LP)	-0.042**									
	(0.017)									
immigrant*RA(HP)		-0.024								
		(0.018)								
immigrant*RL			-0.025							
			(0.017)							
immigrant*RL(finance)				-0.005						
				(0.019)						
immigrant*RL(health)					-0.009					
					(0.019)					
Non-EU*RA(LP)						0.00				
						(0.027)				
EU*RA(LP)						-0.138**				
						(0.064)				
Non-EU*RA(HP)							-0.021			
							(0.024)			
EU*RA(HP)							0.032			
							(0.038)			
Non-EU*RL								-0.008		
								(0.028)		
EU*RL								-0.114**		
								(0.049)		
Non-EU*RL(finance)									0.001	
									(0.021)	
EU*RL(finance)									-0.251*	
									(0.144)	
Non-EU*RL(health)										-0.021
										(0.033)
EU*RL(health)										-0.078*
										(0.042)
N	577	577	657	657	657	577	577	657	657	657

Standard errors are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for gender, age, marital status, having children, education level, socio-economic status, income per capita and interview mode.

Alcohol drinking

The estimated marginal effects of immigration status and risk preferences and their interaction are presented in Appendix B, Table B4 and B5. We do not find any significant differences between immigrants and natives with respect to the probability of regular alcohol drinking. The reason is mostly due to many zeros in the data as only a small proportion of people report having an alcoholic drink most days last month. Therefore, due to small sample size of immigrants and small numbers in the groups of EU immigrants, those who arrived in 1990-2003 and after 2004, and foreign-born individuals with non-UK citizenship we do not have enough variation to make conclusions.

However, we find that probability of regular alcohol drinking in natives is predicted well by self-assessed questions: reporting greater willingness to take risks in general, in finance and in health increases the probability of regular alcohol drinking. The marginal effects for *risk loving*, *risk loving (finance)* and *risk loving (health)* are significant at 1% level and are consistent in magnitude across models. As risk loving increases, native individuals are more likely to drink regularly by approximately 2 pp (see Table B4). Therefore, we provide further support for self-assessed risk preferences predicting well individuals' health behaviours.

The estimated marginal effects of immigrant status and time preferences and their interaction for regular alcohol drinking are presented in Table B6). We do not observe any effect of risk attitude on immigrants' probability of regular alcohol drinking. Discount rate does not predict this probability either. It is likely that the dataset is too small and does not provide enough variation to study this type of health behaviour.

With respect to binge drinking, we observe a similar situation. Risk loving in general, in health and financial domain is associated with greater probability of binge drinking in natives (see Table 2.17). We do not observe native-immigrant differences in binge drinking. But non-EU immigrants

are less likely to binge drink than natives and EU immigrants by approximately 50 pp (see Table 2.17, column 6). Those immigrants, who arrived before 1990, is less likely to binge drink than others, probably due to this group being older than other groups.

Non-EU immigrants are more likely to binge drink if they are willing to take risks in finance and in health. Foreign-born UK citizens are more likely to binge drink the more they are willing to take risks in health. In contrast, foreign-born non-UK citizens are less likely to binge drink as willingness to take risks in health increases (see Table 2.18).

Discount rate predicts the probability of binge drinking only when we distinguish by citizenship status. Both immigrant groups are more likely to binge drink as discount rate increases (see Table 2.19).

Figure B3 shows the predicted probabilities of binge drinking by immigrant status and risk preferences. We present only graphs by citizenship status as this is the only model, where there is variation in outcomes in all groups. Other models do not have variation in some groups due to small sample sizes.

Figure B4 shows the predicted probabilities of binge drinking by immigrant status and time discounting. Discount rate does not predict the probability of binge drinking.

Fast food

Immigrants are less likely to eat fast food than native individuals by approximately 13 pp (see Table 2.20). Immigrants, who arrived earlier (before 1990 and 1990-2003), are less likely to eat fast food than others (see Table 2.21). UK citizens are also less likely to eat fast food than other groups.

Risk preferences are not strongly associated with the probability of eating fast food.

When looking at predicted probabilities, there is not enough variation in immigrant group by country of origin, therefore we do not present the predicted probabilities by country in Figure B5. Risk loving only has an effect on recent immigrants: higher willingness to take risks is associated with higher probability of eating fast food regularly.

Discount rate does not predict the probability of eating fast food for natives. However, for immigrants we see that as discount rate increases, the probability of eating fast food increases by 40 pp (see Table 2.22 and Figure B6).

To sum up, eating fast food is explained better by time preferences than risk preferences. Individuals with high discount rate are impatient and prefer to enjoy the benefits of fast food right now rather than invest time in cooking healthy food and to enjoy the benefits in the distant future. It is reasonable that eating fast food is more related to impatience and willingness to have benefits of fast food now than being risky.

Table 2.15: The effect of immigrant status and risk attitude on smoking - probit model, marginal effects (part 2)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
before 1990	0.222	0.091	0.228*	0.158	0.103					
	(0.140)	(0.192)	(0.125)	(0.121)	(0.108)					
1990-2003	0.273**	0.283***	0.139	-0.002	0.128					
	(0.131)	(0.105)	(0.195)	(0.130)	(0.142)					
after 2003	0.009	0.309*	3.477***	0.207	0.007					
	(0.141)	(0.185)	(0.796)	(0.197)	(0.180)					
UK citizen						0.350***	0.229	0.251*	0.116	0.062
						(0.133)	(0.151)	(0.131)	(0.116)	(0.109)
Non-UK citizen						0.138	0.256*	0.086	0.058	0.207**
						(0.140)	(0.146)	(0.192)	(0.159)	(0.083)
risk aversion (LP)	0.005					0.005				
	(0.005)					(0.005)				
risk aversion (HP)		0.006					0.006			
		(0.005)					(0.005)			
risk loving			0.009					0.009		
			(0.008)					(0.008)		
risk loving (finance)				0.006					0.006	
				(0.008)					(0.009)	
risk loving (health)					0.011*					0.011*
					(0.006)					(0.006)
before 1990*RA(LP)	-0.026									
	(0.021)									
1990-2003*RA(LP)	-0.047									
	(0.031)									
after 2003*RA(LP)	0									
	(.)									
before 1990*RA(HP)		0.006								
		(0.026)								
1990-2003*RA(HP)		-0.054**								
		(0.024)								
after 2003*RA(HP)		0								
		(.)								
before 1990*RL			-0.037							
			(0.025)							
1990-2003 * RL			-0.011							
			(0.030)							
after 2003*RL			-1.077***							
			(0.210)							
before 1990*RL(finance)				-0.028						
				(0.030)						
1990-2003*RL(finance)				0.025						
				(0.026)						
after 2003*RL(finance)				-0.108***						
				(0.034)						
before 1990*RL(health)					-0.007					
					(0.023)					
1990-2003*RL(health)					-0.011					
					(0.032)					
after 2003*RL(health)					-0.013					
					(0.031)					
UK citizen*RA(LP)						-0.055***				
						(0.020)				
Non-UK citizen*RA(LP)						-0.021				
						(0.045)				
UK citizen*RA(HP)							-0.022			
							(0.022)			
Non-UKcitizen*RA(HP)							-0.075			
							(0.050)			
UK citizen*RL								-0.032		
								(0.024)		
Non-UKcitizen*RL								-0.013		
								(0.030)		
UK citizen*RL(finance)									-0.004	
									(0.026)	
Non-UKcitizen*RL(finance)									-0.011	
									(0.049)	
UKcitizen*RL(health)										0.011
										(0.022)
Non-UKcitizen*RL(health)										-0.099*
										(0.056)
N	570	572	657	657	657	577	577	657	657	657

Table 2.16: The effect of immigrant status and discount rate on smoking - probit model, marginal effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
immigrant	-0.032	-0.072						
	(0.188)	(0.212)						
non-EU			-0.53	-0.128				
			(0.347)	(0.261)				
EU			0.223	0.169				
			(0.319)	(0.343)				
before 1990					-0.598**	-0.293		
					(0.261)	(0.220)		
1990-2003					0.002	-0.376		
					(0.306)	(0.368)		
after 2003					0.765***	1.708***		
					(0.238)	(0.388)		
UK citizen							-0.28	-0.538**
							(0.242)	(0.263)
Non-UK citizen							0.186	0.249
							(0.238)	(0.251)
discount rate (3 months)	0.009**		0.009***		0.009**		0.009**	
	(0.004)		(0.004)		(0.004)		(0.004)	
discount rate (12 months)		0.029**		0.031**		0.028**		0.028**
		(0.013)		(0.013)		(0.013)		(0.013)
immigrant*DR(3mo)	0.008							
	(0.014)							
immigrant*DR(12mo)		0.033						
		(0.047)						
Non-EU*DR(3mo)			0.04					
			(0.024)					
Non-EU*DR(12mo)				0.03				
				(0.06)				
EU*DR(3mo)			-0.008					
			(0.027)					
EU*DR(12mo)				-0.01				
				(0.084)				
before 1990*DR(3mo)					0.052***			
					(0.019)			
1990-2003*DR(3mo)					0.006			
					(0.022)			
after 2003*DR(3mo)					-0.178***			
					(0.031)			
before 1990*DR(12mo)						0.086*		
						(0.049)		
1990-2003*DR (12mo)						0.103		
						(0.077)		
after 2003*DR(12mo)						-0.899***		
						(0.151)		
UK citizen*DR(3mo)							0.03	
							(0.018)	
non-UKcitizen*DR(3mo)							-0.014	
							(0.018)	
UKcitizen*DR(12mo)								0.145**
								(0.057)
non-UKcitizen*DR(12mo)								-0.058
								(0.054)
N	659	659	659	659	659	659	659	659

Standard errors are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for gender, age, marital status, having children, education level, socio-economic status, income per capita and interview mode.

Table 2.17: The effect of immigrant status and risk attitude on binge drinking - probit model, marginal effects (part 1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
immigrant	-0.062	-0.107	0.062	-0.085	-0.192					
	(0.147)	(0.149)	(0.151)	(0.111)	(0.163)					
non-EU						-0.583**	-0.378*	0.173	0.026	-0.291*
						(0.261)	(0.203)	(0.168)	(0.146)	(0.154)
EU						0	0	0	0	0
						(.)	(.)	(.)	(.)	(.)
risk aversion (LP)	-0.004					-0.006				
	(0.007)					(0.006)				
risk aversion (HP)		-0.002					-0.003			
		(0.007)					(0.007)			
risk loving			0.016**					0.016**		
			(0.007)					(0.007)		
risk loving (finance)				0.019**					0.020***	
				(0.007)					(0.007)	
risk loving (health)					0.019***					0.020***
					(0.007)					(0.007)
immigrant*RA(LP)	0.002									
	(0.031)									
immigrant*RA(HP)		0.014								
		(0.029)								
immigrant*RL			-0.021							
			(0.025)							
immigrant*RL(finance)				0.007						
				(0.025)						
immigrant*RL(health)					0.029					
					(0.030)					
Non-EU*RA(LP)						0.091***				
						(0.023)				
EU*RA(HP)						0				
						(.)				
Non-EU*RA(HP)							0.066***			
							(0.017)			
EU*RA(HP)							0			
							(.)			
Non-EU*RL								-0.038*		
								(0.020)		
EU*RL								0		
								(.)		
Non-EU*RL(finance)									-0.016	
									(0.019)	
EU*RL(finance)									0	
									(.)	
Non-EU*RL(health)										0.049**
										(0.023)
EU*RL(health)										0
										(.)
N	488	488	552	552	552	483	483	545	545	545

Standard errors are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for gender, age, marital status, having children, education level, socio-economic status, income per capita and interview mode.

Table 2.18: The effect of immigrant status and risk attitude on binge drinking - probit model, marginal effects (part 2)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
before 1990	-0.440***	-0.307	-0.119	-0.057	-0.285*					
	(0.129)	(0.206)	(0.175)	(0.096)	(0.161)					
1990-2003	0.235	0.009	0.144	-0.12	-0.129					
	(0.164)	(0.185)	(0.236)	(0.223)	(0.221)					
after 2003	0	0	0	0	0					
	(.)	(.)	(.)	(.)	(.)					
UK citizen						-0.002	-0.058	0.092	-0.028	-0.364**
						(0.189)	(0.172)	(0.194)	(0.095)	(0.153)
Non-UK citizen						0.039	0.005	-0.019	0.004	-0.038
						(0.254)	(0.231)	(0.165)	(0.207)	(0.175)
risk aversion (LP)	-0.004					-0.004				
	(0.007)					(0.007)				
risk aversion (HP)		-0.002					-0.002			
		(0.007)					(0.007)			
risk loving			0.016**					0.016**		
			(0.007)					(0.007)		
risk loving (finance)				0.019**					0.018**	
				(0.008)					(0.007)	
risk loving (health)					0.019***					0.019**
					(0.007)					(0.007)
before 1990 * RA(LP)	0.078***									
	(0.015)									
1990-2003*RA(LP)	-0.127*									
	(0.065)									
after 2003*RA(LP)	0									
	(.)									
before 1990*RA(HP)		0.049*								
		(0.028)								
1990-2003*RA(HP)		-0.01								
		(0.065)								
after 2003*RA(HP)		0								
		(.)								
before 1990*RL			0.025							
			(0.039)							
1990-2003*RL			-0.034							
			0.035							
after 2003*RL			0							
			.							
before 1990*RL(finance)				0.016						
				0.03						
1990-2003*RL(finance)				0.015						
				0.047						
after 2003*RL(finance)				0						
				(.)						
before 1990*RL(health)					0.054					
					(0.035)					
1990-2003*RL(health)					0.019					
					(0.044)					
after 2003*RL(health)					0					
					(.)					
UKcitizen*RA(LP)						0.008				
						(0.032)				
Non-UK citizen*RA(LP)						0				
						(.)				
UKcitizen*RA(HP)							0.02			
							(0.025)			
Non-UKcitizen*RA(HP)							0			
							(.)			
UK citizen*RL								-0.01		
								(0.033)		
Non-UKcitizen*RL								-0.036**		
								(0.018)		
UKcitizen*RL(finance)									0.014	
									(0.024)	
Non-UKcitizen*RL(finance)									-0.071**	
									(0.034)	
UKcitizen*RL(health)										0.072**
										(0.031)
Non-UKcitizen*RL(health)										-0.073***
										(0.027)
N	482	482	545	545	545	478	478	552	552	552

Table 2.19: The effect of immigrant status and discount rate on binge drinking - probit model, marginal effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
immigrant	0.154	0.078						
	(0.181)	(0.261)						
non-EU			-0.059	-0.04				
			(0.212)	(0.277)				
EU			0	0				
			(.)	(.)				
before 1990					-0.09	0.047		
					(0.234)	(0.337)		
1990-2003					1.296**	0.281		
					(0.652)	(0.473)		
after 2003					0	0		
					(.)	(.)		
UK citizen							-0.045	-0.244
							(0.167)	(0.276)
Non-UK citizen							2.675***	4.632***
							(0.157)	(0.270)
discount rate (3 months)	0.003		0.001		0.003		0.002	
	(0.004)		(0.004)		(0.004)		(0.004)	
discount rate (12 months)		0.016		0.014		0.016		0.015
		(0.013)		(0.013)		(0.013)		(0.013)
immigrant*DR(3mo)	-0.018							
	(0.015)							
immigrant*DR(12mo)		-0.031						
		(0.067)						
Non-EU*DR(3mo)			0.003					
			(0.019)					
Non-EU*DR(12mo)			0					
			(.)					
EU*DR(3mo)				0.003				
				(0.075)				
EU*DR(12mo)				0				
				(.)				
before 1990*DR(3mo)					0.008			
					(0.019)			
1990-2003*DR(3mo)					-0.114**			
					(0.046)			
after 2003*DR(3mo)					0			
					(.)			
before 1990*DR(12mo)						-0.011		
						(0.082)		
1990-2003*DR(12mo)						-0.078		
						(0.119)		
after 2003*DR(12mo)						0		
						(.)		
UKcitizen*DR(3mo)							0.008	
							(0.013)	
non-UKcitizen*DR(3mo)							-0.433***	
							(0.027)	
UKcitizen*DR(12mo)								0.07
								(0.069)
non-UKcitizen*DR(12mo)								-1.911***
								(0.121)
N	547	547	547	547	547	547	547	547

Standard errors are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for gender, age, marital status, having children, education level, socio-economic status, income per capita and interview mode.

Table 2.20: The effect of immigrant status and risk attitude on fast food eating - probit model, marginal effects (part 1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
immigrant	-0.155*	-0.073	0.126	0.038	0.003					
	(0.084)	(0.088)	(0.133)	(0.091)	(0.079)					
non-EU						-0.130	-0.086	-0.011	0.016	0.009
						(0.160)	(0.143)	(0.217)	(0.186)	(0.161)
EU						-0.129	-0.129	0.353	-0.029	-0.008
						(0.145)	(0.145)	(0.451)	(0.211)	(0.201)
risk aversion (LP)	0.003					0.003				
	(0.006)					(0.006)				
risk aversion (HP)		0.004					0.004			
		(0.006)					(0.006)			
risk loving			0.007					0.006		
			(0.008)					(0.008)		
risk loving (finance)				0.006					0.008	
				(0.008)					(0.008)	
risk loving (health)					-0.003					-0.003
					(0.007)					(0.006)
immigrant*RA(LP)	0.028									
	(0.018)									
immigrant*RA(HP)		0.01								
		(0.019)								
immigrant*RL			-0.033							
			(0.027)							
immigrant*RL(finance)				-0.02						
				(0.021)						
immigrant*RL(health)					-0.009					
					(0.020)					
Non-EU*RA(LP)						0.023				
						(0.029)				
EU*RA(LP)						0				
						(.)				
Non-EU*RA(HP)							0.018			
							(0.027)			
EU*RA(HP)							0			
							(.)			
Non-EU*RL								-0.004		
								(0.036)		
EU*RL								-0.156		
								(0.111)		
Non-EU*RL(finance)									-0.017	
									(0.036)	
EU*RL(finance)									-0.041	
									(0.038)	
Non-EU*RL(health)										-0.016
										(0.038)
EU*RL(health)										-0.076
										(0.050)
N	577	577	657	657	657	569	569	657	657	657

Standard errors are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for gender, age, marital status, having children, education level, socio-economic status, income per capita and interview mode.

Table 2.21: The effect of immigrant status and risk attitude on fast food eating - probit model, marginal effects (part 2)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
before 1990	-0.291*	-0.204	0.393**	0.167	0.134					
	(0.171)	(0.272)	(0.173)	(0.136)	(0.118)					
1990-2003	-0.244*	-0.143	-0.04	-0.053	-0.01					
	(0.141)	(0.113)	(0.179)	(0.131)	(0.142)					
after 2003	0.136	0.007	0.272	0.136	-0.460*					
	(0.276)	(0.186)	(0.351)	(0.237)	(0.269)					
UK citizen						-0.291**	-0.210	0.220	-0.016	-0.02
						(0.123)	(0.130)	(0.166)	(0.148)	(0.141)
Non-UK citizen						-0.196	-0.061	0.123	0.063	-0.015
						(0.136)	(0.158)	(0.202)	(0.179)	(0.136)
risk aversion (LP)	0.003					0.003				
	(0.006)					(0.006)				
risk aversion (HP)		0.004					0.004			
		(0.006)					(0.006)			
risk loving			0.007					0.007		
			(0.008)					(0.008)		
risk loving (finance)				0.006					0.006	
				(0.008)					(0.009)	
risk loving (health)					-0.003					-0.003
					(0.007)					(0.007)
before 1990 * RA(LP)	0.037									
	(0.030)									
1990-2003*RA(LP)	0.039									
	(0.026)									
after 2003*RA(LP)	0.013									
	(0.068)									
before 1990*RA(HP)		0.017								
		(0.040)								
1990-2003*RA(HP)		0.019								
		(0.028)								
after 2003*RA(HP)		0.055								
		(0.059)								
before 1990*RL			-0.174***							
			(0.058)							
1990-2003*RL			-0.007							
			(0.031)							
after 2003*RL			-0.021							
			(0.06)							
before 1990*RL(finance)				-0.114**						
				(0.047)						
1990-2003*RL(finance)				-0.007						
				(0.028)						
after 2003*RL(finance)				0.003						
				(0.049)						
before 1990*RL(health)					-0.086**					
					(0.036)					
1990-2003*RL(health)					-0.017					
					(0.038)					
after 2003*RL(health)					0.153**					
					(0.061)					
UKcitizen*RA(LP)						0.037*				
						(0.022)				
Non-UKcitizen*RA(LP)						0.074*				
						(0.038)				
UK citizen*RA(HP)							0.021			
							(0.022)			
Non-UKcitizen*RA(HP)							0.039			
							0.046			
UKcitizen*RL								-0.088**		
								(0.043)		
Non-UKcitizen*RL								-0.012		
								(0.036)		
UKcitizen*RL(finance)									-0.03	
									(0.038)	
Non-UKcitizen*RL(finance)									-0.001	
									(0.044)	
UKcitizen*RL(health)										-0.027
										(0.035)
Non-UKcitizen*RL(health)										0.027
										(0.035)
N	577	577	657	657	657	577	577	657	657	657

Table 2.22: The effect of immigrant status and discount rate on eating fast food - probit model, marginal effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
immigrant	-0.502***	-0.413**						
	(0.176)	(0.204)						
non-EU			-0.495	-0.456				
			(0.314)	(0.322)				
EU			-6.148***	-9.055***				
			(1.249)	(1.490)				
before 1990					-11.142***	-1.208**		
					(1.307)	(0.476)		
1990-2003					-1.459**	-0.409		
					(0.619)	(0.350)		
after 2003					-0.111	-0.162		
					(0.204)	(0.266)		
UK citizen							-0.454*	-0.464*
							(0.272)	(0.257)
Non-UK citizen							-0.516	-0.343
							(0.337)	(0.281)
discount rate (3 months)	-0.002		-0.001		-0.001		-0.002	
	(0.004)		(0.004)		(0.004)		(0.004)	
discount rate (12 months)		-0.016		-0.014		-0.015		-0.016
		(0.013)		(0.013)		(0.013)		(0.013)
immigrant*DR(3mo)	0.038**							
	(0.015)							
immigrant*DR(12mo)		0.095*						
		(0.054)						
Non-EU*DR(3mo)			0.035					
			(0.026)					
Non-EU*DR(12mo)			0.408***					
			(0.094)					
EU*DR(3mo)				0.099				
				(0.081)				
EU*DR(12mo)				1.766***				
				(0.327)				
before 1990*DR(3mo)					0.737***			
					(0.090)			
1990-2003*DR(3mo)					0.100**			
					(0.044)			
after 2003*DR(3mo)					0.028			
					(0.022)			
before 1990*DR(12mo)						0.254**		
						(0.101)		
1990-2003*DR(12mo)						0.081		
						(0.085)		
after 2003*DR(12mo)						0.09		
						(0.076)		
UKcitizen*DR(3mo)							0.029	
							(0.022)	
non-UKcitizen*DR(3mo)							0.046*	
							(0.027)	
UKcitizen*DR(12mo)								0.088
								(0.065)
non-UKcitizen*DR(12mo)								0.099
								(0.073)
N	658	658	658	658	658	658	658	658

Standard errors are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for gender, age, marital status, having children, education level, socio-economic status, income per capita and interview mode.

2.6 Conclusion

The aim of this paper is to test the hypothesis that risk and time preferences of immigrants in the UK are different from those of the native British population and that such dissimilarity contributes to immigrants making distinctive health behaviours and lifestyle choices.

There is empirical evidence from other countries that immigrants are riskier than the average population of the destination country. We aim to close the gap in the literature by making this comparison using UK data. We benefit from a unique dataset that contains different risk measures: risk measured using multiple price lists methods, self-assessed risks in general, in the financial and health domains. We estimate interval regression models with those risk measures as dependent variables and find that immigrants are more risk loving than native-born individuals except for the risk in the financial domain.

When we distinguish by the country of origin, length of stay and citizenship status, we find support for the hypothesis that non-EU immigrants are more risk loving than native counterparts, whereas EU immigrants are not different from the natives, and if anything, EU immigrants are even more risk averse than natives. In particular, length of stay in the UK is associated with immigrants becoming less risk loving and holding the citizenship of the country of birth is associated with immigrants being riskier. In contrast, the results for the health domain are different as length of stay in the UK is associated with becoming riskier in terms of health behaviours. We suggest that the explanation may be that immigrants increasingly adopt to natives' lifestyles and thus engage in similar potentially risky health behaviours. Also, long time spent in the UK implies an increased familiarity with the UK health system, greater trust and greater health service use. This may enable immigrants to embrace riskier health behaviours over time again. We do not know immigrants' risk attitude at the time of arrival but after staying a long time in the UK

(on average individuals stayed 26 years in the UK) they are riskier than the natives. Our results support Dohmen et al. (2011) by showing that general self-assessed measure of risk (in general) is strongly associated with risk measure obtained by multiple price list method.

Immigrants are found to discount time more as their time in the UK increases. The most recent immigrants (arrived after 2003) discount time less than the native-born, whereas those, who spent a long time in the UK (arrived before 1990), have a higher discount rate than natives. This may explain why they adopt riskier health behaviour over time.

Indeed, existing literature provides some evidence that immigrants are different in their health behaviours and that it changes over time: they smoke less and drink less alcohol when they arrive but are more likely to do so as their length of stay in the UK increases. They engage in risky sexual behaviour and use less health care services than native individuals. To test whether immigrants' risk loving explains their distinctive health behaviour, we estimate probit models, in which dependent variable indicates a potentially risky health behaviour (smoking, drinking alcohol regularly, binge drinking, eating fast food regularly) and the main explanatory variables are risk (in general and in financial and health domains) and time preferences, immigrant status and their interaction. We find that risk loving in health explains most health behaviours better than other measures, as expected. As risk loving in health increases, engagement in potentially risky health behaviours increases. This is true for both immigrant and native groups, the evidence is slightly weaker for eating fast food. Discount rate can only predict the probability of smoking for natives, but not any other behaviour. Although, it has a more significant impact on the behaviour of immigrants. As their individual discount rate increases, immigrants are more likely to smoke and to eat fast food. The result for binge drinking is the opposite and, hence, counter-intuitive.

We also find that EU immigrants smoke more than native-born individuals. The probability of smoking also increases with length of stay

and if an immigrant is an UK citizen. In turn, non-EU immigrants and immigrants, who are not UK citizens, are less likely to binge drink. Immigrants, who arrived in the UK recently, are more likely to eat fast food but this probability decreases as time in the UK increases.

To sum up, despite being more risk loving, immigrants are less engaged in some potentially risky health behaviours (binge drinking and eating fast food). Length of stay and country of origin play a protective role in these behaviours, as non-EU immigrants and those, who spent a long time in the UK, are less likely to binge drink and eat fast food regularly. Immigrants arrive with lower discount rate than native individuals but it increases with time spent in the UK.

The study has several limitations. First of all, this is an experiment incorporated into the Innovation Panel of UKHLS. Therefore, we do not have data on risk and health behaviour from the whole sample in wave 6 but only from a random sub-sample. It includes few individuals, specifically, very few immigrants. However, conducting the study even with a small sample may provide a good starting point to understand the relationship between risk and time preferences and health behaviours, health behaviours in immigrant population and how they change over time.

Secondly, we do not have enough variation in the sample to break down immigrant groups further by country of origin, as they may differ in attitudes and behaviours due to different cultural norms.

Third, we do not have variation with respect to the length of stay. All immigrants in the sample spent in the UK on average 26 years. This is a long time and the individuals had a chance to assimilate, including health and health behaviour assimilation. It would be ideal to observe both very recent immigrants (right after their arrival) and immigrants, who stayed in the UK 5, 10, 15 and more years. However, if our analysis shows significant differences for that group of immigrants, they are likely to be different from the natives even with assimilation taking place.

Finally, we only study the effect of risk preferences on *participation* in

health behaviours but not on the *intensity* (number of cigarettes smoked per day, number of days had alcohol, number of days a week had fast food etc.).

Establishing whether immigrants (groups of them) have a higher willingness to take risks in the health domain can contribute to the design of more targeted educational and public health programmes, such as encouraging immigrants to live a healthier lifestyle or exploiting contingent management interventions for smoking and alcohol addictions, etc. Having found a strong impact of length of stay on immigrants' health behaviours, we study its effect on health behaviours in greater detail and a larger sample in the next chapter.

Appendix A. Estimation of subjective time horizon

To obtain information on subjective time horizon, participants were asked to indicate how long they consider the duration between today and a day 1/3/12 months in the future. They were presented with a 180-mm scale, where the left-most end represents "Very short" and the right-most end represents "Very long". The descriptive statistics for the whole sample and separately for immigrants and native citizens is shown in Table A1.

Table A1: Time horizon - descriptive statistics

Group	Conditions	Distance, mm (SD)	Time horizon		Time horizon growth	
			Objective	Subjective	Objective	Subjective
Whole group	1 month	21.59 (19.62)	1	1	-	-
	3 months	37.12 (21.20)	3	1.72	200%	72%
	12 months	55.73 (24.02)	12	2.58	1100%	158%
Immigrants	1 month	23.19 (19.00)	1	1	-	-
	3 months	42.88 (21.27)	3	1.85	200%	85%
	12 months	59.81 (25.51)	12	2.58	1100%	158%
Natives	1 month	21.47 (19.68)	1	1	-	-
	3 months	36.65 (21.15)	3	1.71	200%	71%
	12 months	55.41 (23.89)	12	2.58	1100%	158%

Following the methodology of Zauberman et al. (2009), who used sim-

ilar questions to elicit subjective time horizon, we first calculated it as the distance from the left end of the scale. The mean distance was 21.59 millimetres in the 1-month condition, 37.12 millimetres in the 3-month condition and 55.73 millimetres in the 12-month condition. The within-subject comparison results in the subjective time horizon for 1 month being shorter than for 3 months and, in turn, the subjective time horizon for 3 months is shorter than that for 12 months. The difference is statistically significant at 1% significance level for the whole sample, immigrants and natives. The between-subjects comparison shows statistically significant difference in the 3-month condition. Immigrants report longer distance than native UK citizens (p-value 0.048). The native-migrant differences for 1- and 12-month conditions are not statistically significant.

Next, we transformed millimetres into months anchoring on the 1-month condition. The mean value of the distance for 1 month was set equal to 1-month time horizon. Based on this figure, we calculated the subjective time horizons for 3 months and 12 months. Subjective time horizons appeared to be considerably lower in months compared to objective time horizon (Table A1). Considering time horizon growth, the objective time horizon grows 200% from 1-month condition to 3-month one, however the subjective time horizon grows only 72% in the whole sample, 85% in the immigrant group and 71% in the native group. Similarly, the objective time horizon grows 1,100% from 3-month condition to 12-month one, but the subjective time horizon only grows 158%.

Appendix B

Table B1: Variable description

Variable	Variable description	N	Mean	SD	Min	Max
risk aversion (low payoff)	Number of safe choices, low payoffs	657	4.70	3.19	0	9
risk aversion (high payoff)	Number of safe choices, high payoffs	654	4.26	3.24	0	9
risk loving (general)	Willingness to take risks in general	661	4.48	2.44	0	10
risk loving (finance)	Willingness to take financial risks	661	3.08	2.27	0	10
risk loving (health)	Willingness to take health risks	661	3.11	2.38	0	10
discount rate (3 months)	Discount rate (3-month objective time horizon)	661	11.43	4.24	2.77	15.24
discount rate (3 months sub)	Discount rate (using 3-month subjective time horizon)	661	19.98	7.41	4.85	26.65
discount rate (12 months)	Discount rate (using 12-month objective time horizon)	661	3.79	1.26	1.61	5.22
discount rate (12 months sub)	Discount rate (using 12-month subjective time horizon)	661	17.61	5.84	7.5	24.31
smoking	Smoking regularly (1 if yes, 0 if no)	661	0.19	0.39	0	1
alcohol	Had a drink most days in the last month (1 yes, 0 no)	661	0.14	0.35	0	1
binge_drinking	Had 5 or more drinks on one occasion more than twice within last 4 weeks	575	0.22	0.42	0	1
fast food	Eat fast food everyday or nearly everyday (1 if yes, 0 if no)	661	0.22	0.41	0	1
immigrant	Foreign-born (1 if yes, 0 if no)	661	0.08	0.28	0	1
YSM	Immigrants' years since migration (0 for UK-born individuals)	61	26.30	16.50	4	81
EU	Immigrants' country of origin (1 if born in EU country, 0 otherwise)	61	0.18	0.39	0	1
non-EU	Immigrants' country of origin (1 if born in non-EU country, 0 otherwise)	61	0.82	0.39	0	1
before 1990	Immigrants' arrival group (1 if arrived before 1990, 0 otherwise)	61	0.44	0.50	0	1
1990-2003	Immigrants' arrival group (1 if arrived between 1990 and 2003, 0 otherwise)	61	0.41	0.50	0	1
after 2003	Immigrants' arrival group (1 if arrived after 2003, 0 otherwise)	61	0.15	0.36	0	1
UK citizen	Immigrants' citizenship status (0 if UK born, 1 if foreign-born and UK citizen)	61	0.64	0.48	0	1
Non-UK citizen	Immigrants' citizenship status (0 if UK born, 1 if foreign-born and non-UK citizen)	61	0.36	0.48	0	1
age	Age in years	661	51.72	18.44	17	97
height	Height in cms	661	169.13	10.15	142	196
female	Gender (1 if female, 0 male)	661	0.55	0.50	0	1
married	Marital status (1 if married, 0 otherwise)	661	0.46	0.50	0	1
kids	1 if has children, 0 otherwise	661	0.28	0.45	0	1
white	Individual's ethnic background (1 if white, 0 otherwise)	661	0.93	0.25	0	1
asian	Individual's ethnic background (1 if asian, 0 otherwise)	661	0.04	0.18	0	1
black	Individual's ethnic background (1 if black, 0 otherwise)	661	0.02	0.13	0	1
mixed	Individual's ethnic background (1 if mixed, 0 otherwise)	661	0.01	0.09	0	1
other ethnicity	Individual's ethnic background (1 if other ethnicity, 0 otherwise)	661	0.01	0.09	0	1
income	Gross household income, in pounds	661	5,036.35	25,705.19	0	666,546.4
hhsize	Household size	661	2.44	1.33	1	9
uni	The level of education (1 if has a university degree or higher, 0 otherwise)	661	0.24	0.43	0	1
SES_unemployed	Socio-economic status (1 if unemployed, 0 otherwise)	661	0.48	0.50	0	1
SES_low	Socio-economic status (1 if low, 0 otherwise)	661	0.17	0.38	0	1
SES_intermediate	Socio-economic status (1 if intermediate, 0 otherwise)	661	0.14	0.35	0	1
SES_management	Socio-economic status (1 if management & professional, 0 otherwise)	661	0.22	0.41	0	1
SAH_excellent	Self-assessed health (1 if excellent, 0 otherwise)	661	0.15	0.35	0	1
SAH_vgood	Self-assessed health (1 if very good, 0 otherwise)	661	0.35	0.48	0	1
SAH_good	Self-assessed health (1 if good, 0 otherwise)	661	0.31	0.46	0	1
SAH_fair	Self-assessed health (1 if fair, 0 otherwise)	661	0.15	0.35	0	1
SAH_poor	Self-assessed health (1 if poor, 0 otherwise)	661	0.05	0.22	0	1

Table B2: The effect of immigrant status on discount rate (3 months) - interval regression model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
immigrant	0.97	-0.57	-1.19								
	(1.48)	(1.38)	(2.88)								
Non-EU				3.74*	1.59	1.58					
				(2.24)	(2.52)	(2.91)					
EU				-2.62	-2.40	-2.41					
				(3.23)	(3.27)	(3.66)					
before 1990							0.38	-1.19			
							(1.57)	(1.73)			
1990-2003							4.33**	2.84*			
							(1.86)	(1.66)			
after 2003							-5.81	-7.59**			
							(4.23)	(3.78)			
UK citizen									-0.54	-2.16	-5.40
									(1.60)	(1.75)	(3.59)
Non-UK citizen									2.99	1.57	-0.08
									(2.51)	(2.25)	(2.95)
white		-3.65**	-3.68***		-2.52	-2.52		-3.79**		-3.74***	-3.91***
		(1.39)	(1.35)		(1.66)	(1.69)		(1.49)		(1.39)	(1.36)
YSM			0.03			0.0004					0.10
			(0.09)			(0.06)					(0.09)
constant	26.37***	29.17***	29.13***	26.57***	28.20***	28.20***	25.43**	28.29***	26.21***	29.01***	28.75***
	(9.46)	(9.34)	(9.38)	(9.43)	(9.37)	(9.54)	(9.68)	(9.44)	(9.42)	(9.24)	(9.31)
lnsigma	1.95***	1.94***	1.94***	1.94***	1.94***	1.94***	1.94***	1.93***	1.94***	1.94***	1.94***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
N	672	672	672	672	672	672	672	672	672	672	672

Standard errors are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for gender, age, height, marital status, having children, education level, socio-economic status, income per capita and interview mode.

Table B3: The effect of immigrant status on discount rate (3 months, subjective time horizon) - interval regression model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
immigrant	1.70	-0.99	-2.10								
	(2.58)	(2.41)	(5.04)								
Non-EU				6.54*	2.77	2.76					
				(3.91)	(4.40)	(5.01)					
EU				-4.58	-4.19	-4.21					
				(5.65)	(5.72)	(6.39)					
before 1990							0.66	-2.08			
							(2.75)	(3.03)			
1990-2003							7.56**	4.96*			
							(3.24)	(2.91)			
after 2003							-10.16	-13.27**			
							(7.40)	(6.60)			
UK citizen									-0.94	-3.78	-9.44
									(2.8))	(3.07)	(6.28)
Non-UK citizen									5.22	2.74	-0.13
									(4.38)	(3.93)	(5.15)
white		-6.37**	-6.44***		-4.41	-4.41		-6.63**		-6.53***	-6.84***
		(2.43)	(2.36)		(2.91)	(2.97)		(2.61)		(2.43)	(2.38)
YSM			0.04			0.0006					0.18
			(0.15)			(0.09)					(0.17)
constant	46.11***	50.99***	50.92***	46.46***	49.31***	49.29***	44.46**	49.47***	45.83***	50.72***	50.28***
	(16.53)	(16.34)	(16.40)	(16.49)	(16.38)	(16.68)	(16.92)	(16.51)	(16.47)	(16.15)	(16.27)
lnsigma	2.50***	2.50***	2.49***	2.50***	2.50***	2.49***	2.49***	2.49***	2.50***	2.50***	2.49***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
N	672	672	672	672	672	672	672	672	672	672	672

Standard errors are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for gender, age, height, marital status, having children, education level, socio-economic status, income per capita and interview mode.

Table B4: The effect of immigrant status and risk attitude on regular alcohol drinking - probit model, marginal effects (part 1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
immigrant	-0.126	-0.102	0.046	-0.028	-0.012					
	(0.111)	(0.103)	(0.081)	(0.076)	(0.071)					
non-EU						-0.007	-0.004	0.200*	0.067	0.066
						(0.187)	(0.141)	(0.120)	(0.101)	(0.096)
EU						0	0	0	0	0
						(.)	(.)	(.)	(.)	(.)
risk aversion (LP)	-0.003					-0.003				
	(0.004)					(0.004)				
risk aversion (HP)		0.001					0.001			
		(0.005)					(0.005)			
risk loving			0.018***					0.018***		
			(0.005)					(0.005)		
risk loving (finance)				0.019***					0.018***	
				(0.005)					(0.005)	
risk loving (health)					0.018***					0.017***
					(0.005)					(0.005)
immigrant*RA(LP)	0.008									
	(0.021)									
immigrant*RA(HP)		0.003								
		(0.019)								
immigrant*RL			-0.020							
			(0.018)							
immigrant*RL(finance)				-0.006						
				(0.017)						
immigrant*RL(health)					-0.011					
					(0.014)					
Non-EU*RA(LP)						0.004				
						(0.026)				
EU*RA(LP)						0				
						(.)				
Non-EU*RA(HP)							0.004			
							(0.020)			
EU*RA(HP)							0			
							(.)			
Non-EU*RL								-0.024		
								(0.021)		
EU*RL								0		
								(.)		
Non-EU*RL(finance)									0.00	
									(0.020)	
EU*RL(finance)									0	
									(.)	
Non-EU*RL(health)										0.002
										(0.017)
EU*RL(health)										0
										(.)
N	578	578	658	658	658	570	570	648	648	648

Standard errors are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for gender, age, marital status, having children, education level, socio-economic status, income per capita and interview mode.

Table B5: The effect of immigrant status and risk attitude on regular alcohol drinking - probit model, marginal effects (part 2)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
before 1990	0.007	0.178	0.047	-0.009	0.079					
	(0.114)	(0.116)	(0.114)	(0.100)	(0.070)					
1990-2003	0	0	0	0	0					
	(.)	(.)	(.)	(.)	(.)					
after 2003	0	0	0	0	0					
	(.)	(.)	(.)	(.)	(.)					
UK citizen						-0.039	0.004	0.061	0.036	0.069
						(0.116)	(0.114)	(0.102)	(0.075)	(0.075)
Non-UK citizen						0	0	0	0	0
						(.)	(.)	(.)	(.)	(.)
risk aversion (LP)	-0.003					-0.003				
	(0.005)					(0.004)				
risk aversion (HP)		0.001					0.001			
		(0.005)					(0.005)			
risk loving			0.018***					0.018***		
			(0.005)					(0.005)		
risk loving (finance)				0.019***					0.019***	
				(0.005)					(0.005)	
risk loving (health)					0.019***					0.018***
					(0.006)					(0.006)
before 1990*RA(LP)	0									
	(0.021)									
1990-2003*RA(LP)	0									
	(.)									
after 2003*RA(LP)	0									
	(.)									
before 1990*RA(HP)		-0.031								
		(0.021)								
1990-2003*RA(HP)		0								
		(.)								
after 2003*RA(HP)		0								
		(.)								
before 1990*RL			-0.001							
			(0.027)							
1990-2003*RL			0							
			(.)							
after2003*RL			0							
			(.)							
before 1990*RL(finance)				0.017						
				(0.026)						
1990-2003*RL(finance)				0						
				(.)						
after 2003*RL(finance)				0						
				(.)						
before 1990*RL(health)					-0.013					
					(0.017)					
1990-2003*RL(health)					0					
					(.)					
after 2003*RL(health)					0					
					(.)					
UKcitizen*RA(LP)						0				
						(0.021)				
Non-UKcitizen*RA(LP)						0				
						(.)				
UKcitizen*RA(HP)							-0.008			
							(0.018)			
Non-UKcitizen*RA(HP)							0			
							(.)			
UKcitizen*RL								-0.011		
								(0.022)		
Non-UKcitizen*RL								0		
								(.)		
UKcitizen*RL(finance)									-0.009	
									(0.019)	
Non-UKcitizen*RL(finance)									0	
									(.)	
UKcitizen*RL(health)										-0.02
										(0.016)
Non-UKcitizen*RL(health)										0
										(.)
N	551	551	628	628	628	562	562	638	638	638

Table B6: The effect of immigrant status and discount rate on regular alcohol drinking - probit model, marginal effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
immigrant	0.022	-0.013						
	(0.144)	(0.187)						
non-EU			0.029	-0.023				
			(0.187)	(0.229)				
EU			0	0				
			(.)	(.)				
before 1990					0.134	0.203		
					(0.177)	(0.246)		
1990-2003					0	0		
					(.)	(.)		
after 2003					0	0		
					(.)	(.)		
UK citizen							0.037	0.026
							(0.168)	(0.217)
Non-UK citizen							0	0
							(.)	(.)
discount rate (3 months)	0.001		0.00		0.001		0.001	
	(0.003)		(0.003)		(0.003)		(0.003)	
discount rate (12 months)		-0.006		-0.007		-0.006		-0.006
		(0.010)		(0.010)		(0.010)		(0.010)
immigrant*DR(3mo)	-0.007							
	(0.012)							
immigrant*DR(12mo)		-0.009						
		(0.045)						
Non-EU*DR(3mo)			0.005					
			(0.016)					
Non-EU*DR(12mo)			0					
			(.)					
EU*DR(3mo)				0.027				
				(0.059)				
EU*DR(12mo)				0				
				(.)				
before 1990*DR(3mo)					-0.009			
					(0.014)			
1990-2003*DR(3mo)					0			
					(.)			
after 2003*DR(3mo)					0			
					(.)			
before 1990*DR(12mo)						-0.042		
						(0.060)		
1990-2003*DR(12mo)						0		
						(.)		
after 2003*DR(12mo)						0		
						(.)		
UKcitizen*DR(3mo)							-0.003	
							(0.013)	
non-UKcitizen*DR(3mo)							0	
							(.)	
UKcitizen*DR(12mo)								-0.004
								(0.052)
non-UKcitizen*DR(12mo)								0
								(.)
N	630	630	630	630	630	630	630	630

Standard errors are reported in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for gender, age, marital status, having children, education level, socio-economic status, income per capita and interview mode.

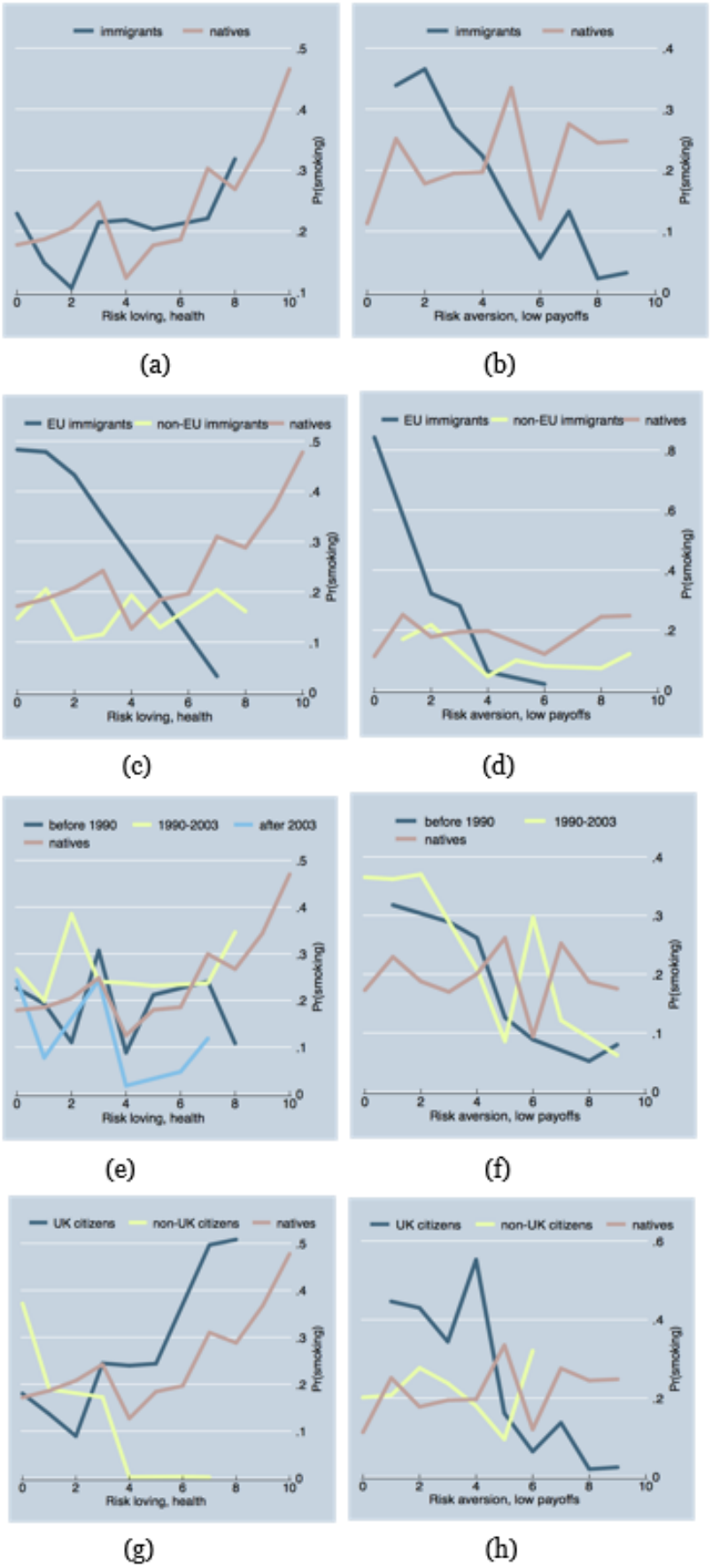

Figure B1: Predicted probabilities of smoking by immigrant status and risk preferences

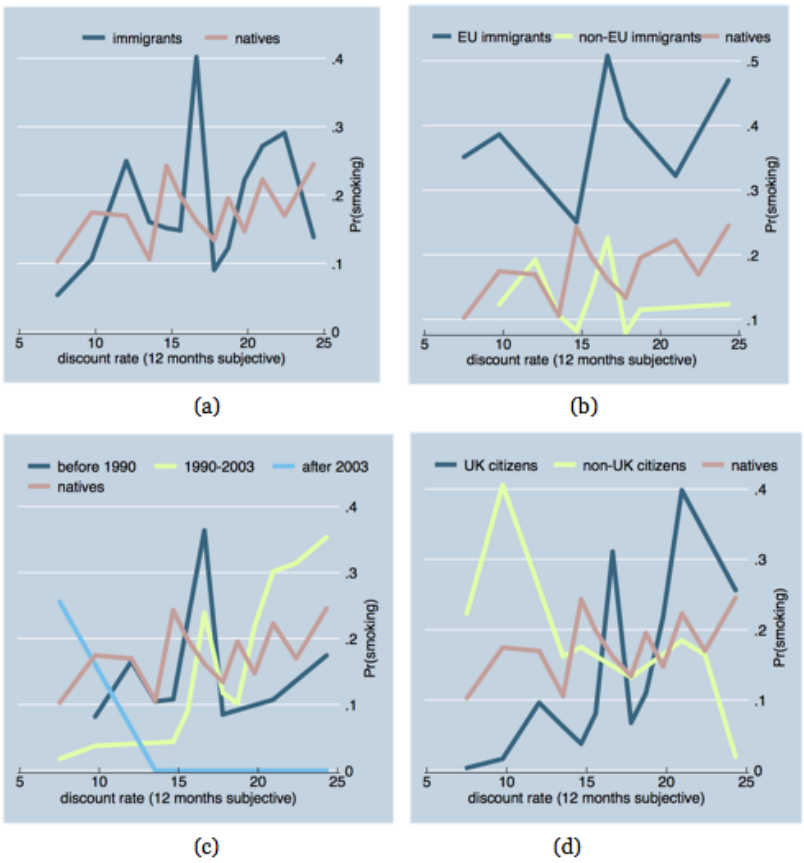

Figure B2: Predicted probabilities of smoking by immigrant status and discount rate

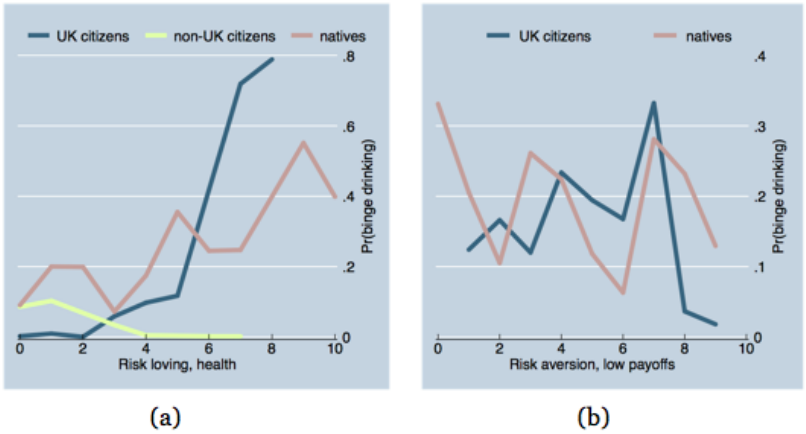

Figure B3: Predicted probabilities of binge drinking by immigrant status and risk preferences

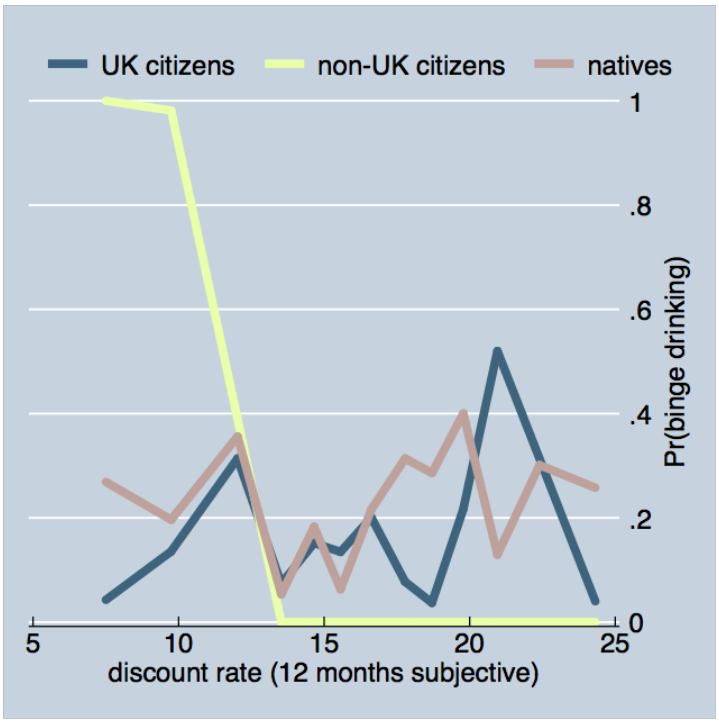

Figure B4: Predicted probabilities of binge drinking by immigrant status and discount rate

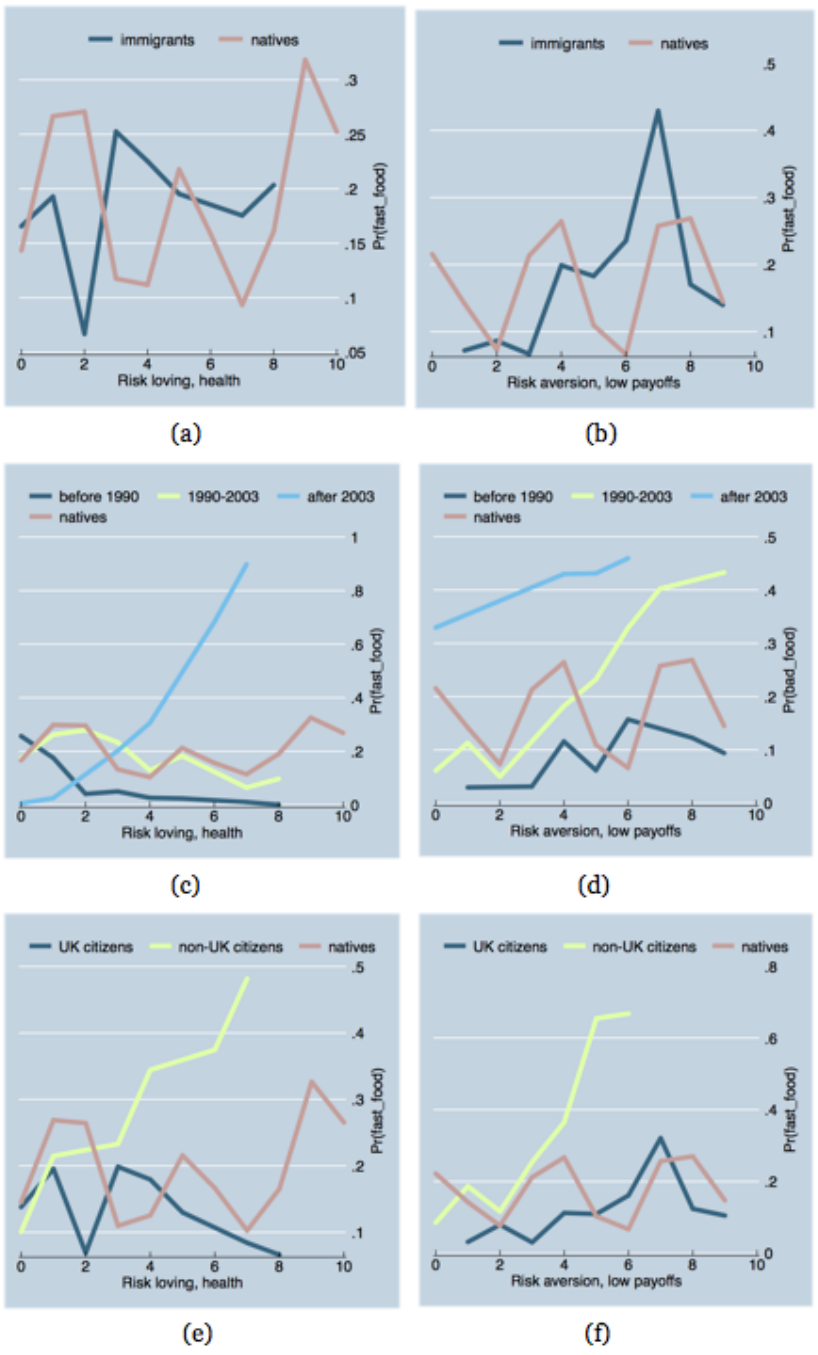

Figure B5: Predicted probabilities of eating fast food by immigrant status and risk preferences

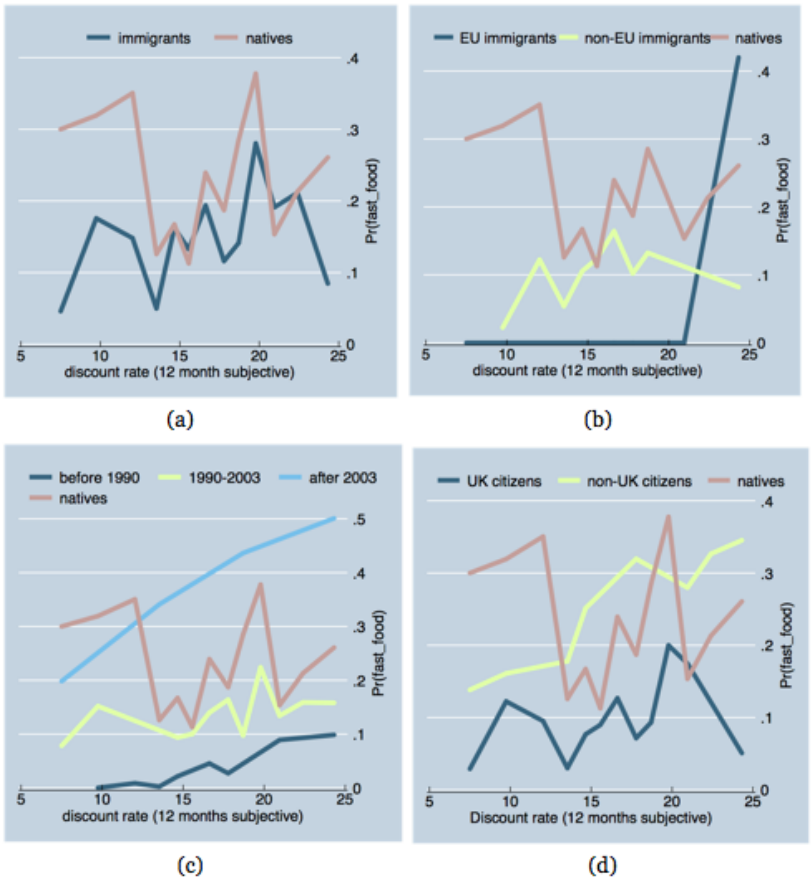

Figure B6: Predicted probabilities of eating fast food by immigrant status and discount rate

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CHAPTER 3

ACCULTURATION AND IMMIGRANTS' HEALTH BEHAVIOURS: EVIDENCE FROM THE UNITED KINGDOM

3.1 Introduction

The health of immigrants is a key indicator of the degree of assimilation into receiving societies, alongside levels of employment, their integration into the education system and housing. Acculturation is currently viewed as a multidimensional process of an individual's adaptation to a new environment, during which the individual may adopt behaviours from the host society while still maintaining practices and habits from the culture of origin (Abraído-Lanza et al., 2016). Health behaviour acculturation is part of the general process of acculturation of immigrants.

Immigrants tend to arrive at the destination country healthier on average than the native population. However, with time, immigrants' health deteriorates more rapidly than that of the average native individual. This phenomenon is often called "healthy migrant effect" and it has been confirmed in a number of empirical studies (Alarcon, 2015; Kennedy et al.,

2015; Costa-Font & Sato, 2016; Farré, 2016; Ljunge, 2016). Specifically, Alarcon (2015) shows that immigrants working in the UK report better health than native UK citizens and immigrants' health distribution converges to that of natives over time. Gibson et al. (2013) account for the self-selection bias but still find that immigrants experience persistent increase in blood pressure and hypertension. We hypothesize that the decline of immigrants' health can be explained partly by the process of acculturation, when this involves the adoption of unhealthy behaviours such as smoking, alcohol consumption, unhealthy diet and lack of physical activity.

Unhealthy behaviours enter the model of health capital as negative investments (Grossman, 1972; Grossman, 2000). The model allows people to have initial endowment of health capital that depreciates with time but can be increased by spending time and money on health care interventions and healthy behaviours. People aim to maximise their utility and so they allocate their time and money to health-related and market consumption and investment. Individuals decide on their engagement in potentially risky health behaviours until the cost of buying market goods related to health behaviours, e.g. alcohol drinks or fast food, is equal to pleasure (or benefit) derived from these behaviours (Cawley & Ruhm, 2011).

The effect of acculturation on immigrants' health behaviours has been studied in countries with considerable immigrant population, i.e. US, Australia and Canada. However, there is a lack of evidence from the UK. In 2015 immigrant population comprised 13.5% of the total population in the UK (Vargas-Silva & Rienzo, 2016). The two studies conducted in the UK exploit Millennium Cohort Study and focus specifically on immigrant mothers and their health behaviours during pregnancy (Hawkins et al., 2008; Jayaweera & Quigley, 2010). Therefore, the generalisability of these results is limited.

All empirical studies of immigrants' acculturation have suffered from the limitations of using cross-sectional or repeated cross-sectional data.

Similar studies of the effect of acculturation on earnings, education and home ownership have shown that cross-sectional studies are often temporally biased (Borjas, 1985). Researchers highlight the need to study acculturation using a cohort of immigrants and natives which is followed over time (Park et al., 2009).

Earlier studies focused solely on length of stay in the host country as a proxy for acculturation. Later on, researchers started incorporating other indicators that are associated with the adoption of new behaviours, namely language proficiency, ethnic identification, and social acceptance. Few studies look at acculturation as a multi-dimensional process and account for such factors as immigrants' national identity because they are unlikely to completely abandon their original culture right after immigration (Creighton et al., 2012; Gorman et al., 2016).

We aim at investigating the effect of acculturation on immigrants' health behaviours in the UK using longitudinal data. We look at smoking, alcohol consumption, physical activity and diet. We exploit the UKHLS. The UKHLS Main Survey contains information on the immigrant status along with their health behaviours, socio-economic characteristics and factors that affect acculturation over time. We exploit the panel structure of the data to estimate linear probability models to capture the process of health acculturation. Two proxies for acculturation are used in the paper: length of stay, one of the most widely used measures in the literature, and national identity. We repeat the analysis for the sub-sample of immigrants, who spent 15 or less years in the UK, to explore if the effect of YSM is the same over the acculturation process.

We also allow for different acculturation trajectories based on factors that are believed to affect the acculturation process, such as the individual's social support, family background, life satisfaction and mental health condition. Very importantly, we introduce a measure of cultural distance as acculturation trajectories may differ for immigrants from the countries culturally close to Britain relative to those from more distant cultures. To

the best of our knowledge, a measure of cultural distance has not been used in the acculturation literature so far. Thereby allowing us to make an important contribution to the related literature.

Our results indicate that length of stay is associated with lower rate of smoking and smoking intensity, higher probability of healthy diet and regular physical activity. National identity is associated with lower rate of smoking and smoking intensity, but lower probability of healthy diet and more alcohol units consumed by immigrant women. We find that immigrants whose culture is close to the British one do not change their behaviours almost at all over time and if they do, this change is towards less healthy lifestyle such as lower levels of physical activity and unhealthier diets. In contrast, those with distant cultures experience a considerable change in health behaviours but towards a healthier lifestyle.

We contribute to the existing literature by closing a gap in the literature by providing evidence for the UK, where there is a significant share of immigrant population but little evidence on how acculturation affects immigrants' health behaviours. We also use a longitudinal dataset and are able to observe how immigrants' and natives' health behaviours change over time and also remove unobserved heterogeneity that could have biased our estimates. It is important to control for immigrants' starting point, specifically how distant is the culture of origin from the British one. We identified only one study in our literature search that accounts for the difference between source and destination country's smoking rates (Leung, 2014). We apply a measure of cultural distance that has not yet been used in acculturation studies. Importantly, we consider acculturation to be a multidimensional process. Therefore, we define acculturation not only as time spent in the UK but also a change in national identity that represents orientation towards the host country. We also attempt to explain what factors affect the acculturation process and which specific group of immigrants may benefit from targeted interventions to improve their lifestyle.

The adoption of unhealthy behaviours by immigrants leads to increase in morbidity and mortality for certain diseases. Therefore, it is essential to ensure they have access to health services and their health needs are met. Health behaviours have been also shown to influence medical care costs, specifically obesity increases medical costs by $2,741 (in 2005 dollars) (Cawley & Meyerhofer, 2012). Binge drinking (Renna, 2007) and weight increase (Sabia, 2007) have a negative effect on education attainment. In turn, alcohol dependency and obesity decrease the probability of employment (Johansson et al., 2007; Rooth, 2009). Earnings of women decline after they reach a Body Mass Index of 23 (Gregory & Ruhm, 2011).

Therefore, public health policies targeted towards specific groups of immigrants based on immigrants' country of origin, national identity and length of stay in the UK are expected to save future health care costs and individuals' well-being as well as improve their education and labour market outcomes.

The paper is organised as follows. Section 2 provides the review of the related literature. Section 3 describes the data, Section 4, our empirical strategy. Section 5 presents the results and Section 6 concludes.

3.2 Related Literature

Acculturation originates in anthropology and archaeology, where it was used to describe what happens when two groups come into contact (Fox, Thayer & Wadhwa, 2017). The concept was adopted by psychology and a number of theoretical models were developed. They are discussed below. Acculturation is also of great interest in the field of health research and health economics. Empirical studies explore the HIE and if unhealthy assimilation takes place with respect to different health outcomes (e.g. obesity) and health behaviours (e.g. physical activity). We hypothesize that acculturation can partially explain immigrants' unhealthy assimila-

tion: their health outcomes become poorer over time due to adoption of unhealthy behaviours from the host culture and weaker connections with the culture of origin. Fox, Thayer & Wadhwa (2017) suggest that acculturation process includes the change in internal state (attitude, preferences) and external state (behaviours). The two are often strongly correlated, i.e. attitudes are reflected in behaviour. Therefore, acculturation can affect physical health outcomes either directly or indirectly. Specifically, change in behaviours due to acculturation affects health directly via changing human biology, whereas attitudes and preferences can affect health only indirectly through changes in behaviours. The effect of health behaviours we study in this paper is well-known (Jha et al., 2013; Lear et al., 2017; Griswold et al., 2018; Afshin et al., 2019). We focus on acculturation as a change in internal state and how if affects immigrants' health behaviours.

Theoretical models of acculturation

The theoretical background of acculturation originates predominantly in the sociology and psychology literatures. Among the most commonly used are the bi-dimensional model developed by Berry (2003); the segmented assimilation theory by Zhou (1997); and, the combination of Berry's model and Antonovsky's salutogenic theory developed by Riedel et al. (2011).

According to Berry's model, immigrants initially experience behavioural changes that are usually made easily: e.g. change in speaking, dressing and eating. Although certain differences in the new environment and adjustment required can be rather painful and result in acculturative stress manifested as anxiety and depression. In the long-term, the individual adapts to the new culture and this adaptation has 2 forms: psychological and socio-cultural. Psychological adaptation implies that individual's sense of well-being and self-esteem are not affected by the acculturation process any longer. Ability to participate in daily life activities in the new culture is the outcome of socio-cultural adaptation. The aim of the model

is to find out where the individual is in acculturation space and not assess the level of acculturation. This makes the model limited to use and test empirically.

The model developed by Riedel et al. (2011) assumes that people have resources to generate health, whereas there are health-threatening hazards in individual's everyday life leading to disease. Self-regulatory processes prevent the individual from falling sick and include generalised resistance resources (constitution, personality traits, social support) and sense of coherence. If the individual has strong sense of coherence, he or she is more likely to be healthy than one with weak sense of coherence. Migration experience affects the sense of coherence and the effect can be two-fold. The sense of coherence can be weakened by the stressful experience of changing the environment, but if the sense of coherence was strong in the first place, it can stimulate coping mechanisms and help the individual successful adapt to the new culture. The acculturation outcome is the state of mental or physical health that can be considered as a resource because positive outcome will lead to easier coping with stress in the future.

The segmented assimilation theory (Zhou, 1997) aims at explaining why immigrants have different acculturation patterns and how these patterns are associated with convergence or divergence. It is important to note that it is based entirely in the US context and has a specific focus on second-generation immigrants, however certain features are applicable to first-generation immigrants as well. The theory takes into account the fact that the host society consists of segregated and unequal segments. There are three possible directions of acculturation: upward-mobility pattern, downward-mobility pattern and economic integration. The theory considers individual (education, language proficiency, place of birth, length of stay etc.) and structural (race, family background, place of residence) factors as determinants of the direction but focuses on the interaction between them.

Despite the existing models, Abraído-Lanza et al. (2016) in their review of the acculturation literature highlight the need to develop a model that explains the mechanisms of acculturation and takes into account both individual and contextual factors.

As a result of this literature, there exist instruments specifically developed to measure acculturation. Based on the underlying definition of acculturation, three types of instruments can be distinguished: unidimensional, bi-dimensional and multidimensional (Thomson & Hoffman-Goetz, 2009). Unidimensional instruments, which are predominantly used in the literature, assess solely the transition from culture of origin to the new one. Bi-dimensional instruments aim to capture two processes simultaneously: maintenance of culture of origin and adoption of new culture. In turn, multidimensional instruments attempt to measure multiple dimensions of acculturation separately. Most instruments were developed for specific ethnic groups such as Hispanic Americans and Asian Americans. For detailed discussion of specific instruments for Latino individuals see Zane & Mak (2003) and Thomson & Hoffman-Goetz (2009). Most instruments include such domains as language, length of stay, cultural orientation, ethnic self-identification, media use, ethnic values and beliefs. However, some factors that are perceived by researchers as important are not included in the existing instruments: perceived social acceptance, contextual factors (e.g. place of residence, family background, discrimination, neighbourhood effect) and structural factors (e.g. historic racism, immigration policies).

Many studies focus on Latino immigrants in the US. Abraído-Lanza et al. (2016) reviewed the research on Latino immigrants, acculturation and health conducted in the past decade. Compared to their review ten years ago (Abraído-Lanza et al., 2006), there has been considerable progress made in the field, even though in the recent review they point out new suggestions for research. Despite this advancement being useful for the whole field of acculturation and health, the results are specific to Latino immigrants in the US.

Empirical studies

There is a number of empirical studies looking at the effect of immigration and immigrants' length of stay on health outcomes. With respect to mental health, immigrants have a better mental health status than the native population in the short-term (Stillman, McKenzie & Gibson, 2009; Riviera, Casal & Currais, 2015), whereas in the long-term their mental health deteriorates and converges to that of natives. The majority of studies explore the effect of length of stay on immigrants' Body Mass Index (BMI). A lot of studies use length of stay as a proxy for acculturation (Antecol & Bedard, 2006; Giuntella & Stella, 2017; Kaplan et al., 2004; Kaushal, 2009; Menigoz et al., 2016; Park et al., 2009). All of them show that immigrants are more likely to become obese as their length of stay in the host country increases. Some studies also investigate the convergence of immigrants' BMI level to the natives' level. Antecol & Bedard (2006) find that immigrant women converge to the BMI level of native Americans within 10 years, although immigrant men never fully converge. Giuntella & Stella (2017) study the cohort effects in immigrants' convergence to native BMI level. They show that more recent immigrants also converge to the weight level of natives faster than earlier immigrants. Park et al. (2009) use repeated cross-sectional data and compare cohorts of immigrants and natives. The result is different from the other two studies in the sense that immigrants never fully converge to the natives' level. The studies that incorporate other aspects of acculturation such as language proficiency, social interactions and connection with the culture of origin show less consistent results. For example, Iversen et al. (2013) find no effect of duration of stay in Norway on the change in BMI. However, acculturation measured by Norwegian language skills diminishes the gap of BMI between natives and immigrants. Creighton et al. (2012) and Gorman et al. (2016) confirm the association of longer stay in the US with higher odds of being obese. Although, they differ in their conclusions regarding

other acculturation proxies. Creighton et al. (2012) argue that the change in BMI is better explained by economic factors rather than by linguistic and social acculturation. In contrast, Gorman et al. (2016) find the protective effect of language proficiency on odds of being overweight, even though this effect declines with the duration of stay. Therefore, the overall conclusion can be made: immigrants do grow more obese as their length of residence increases, better integration in the new culture may have protective effect against obesity, but it is important to exclude potential confounders of the effect such as socio-economic status.

Dietary habits are associated with obesity. Two studies that explored the effect of linguistic acculturation on the quality of the diet come up with the same conclusion: greater acculturation is associated with poorer diet (Allen et al., 2014; Creighton et al., 2012).

According to Evenson et al. (2004), immigrants' intensity of physical activity is not associated with their length of stay in the host country. However, the younger the age at arrival, the higher the level of physical activity attained later on. Linguistic acculturation was also associated with increased physical activity but only for women. Hosper et al. (2007) use different acculturation proxies, namely cultural and social integration, but arrive at the same conclusion. Higher level of acculturation is associated with higher level of leisure-time physical activity.

Studies of the effect of acculturation on smoking also obtained mixed results. Gorman et al. (2014) find that smoking increases with the duration of stay. However, English proficiency and citizenship status have a protective effect with respect to smoking. In contrast, Allen et al. (2014) find that more acculturated immigrant adolescents are the most likely to report being current smokers. Acculturation was measured by the language proficiency. The discrepancy is likely to be due to different population studied. Acculturation has negative effect on adolescents through the exposure to risky health behaviours in the new culture, whereas for adults it has the protective effect through reduced stress and potential

increase in SES. Another reason can be the importance of controlling for immigrants' country of origin. Leung (2014) distinguish between source countries that have higher smoking rates and source countries that have lower smoking rates than the US. Acculturation is associated with higher probability of smoking among immigrants from lower-smoking countries, the effect on the probability of ever quitting is the opposite. In turn, immigrants from higher-smoking countries are both less likely to smoke and the probability of ever quitting smoking increases with acculturation.

Eitle et al. (2009) show that the first generation of immigrant adolescents is less likely to drink and binge drink compared to higher generations. Although, other acculturation measure, bilingualism, has a protective effect on alcohol consumption. As expected, strong family relations and higher proportion of students of the same ethnicity at school have the protective effect too. In turn, Gong et al. (2003) uses length of stay, age at arrival and English language proficiency as proxies for acculturation to study its effect on alcohol dependence. In line with Eitle et al. (2009), longer stay in the US and younger age at arrival are associated with higher probability of alcohol dependence. However, they do not find significant effect of English proficiency on alcohol dependence.

3.3 Data

To answer the questions of interest, we exploit the UKHLS - the largest UK household panel survey. It started in 2009 aiming at developing further its predecessor, the BHPS. The purpose of the survey is to study the dynamics of the population in the UK. The overall sample includes almost 40,000 households. It includes four components: the general population sample, ethnic minority boost sample, BHPS sample and the Innovation Panel.

We use the general population sample (University of Essex, 2017). It is a stratified, clustered, equal probability sample of residential addresses

drawn to a uniform design throughout the whole UK including north of Caledonian Canal (Buck & McFall, 2011). The data is collected using computer-assisted personal interviewing (CAPI) approach. There is a household questionnaire and individual questionnaire (CAPI and self-completed parts) that is completed by each person aged 16 or above within the household. The questionnaire is available in 9 languages: Bengali, Punjabi (Urdu and Gurmukhi scripts), Welsh, Arabic, Somali, Cantonese, Urdu and Gujarati. The general population sample will be referred to as Main Survey from now on.

Respondents from BHPS receive the same questionnaire as Understanding Society sample from Wave 2 onwards. Currently 7 waves are available for the Main Survey: wave 1 (2009-2011), wave 2 (2010-2012), Wave 3 (2011-2013), Wave 4 (2012-2014), Wave 5 (2013-2015), Wave 6 (2014-2016) and Wave 7 (2015-2017).

3.3.1 Health behaviours

Our outcome variables of interest are four health behaviours: smoking, alcohol consumption, physical activity and healthy diet. The descriptions of the outcome variables are presented in Table 3.1. The description of all variables used in the analysis is in the Appendix (Table A1). Smoking is represented by two variables: a binary variable identifying if a person is currently a smoker (*smoking*) and a continuous variable that indicates the number of cigarettes smoked per day (*ncigs*). Alcohol consumption is also captured by two variables: a binary variable equal to 1 if a person had alcohol most days last week (*drink*), and a continuous variable containing the number of alcohol units consumed on the day the respondent drank the most units (*alc_units*). *Healthy_diet* is defined as eating 5 or more portions of fruit or vegetables a day according to the NHS recommendation (Food Standards Agency, 2007). Physical activity is represented by the variable *sport* that is equal to 1 if an individual has moderate physical

Table 3.1: Description of outcome variables

Variable	Description	N	n	Waves
smoking	Smoking status (1 if current smoker, 0 otherwise)	3,563	1,139	2,5,6,7
ncigs	Number of cigarettes smoked per day	3,563	1,139	2,5,6,7
drink	Alcohol drinking (1 if had alcohol most days last week, 0 otherwise)	628	227	2,5,7
alc_units	Number of units of alcohol (on the day you drank the most)	633	350	2,5
sport	Physical activity (1 if moderate physical activity at least once a week, 0 otherwise)	1,410	556	2,5,7
healthy_diet	Healthy diet (1 if eats 5 portions of fruit/veg a day, 0 otherwise)	2,896	1,139	2,5,7

Note: N - total number of individual-time observations, n - the number of individuals that are observed over time

activity at least once a week and equals to 0 otherwise. Moderate physical activity includes among others such popular activities as health, fitness, gym or conditioning activities; swimming; cycling and jogging. The NHS recommends doing at least 150 minutes of moderate aerobic activity such as cycling or brisk walking every week and strength exercises on 2 or more days a week that work all the major muscles (legs, hips, back, abdomen, chest, shoulders and arms) (National Health Service, 2018). The sample size for alcohol consumption is particularly low due to missing values in the dataset, however the reason for it is unknown.

We focus on the period from wave 2 (2010-2012) to wave 7 (2015-2017) as most outcome variables are available in waves 2, 5 and 7. The sample includes foreign-born individuals who arrived in the UK aged 18 years or older. We restricted the sample to immigrants with non-missing data on the outcome variables and main variables of interest. We have full information only about 24.8% of the individuals. The average values of outcome variables over time is shown in Table 3.2.

As can be observed in Table 3.2, the rate of smoking is decreasing over time for both men and women, although women smoke significantly less than men. This is in line with the literature (Courtenay, 2000). The rate of smoking for the male sample is much lower compared to national average

Table 3.2: Outcome variables

Variable	Wave 2 2010/12	Wave 5 2013/15	Wave 6 2014/16	Wave 7 2015/17
		Men		
Smoking	0.19	0.16	0.15	0.15
	(0.39)	(0.36)	(0.35)	(0.36)
Number of cigarettes	1.8	1.5	1.4	1.5
	(4.9)	(4.6)	(4.2)	(4.1)
Regular drinking	0.27	0.23	NA	0.24
	(0.45)	(0.42)	NA	(0.43)
Alcohol units	7.6	6.8	NA	NA
	(8.3)	(6.4)	NA	NA
Physical activity	0.54	0.59	NA	0.53
	(0.50)	(0.49)	NA	(0.50)
Diet	0.15	0.17	NA	0.47
	(0.36)	(0.37)	NA	(0.50)
		Women		
Smoking	0.08	0.06	0.06	0.06
	(0.27)	(0.24)	(0.24)	(0.24)
Number of cigarettes	0.7	0.5	0.5	0.6
	(3.0)	(2.4)	(2.6)	(2.7)
Regular drinking	0.17	0.17	NA	0.19
	(0.38)	(0.37)	NA	(0.40)
Alcohol units	4.8	4.3	NA	NA
	(4.0)	(3.7)	NA	NA
Physical activity	0.59	0.57	NA	0.53
	(0.49)	(0.50)	NA	(0.50)
Diet	0.22	0.26	NA	0.52
	(0.42)	(0.44)	NA	(0.50)

Note: standard deviations are reported in parentheses. NA - not applicable.

(20.6% in 2011 and 15.8% in 2016, ONS 2017a). The number of cigarettes smoked per day is also lower for women (0.6 vs 1.5 in wave 7). The low average in the number of cigarettes is due to the high number of people who do not smoke and thus have zeroes. The proportion of individuals who drink regularly goes down for men (from 27% in wave 2 to 24% in wave 7) but goes up for women (from 17% in wave 2 to 19% in wave 7) although women are less likely to be engaged in regular drinking than men. The proportion of individuals engaged in regular drinking is higher compared to the national average (13% in 2011, 10% in 2016, ONS 2017b). The number of alcohol units decreases over time for both men and women.

The proportion of people who have moderate physical activity at least once a week reduces over time (from 59% in wave 2 to 53% in wave 7). The trend is less clear for men as it rises first (from 54% to 59%) and then drops to 53%. There is a dramatic increase in the proportion of individuals who have a healthy diet for both men (from 15% in wave 2 to 47% in wave 7) and women (from 22% in wave 2 to 52% in wave 7).

Table 3.3 reports the outcome variables by the individuals' length of stay in the UK. The categories of the length of stay include: 1-4 years, 4-9 years, 9-14 years and 15 years and longer.

Table 3.3: Outcome variables by years since migration categories

Variable	YSM_4	YSM_9	YSM_14	YSM_15+
		Men		
Smoking	0.21	0.21	0.15	0.18
	(0.41)	(0.41)	(0.36)	(0.38)
Number of cigarettes	2.11	1.96	1.24	1.88
	(4.8)	(5.32)	(4.31)	(4.88)
Regular drinking	0.08	0.15	0.14	0.40
	(0.28)	(0.36)	(0.36)	(0.49)
Alcohol units	8.65	9.10	6.50	6.97
	(7.0)	(12.73)	(5.10)	(5.59)
Physical activity	0.60	0.50	0.44	0.63
	(0.50)	(0.50)	(0.50)	(0.49)
Diet	0.17	0.10	0.19	0.17
	(0.38)	(0.30)	(0.39)	(0.37)
		Women		
Smoking	0.10	0.10	0.06	0.07
	(0.30)	(0.30)	(0.23)	(0.26)
Number of cigarettes	0.75	1.11	0.42	0.62
	(2.70)	(4.02)	(2.43)	(2.73)
Regular drinking	0.25	0.09	0.05	0.24
	(0.45)	(0.29)	(0.22)	(0.43)
Alcohol units	7.31	4.69	4.90	4.27
	(5.56)	(4.34)	(3.25)	(3.62)
Physical activity	0.57	0.56	0.54	0.66
	(0.50)	(0.50)	(0.50)	(0.48)
Diet	0.15	0.21	0.27	0.23
	(0.36)	(0.41)	(0.45)	(0.42)

Note: standard deviations are reported in parentheses. YSM is years since migration, YSM_4 is 1-4 years, YSM_9 is 5-9 years, YSM_14 is 10-14 years, YSM_15+ is 15 years and longer.

Based on the descriptive statistics, the probability of smoking and number of cigarettes smoked per day is decreased with the length of stay in men and women. The probability of regular drinking increases over time for men, while the pattern is not clear for women. The number of alcohol units decreases over time for both men and women. The probability of regular physical activity seem to be higher in individuals who spent over 15 years in the UK compared to all other categories. The probability of having healthy diet seem to be high when women just arrived in the UK, and then it decreases after 5 years in the UK and does not change with time since then. The pattern is not clear for men.

Table 3.4 presents the difference of health behaviours by region of origin. We obtained a special licence from UK Data Service to be able to categorise immigrants by their region of origin. Our categories include the following countries: Europe - Ireland, France, Germany, Italy, Spain, Poland, Portugal, Cyprus; Africa - Kenya, Ghana, Nigeria, Uganda and South Africa; Asia - India, Pakistan, Bangladesh, Sri Lanka and China; South Pacific region - Australia and New Zealand; America - USA, Canada and Jamaica. The distribution of the sample by region of origin is the following: 57.7% from Asia, 17.5% from Europe, 15.1% from Africa, 7.9% from America and 1.8% from South Pacific region.

Region of origin determines cultural differences, which have an effect on engagement in certain behaviours. It is clear that immigrants from Europe are much more likely to smoke compared to any other region. This also leads to greater intensity of smoking (the number of cigarettes is almost twice as large than other regions). In contrast, immigrants from South-Pacific and American regions are more likely to drink alcohol regularly than European or African immigrants. Immigrants with Asian background are the least likely to drink regularly. However, the number of alcohol units is the highest in case of European and African immigrants and this involves drinking more on a single occasion compared to immigrants from South-Pacific and American regions. Physical activity

Table 3.4: Outcome variables by regions of origin

Variable	Europe	Africa	Asia	South-Pacific	America
Smoking	0.24	0.08	0.09	0.10	0.08
	(0.43)	(0.28)	(0.29)	(0.31)	(0.27)
Number of cigarettes	2.7	0.7	0.7	1.2	0.6
	(6.3)	(3.4)	(2.7)	(4.5)	(2.4)
Sample size	239	193	645	30	102
Regular drinking	0.18	0.19	0.08	0.33	0.32
	(0.38)	(0.40)	(0.28)	(0.48)	(0.48)
Alcohol units	6.1	6.7	4.6	5.5	5.6
	(4.80)	(5.6)	(3.1)	(2.9)	(4.1)
Sample size	133	48	61	24	48
Physical activity	0.53	0.63	0.59	0.57	0.59
	(0.50)	(0.49)	(0.49)	(0.51)	(0.49)
Sample size	163	96	252	22	58
Diet	0.26	0.13	0.14	0.53	0.29
	(0.44)	(0.34)	(0.35)	(0.51)	(0.45)
Sample size	238	191	630	30	102

Note: standard deviations are reported in parentheses. Europe - Ireland, France, Germany, Italy, Spain, Poland, Portugal, Cyprus. Africa - Kenya, Ghana, Nigeria, Uganda and South Africa. Asia - India, Pakistan, Bangladesh, Sri Lanka and China. South Pacific region - Australia and New Zealand. America - USA, Canada and Jamaica. Sample size for smoking and number of cigarettes is the same; for regular drinking and alcohol units too.

seem not to be different by the region of origin as slightly above the half of the people from each region are engaged in regular physical activity. Immigrants from South-Pacific region are more likely to have a healthy diet than immigrants from other regions.

Based on the descriptive statistics discussed above, it is important to control for as many characteristics as possible that may affect health behaviours in order to isolate the effect of the length of stay. The cohorts by year of arrival are likely to be different by age, education level and income that are proved to have considerable impact on health behaviours (Kaushal, 2009; Biddle, Kennedy & McDonald, 2007). Controlling for the country of origin is also necessary as health behaviours differ by region of origin as discussed above.

3.3.2 Socio-economic characteristics

Despite the fact that the UKHLS was not designed to be representative of immigrant population in the UK, the share of immigrants corresponds well to the national statistics. For example, as discussed above, immigrant population comprised 13.1% of the total UK population in 2014. This is slightly higher than share of immigrants in wave 5 (12.4%). The majority of immigrants are from India, Poland and Pakistan, which are among the top countries of origin in the national statistics.

Both immigrant men and women arrive on average being 28 years old (see Table 3.5). About half of the sample (43% of men and 42% of women) spent 15 or more years in the UK. The second highest proportion of immigrants arrived 5-9 years ago (25% of men and 24% of women). It corresponds to increased immigration to the UK after A8 countries joined the EU in 2004[1].

With respect to socio-economic characteristics, immigrants are on average 45 years old, slightly over 60% of them (both men and women) are married, about 50% have children. The vast majority of individuals assess their health as good (80% of men and 77% of women). 24% of men and 27% of women report having a chronic condition. Hence, women tend to be in slightly worse health compared to men. The same is observed in Green and Pope (1999). Immigrants tend to be in a poorer mental health - possibly as a result of the stress associated with immigration. Therefore, we include measures of life satisfaction and mental health condition. Participants of the UKHLS were asked how satisfied they are with their overall life on a scale from 1 (completely dissatisfied) to 7 (completely satisfied). On average immigrants report value 5, which means that they are somewhat satisfied with their life (see Table 3.5).

Mental health functioning is measured by the Short Form-12 Health

[1]A8 countries: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia.

Table 3.5: Socio-economic characteristics (by gender)

Variable	Men		Women	
	Mean	SD	Mean	SD
Age (years)	46.4	15.7	45.4	15.5
Age at arrival (years)	28.7	28.7	27.9	8.7
1-4 years since arrival	0.16	0.35	0.12	0.33
5-9 years since arrival	0.25	0.43	0.24	0.43
10-14 years since arrival	0.16	0.37	0.19	0.39
15+ years since arrival	0.43	0.49	0.42	0.49
SAH	0.80	0.40	0.77	0.42
Chronic condition	0.24	0.42	0.27	0.44
Life satisfaction	5.09	1.48	5.05	1.57
SF-12 MCS	50	9.32	48.84	9.76
Married	0.63	0.48	0.62	0.49
Kids	0.49	0.50	0.53	0.50
White	0.22	0.42	0.26	0.44
Mixed	0.03	0.16	0.03	0.18
Asian	0.49	0.50	0.40	0.49
Black	0.18	0.38	0.21	0.41
Other	0.08	0.27	0.08	0.28
Employed	0.66	0.47	0.47	0.50
University	0.48	0.5	0.46	0.50
School	0.27	0.44	0.25	0.43
No qualification	0.25	0.43	0.29	0.45
Income Q1	0.22	0.42	0.37	0.48
Income Q2	0.26	0.44	0.23	0.42
Income Q3	0.25	0.43	0.21	0.40
Income Q4	0.27	0.44	0.20	0.40

Note: SD is standard deviation, SAH - self-assessed health, SF-12 - Short Form-12 Health Survey, MCS - mental health component.

Survey (SF-12) Mental Health Component Summary (MCS) score. SF-12 is a generic health-related quality-of-life instrument. It consists of physical and mental components and the latter is used for screening for depression and other mental health disorders (Vilagut et al., 2013). The mental health component contains five questions about mental health affecting work and social life, feeling distressed etc. The summary score ranges from 0 (low functioning) to 100 (high functioning). Immigrants report the average score of about 50 (slightly lower for women – 48.8) suggesting that on average immigrants have a medium level of mental

health functioning (see Table 3.5).

The most prevalent ethnic background if Asian (49% of men and 40% of women), the second most prevalent is White (22% of men and 26% of women) and then Black (18% of men and 21% of women). Ethnic background has a significant on health behaviours, therefore it will be important to control for it in our model (Gong et al., 2003). Hawkins et al. (2008) suggest that ethnicity is a better predictor of health behaviours than length of stay. Despite that slightly under 50% of the sample (both men and women) have a university degree (or higher), there is a significant gender difference in the rate of employment – 66% of men vs. 47% of women are employed. Income distribution also differs by gender: higher proportion of women (37% vs. 22%) is in the lower quartile and lower proportion of women is in the highest quartile (27% vs. 20%).

3.3.3 Factors affecting acculturation

The degree of acculturation is most commonly proxied with time spent in the destination country (Antecol & Bedard, 2006; Giuntella & Stella, 2017; Evenson et al., 2004; Gorman et al., 2014; Gong et al., 2003). The second most common proxy in the literature is language proficiency. The UKHLS contains information on different aspects of respondents' English proficiency: speaking day to day English, speaking on the phone, reading and completing forms. However, these variables are only available for wave 1, 5 and 6. Therefore, we are not able to follow the respondents progress from wave 2 to wave 5 and wave 7, which we use in our analysis. The information on the language of the interview is only available for 6% of the sample. Hence, we do not control for language proficiency.

However, we have information about national identity in all seven waves. Respondents were asked what they consider their nationality to be. We combined the responses into a binary variable that equals one if British (including English, Welsh, Scottish and Northern Irish) and

zero otherwise. 37% of immigrants identify themselves as British in wave 2, this proportion rises to 40% in wave 5 and equals to 39% in wave 7. National identity represents how strong is immigrant's connection to host country. If immigrants identify themselves as British, their connection with the UK is very strong and is likely to be stronger than connection with their country of origin.

3.3.3.1 Combined parental education

One of the structural factors that affect acculturation process is family background. Bonin et al. (2012) show that personality traits inherited from parents are more important than country of birth. We have information about mother's and father's education. We distinguish four levels of parents' education: no school (which includes not going to school at all or leaving school with no certificates), school (leaving school with a certificate), post school (gained post school qualifications or certificates) and university or higher (gained a university degree or higher degree).

We apply a factor analysis to explore if combined parental education can be explained by one variable that represents family background that can be later interacted with proxies for acculturation. Table A2 in the Appendix we show the factors generated combining parents' education, their corresponding eigenvalues and the proportion of the total variance that they account for. Only the first factor is retained as its eigenvalue is greater than one and it accounts for 78.7% of the total variance, as per Table A2. Factor loadings and uniqueness are shown in Table 3.6.

Table 3.6: Factor loading and unique variances- Family background

Variables	Factor 1	Uniqueness
High level of education (father)	0.8871	0.213
High level of education (mother)	0.8871	0.213

Factor loadings in Table 3.6 show the correlation between the variables

and the factors. The fact that the two factor loadings are the same implies that the factor is equally correlated with mother's and father's education. This is reasonable as we are more likely to assume that both parents' education has the same impact on the individual, rather than assuming that one parent has greater impact than another. As the value of the factor increases, the more educated his/her parents are. Uniqueness is the proportion of variance that is not explained by the factors. Uniqueness is likely to be explained by the measurement error but the higher the value of uniqueness, the more likely it is to be more than just measurement error. The value of 0.6 is considered high. In our case it is between 0.213, therefore it is relatively low.

3.3.3.2 Social support

Another contextual factor that may play an important role in the acculturation process is social support. The UKHLS includes questions on the level of support from individual's partner, family and friends. The respondents are asked if they have understanding with; feel support of; can rely on; and, can open up to their partners/family/friends. We again employ factor analysis to generate one variable that represents the overall level of social support, which later we use to analyse the determinants of the trajectories of acculturation. Table A3 in the Appendix shows that 9 factors were generated, their eigenvalues and the proportion of the total variance that factors account for. Three factors are retained as their eigenvalues are greater than one and all together they account for 74% of the total variance. Factor loadings and uniqueness are shown in Table 3.7.

The values of uniqueness are between 0.2 and 0.3, therefore it is relatively low. The answers to the questions are coded from 1 (a lot) to 4 (not at all). Therefore, by interpreting the three factors, we conclude that only factor 1 produces meaningful interpretation: as the value of the factor increases, the lower social support individual has.

Table 3.7: Factor loadings and unique variances - Social support

Variables	Factor 1	Factor 2	Factor 3	Uniqueness
Understanding partner	0.4790	0.6450	0.1960	0.3158
Can rely on your partner	0.4173	0.68	0.249	0.3010
Can open up to your partner	0.5145	0.668	0.23	0.2359
Understanding family	0.6698	-0.028	-0.496	0.3042
Can rely on your family	0.6427	-0.023	-0.573	0.2579
Can open up to your family	0.7088	-0.07	-0.538	0.2029
Understanding friends	0.6431	-0.419	0.369	0.2743
Can rely on your friends	0.6621	-0.415	0.399	0.2301
Can open up to your friends	0.6505	-0.475	0.408	0.1851

Social support and background will have an effect on how acculturation process goes: those with greater social support and highly educated parents are expected to adapt to the new culture easier and faster than others. However, they are also more likely to keep protective mechanisms and have healthier lifestyle.

3.3.3.3 Cultural distance

We believe that acculturation is likely to go differently for people with different cultural backgrounds. Moreover, it is important to account how distant is the culture of origin from the British one. We would expect that the closer the cultural background is to the UK culture, the easier adaptation will go and immigrants will be changing their behaviours only slightly. In contrast, immigrants with a very different culture will go through a long and complicated process of assimilation and will be changing their behaviours more considerably. Therefore, it is important to control for immigrants' cultural distance.

Researchers have been trying to measure the cultural distance for many decades. A great body of literature exists mainly in International Business field, where it is important to evaluate the effect of culture on business activity (Avloniti & Filippaios, 2014). The most widely used, but also highly debated, instrument was developed by Hofstede in 1980. It

was developed using the data from a large multinational corporation: the International Business Machines (IBM) Corporation (Hofstede, 2001). The instrument incorporates four dimensions (power distance, uncertainty avoidance, individualism and masculinity) and produces four corresponding indices. Based on these indices, Kogut & Singh (1988) created a composite index that is based on the deviation of each of the four dimensions of each country from the US ranking. One of the limitations of the instrument is that it is based on the data from a single firm sample sizes of some nations were pretty low (Avloniti & Filippaios, 2014). This limitation and the focus on the distance of other nationalities from the US makes it inappropriate for our study. Avloniti & Filippaios (2014) present a comprehensive review of various instruments used to measure cultural and psychic distance (cultural distance is considered to be a component of psychic distance).

Based on the above discussion, we concluded that the instrument developed by Dow & Karunaratna (2006) is the most suitable for our analysis as it is focused on the factors that are commonly measured at a national level. Specifically, it quantifies the differences in psychic distance stimuli: language, religions, industrial development, levels of education and political systems. For us language differences will be particularly important as we do not have this information available from the UKHLS. Moreover, the efficiency in communication makes immigrants more likely to adopt new health behaviours. Education system is also very important in a way people communicate and interpret information. Differences in industrial development affects the nature of individual's employment. Religion is strongly related to attitudes and norms and, hence, will have an effect on what individual may adopt as a new behaviour and what will be considered unacceptable. Separate score is available for each stimulus for 14,280 country pairs. For each stimulus several indicators are taken into account and then reduced to a single factor using confirmatory factor analysis. The detailed description is available on Douglas Dow's website

Table 3.8: Psychic Distance Stimuli - Descriptive statistics

Variable	Mean	SD	Min	Max
Language distance	-1.65	1.43	-3.86	0.53
Religion distance	0.36	0.82	-1.03	1.27
Education distance	1.19	0.59	0.04	1.84
Political distance	0.55	0.47	0.003	1.89

(Dow, 2012). We use the instrument to assign distances to immigrants' countries of origin. Table 3.8 shows descriptive statistics of the four psychic distance stimuli we use in our analysis.

The variable for language distance goes from -3.86 (the closest countries to the UK in terms of language) to 0.53 (the most distant countries from the UK in terms of language). For example, Ireland has the lowest score as the major language is the same as in the UK – English. Turkey has the highest score as Turkish and English are in different language families and the proportion of the population in the UK/Turkey that are able to speak Turkish/English is less than 1%. The variable for religion distance follows similar logic. It takes values from -1.03 (the closest countries to the UK in terms of religion) to 1.27 (the most distant countries from the UK in terms of religion). For example, the closest country to the UK is New Zealand as its major religion is also Christianity (Anglican). The most distant country is India as Hinduism, its major religion, is from a different family of religions. The education distance variable takes into account the difference in the number of literate individuals as well as the number of individuals in the second and third level of education. For example, Portugal and Ireland are the closest to the UK with respect to the above scores, whereas Bangladesh and Pakistan are the most distant. The political distance variable represents the difference in the degree of democracy. The closest to the UK are Italy and Spain, whereas the most distant are China and Nigeria.

3.4 Empirical strategy

To answer the question of interest we specify the following model:

$$Health\_behaviour_{it} = \alpha_0 + \alpha_1 \cdot X_{it} + \alpha_2 \cdot YSM_{it} + \epsilon_{it} \tag{3.1}$$

where $Health\_behaviour_{it}$ is binary variables indicating probability of engaging in a health behaviour (smoking, regular alcohol drinking, physical activity, healthy diet) and number of cigarettes and number of alcohol units as continuous measures; X_{it} is a vector of controls (age groups as a set of binary variables; marital status; ethnicity; education level; living in an urban area; having children and income level.); YSM_{it} is years since migration and ϵ_{it} is an error term. We do not include wave fixed effects as they change along with YSM and will confuse the results.

We exploit the panel nature of the data and specify a correlated random-effects linear probability model estimated using generalised least squares (GLS). Panel data allows us to control for unobserved heterogeneity by following the same individual over time. We cannot use fixed effects model that assumes individual effects are constant over time as we are interested in a coefficient for YSM variable that is constant over time (it only includes a time trend as it increases as we move along waves by 1 year). Standard random effects model assumes that individual effects are random variables drawn from a distribution (Greene, 2011). But it makes a strong assumption about random effects not being correlated with the regressors. They are likely to be correlated with variables we do not control for (and that are, therefore, included in the random effects), e.g. risk and time preferences that are related to individual's age, gender, ethnicity and income. To relax this assumption, we estimate a correlated random effects (CRE) model. The model adds group-means of variables that vary between individuals.

LPM has a limitation of not accounting for the main property of probability concept: probability can only take values between 0 and 1. This

limitation cannot be overcome but the model is easier to interpret and, therefore, is widely used in the literature. We also estimate random-effects probit model as a robustness check.

The baseline model includes only YSM and the set of controls described above. Next we introduce a set of variables to check for robustness of the acculturation effect. In the second specification, we control for immigrants' region of origin. The third specification controls for the factors affecting acculturation (social support and family background). The fourth specification controls for immigrants' life satisfaction and mental health condition. The fifth, sixth and seventh specifications control for cultural distance: language distance, education distance and religion distance. Then we introduce a set of interactions to the model to see if immigrants with different characteristics have different trajectories of acculturation.

As health behaviours differ considerably by gender, we first interact YSM variable with gender to see if length of stay in the UK has different effect on men and women. We also allow for different trajectories of acculturation based on immigrants' level of social support and better educated parents. Immigrants with better social support and family background are expected to adapt to the new culture faster than others. We interact YSM with life satisfaction and SF-12 MCS score to see if they affect how acculturation process goes. We expect that better scores lead to healthier lifestyle. Finally, we interact YSM with language distance as it has the strongest effect on acculturation and for some behaviours, also with education distance.

Another model uses national identity variable as a proxy for acculturation instead of length of stay. This reflects the strength of connection with the host country as over time more and more foreign-born individuals identify themselves as British. By using this alternative measure, we can conclude if national identity has greater effect on individuals' health behaviour and is better proxy for acculturation than YSM. The model is

specified in a similar fashion to the first one:

$$Health\_behaviour_{it} = \alpha_0 + \alpha_1 \cdot X_{it} + \alpha_2 \cdot nat\_ID_{it} + \epsilon_{it} \tag{3.2}$$

where nat_ID_{it} is national identity. The model is also estimated as CRE model. The procedure of checking for the robustness of the acculturation effect and allowing for different acculturation trajectories is repeated for the second model.

Where the interaction term with gender was statistically significant, we estimated the models for women only to check what factors have an impact on women's acculturation process.

Immigrants spent on average 19 years in the UK and the process of acculturation has already taken place to a large extent. Therefore, we try to check if the results are the same for a group of more recent immigrants. To keep the sample size reasonably big, we repeat the analysis for the sub-sample of immigrants, who spent less than 15 years in the UK. LPM model assumes that one additional year spent in the UK has the same effect on the outcome variable and it may differ between more recent immigrants and those, who spent a long time in the UK. We present the results of the sub-sample analysis in the Appendix A.

3.5 Results

Models are estimated for all four health behaviours including measures of intensity of smoking and drinking.

3.5.1 Smoking

The estimates of the effect of length of stay on the probability of smoking are shown in Table 3.9.

Table 3.9: The effect of length of stay on smoking: correlated random effects (CRE) linear probability model (LPM)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YSM	-0.002***	-0.002***	-0.001	-0.002**	-0.002***	-0.002***	-0.002***	-0.004**	-0.002***	-0.004***	-0.002***	0.000	-0.001	-0.004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.002)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
africa		-0.089**						-0.108**						
		(0.046)						(0.063)						
asia		-0.081*						-0.049						
		(0.045)						(0.114)						
south pacific		-0.074						-0.025						
		(0.056)						(0.086)						
america		-0.069*						-0.054						
		(0.041)						(0.052)						
support			0.006					0.000	0.011					
			(0.009)					(0.011)	(0.014)					
background			0.002					0.000		0.013				
			(0.009)					(0.010)		(0.010)				
SF12				-0.000				-0.002**			0.001			
				(0.000)				(0.001)			(0.001)			
LS				-0.001				0.007				-0.0004		
				(0.002)				(0.005)				(0.004)		
lang_distance					0.015***	0.015**	0.016**	0.025***					0.033	
					(0.006)	(0.006)	(0.006)	(0.009)					(0.009)	
educ_distance						-0.016	-0.01	0.027						
						(0.022)	(0.022)	(0.032)						
rel_distance							-0.013	-0.063						
							(0.011)	(0.056)						
female									-0.12***					
									(0.027)					
YSM*female									0.001					
										(0.001)				
YSM*support										-0.000				
										(0.000)				
YSM*background											-0.000			
											(0.000)			
YSM*SF12												-0.000		
												(0.000)		
YSM*LS													-0.00003	
													(0.000)	
YSM*lang_distance														-0.001**
														(0.0004)
N of ind	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139
Rho	0.72	0.71	0.70	0.73	0.71	0.71	0.71	0.70	0.72	0.69	0.70	0.73	0.72	0.71
R^2	0.057	0.074	0.038	0.058	0.075	0.076	0.076	0.083	0.057	0.040	0.061	0.058	0.057	0.079

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level. Rho indicates the proportion of variance in the dependent variable between subjects.

The effect of YSM is robust across Specification 1-8. The estimated effect of one year spent in the UK on the probability of smoking is 0.2 percentage points (pp) (see Table 3.9). Region of origin has a significant effect on the probability of smoking. Immigrants from all regions (Asia, Africa, South Pacific region and America) are less likely to smoke compared to immigrants from Europe. Social support, family background and life satisfaction do not have significant effect on the probability of smoking. When we control for all factors in one specification, we observe that the better mental health condition, the less likely immigrants are to smoke (see column 8 in Table 3.9). In contrast, language distance does affect the probability of smoking significantly. Increasing language distance by 1 unit leads to increase in the probability of smoking by 1.6 pp. The magnitude of the effect increases to 2.5 pp, when we control for other factors in column 8. Education and religion distance do not affect the probability of smoking based on our estimates.

Even though gender has a significant effect on the probability of smoking, the interaction of YSM with gender does not produce a significant result (see column 9). Therefore, women are 12 pp less likely to smoke compared to men but the effect of YSM on the probability of smoking does not differ by gender. The effect of length of stay also varies with language distance (see column 14). As this is the interaction of two continuous variables, we analyse it graphically by plotting marginal effects of YSM holding language distance constant at different levels (see Figure 3.9).

The probability of smoking is predicted as negative for some individuals. This is the limitation of LPM that cannot be accounted for. However, the fact that the results are similar to those of probit models suggest that we do not need to worry about the limitation. We can see that immigrants with the lowest language distance are represented by the blue line that is almost flat: the probability of smoking does not change over time almost at all. In contrast, we predict the most dramatic change in the probability of smoking for immigrants' with the greatest language distance.

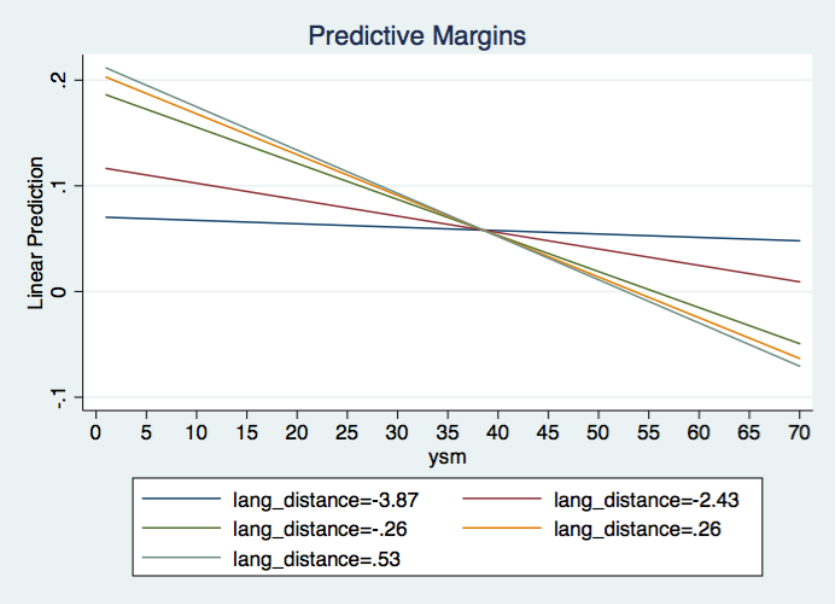

Figure 3.9: The effect of YSM on the probability of smoking at different levels of language distance

The estimates for the sub-sample of individuals, who spent 15 years or less in the UK, are presented in Table A4 in the Appendix. The coefficients for YSM are also statistically significant and consistent across specifications. However, the effect is larger: each year in the UK leads to 0.8 pp decrease in the probability of smoking. Hence, our hypothesis is confirmed: the effect of one year is larger for immigrants, who spent less time in the UK. Moreover, other factors define the trajectories of acculturation: gender, social support and mental health. In contrast, in the model with the full sample we had language distance significant. Hence, different factors define acculturation process at different stages.

The estimates of the effect of the national identity on the probability of smoking are presented in Table 3.10.

Table 3.10: The effect of national identity on smoking: correlated random effects (CRE) linear probability model (LPM)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
nat_ID	-0.029**	-0.035**	-0.028	-0.033**	-0.038**	-0.038**	-0.039**	-0.051**	-0.033	-0.040**	-0.027*	0.016	-0.071***	-0.050*
	(0.014)	(0.016)	(0.020)	(0.0149)	(0.016)	(0.016)	(0.016)	(0.023)	(0.027)	(0.019)	(0.014)	(0.038)	(0.023)	(0.027)
africa		-0.075						-0.096						
		(0.046)						(0.063)						
asia		-0.069						-0.031						
		(0.046)						(0.116)						
south pacific		-0.077						-0.026						
		(0.055)						(0.086)						
america		-0.069*						-0.055						
		(0.041)						(0.052)						
support			0.006					0.000		0.018				
			(0.009)					(0.011)		(0.012)				
background			0.003					0.002			0.013			
			(0.009)					(0.010)			(0.008)			
SF12				-0.0001				-0.002**				0.0003		
				(0.0004)				(0.001)				(0.0005)		
LS				-0.0009				0.007					-0.005*	
				(0.0019)				(0.005)					(0.003)	
lang_distance					0.016**	0.016**	0.017**	0.027						0.018**
					(0.006)	(0.006)	(0.006)	(0.009)						(0.007)
educ_distance						-0.004	0.003	0.035						
						(0.022)	(0.022)	(0.032)						
rel_distance							-0.013	-0.069						
							(0.011)	(0.057)						
Female									-0.105***					
									(0.020)					
Female*nat_ID									0.007					
									(0.033)					
nat_ID*support										-0.024*				
										(0.014)				
nat_ID*background											-0.002			
											(0.013)			
nat_ID*SF12												-0.001		
												(0.0007)		
nat_ID*LS													0.008**	
													(0.004)	
nat_ID*lang_distance														-0.007
														(0.011)
N of individuals	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139
Rho	0.71	0.71	0.70	0.72	0.71	0.71	0.71	0.70	0.71	0.69	0.70	0.72	0.72	0.71
R^2	0.061	0.075	0.042	0.063	0.077	0.077	0.078	0.083	0.061	0.046	0.064	0.062	0.063	0.078

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level. Rho indicates the proportion of variance in the dependent variable between subjects.

National identity has a significant effect on the probability of smoking. The estimate of the baseline model shows that identifying yourself as British decreases the probability of smoking by 2.9 pp. The region of origin seems to have less impact on the probability of smoking here compared to the model of the effect of length of stay. Unlike region of origin, language distance has a significant effect on the probability of smoking. As immigrants become more distant in terms of language from the native UK citizens, they are more likely to smoke (by 1.6 pp, see column 5). This effect is very similar to the one we observed in the first model. When we control for all factors affecting acculturation, mental health comes into play: improved mental health condition is associated with lower probability of smoking.

Social support and life satisfaction produce different trajectories of acculturation. Immigrants, who identify themselves as British, are less likely to smoke as the level of social support goes down (-0.040-0.024=-0.066 or 6.4 pp). Immigrants with other national identities seem to be more likely to smoke as the level of social support decreases but this coefficient is not statistically significant (see column 10). With respect to life satisfaction, immigrants, who identify themselves as British, are less likely to smoke (-0.071+0.008=-0.063 or 6.3 pp) as their life satisfaction increases. For other national identities the effect is the opposite.

The effect of national identity on smoking in the sub-sample of immigrants is the same in magnitude but it is not statistically significant (see Table A5). Thus, national identity is likely to affect the acculturation process later rather than sooner.

Table 3.11 shows the estimates of the effect of length of stay on the intensity of smoking. The dependent variable here is the number of cigarettes smoked per day.

Table 3.11: The effect of length of stay on smoking intensity: correlated random effects (CRE) linear probability model (LPM)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YSM	-0.022***	-0.032***	-0.035**	-0.024***	-0.029***	-0.030***	-0.030***	-0.061***	-0.027***	-0.039***	-0.022***	-0.026*	-0.028***	-0.055***
	(0.007)	(0.009)	(0.014)	(0.008)	(0.009)	(0.009)	(0.009)	(0.021)	(0.009)	(0.014)	(0.007)	(0.013)	(0.009)	(0.012)
africa		-0.939						-1.455						
		(0.677)						(0.967)						
asia		-1.045						-1.733						
		(0.665)						(1.375)						
south pacific		-1.010*						-0.707						
		(0.597)						(0.827)						
america		-0.805						-0.744						
		(0.584)						(0.642)						
support			-0.029					-0.108		-0.038				
			(0.085)					(0.111)		(0.106)				
background			0.123					0.145			0.123			
			(0.116)					(0.136)			(0.126)			
SF12				-0.0031				-0.021**				-0.004		
				(0.0033)				(0.010)				(0.006)		
LS				-0.0008				0.068					-0.028	
				(0.023)				(0.050)					(0.042)	
lang_distance					0.113	0.105	0.122	0.238**						0.395***
					(0.071)	(0.071)	(0.076)	(0.111)						(0.125)
educ_distance						-0.355	-0.285	0.410						
						(0.290)	(0.279)	(0.399)						
rel_distance							-0.156	-0.059						
							(0.125)	(0.498)						
female									-1.223***					
									(0.291)					
YSM*female									0.008					
									(0.009)					
YSM*support										0.0024				
										(0.006)				
YSM*background											0.0016			
											(0.007)			
YSM*SF12												0.00003		
												(0.0002)		
YSM*LS													0.0009	
													(0.001)	
YSM*lang_distance														-0.014***
														(0.004)
N of individuals	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139
Rho	0.76	0.74	0.84	0.75	0.74	0.74	0.74	0.80	0.76	0.84	0.74	0.75	0.75	0.74
R^2	0.056	0.069	0.043	0.061	0.068	0.068	0.068	0.097	0.055	0.046	0.057	0.061	0.059	0.073

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level. Rho indicates the proportion of variance in the dependent variable between subjects.

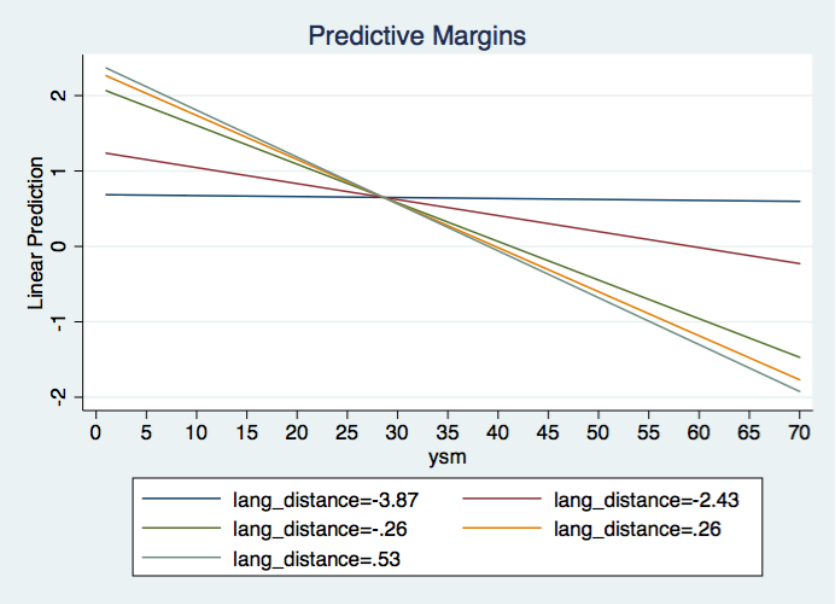

Figure 3.10: The effect of YSM on the number of cigarettes smoked per day at different levels of language distance

The number of cigarettes smoked is consistently decreasing over time and this is true across specifications. Controlling for various characteristics does not reduces the effect of year spent in the UK. When we control for all factors, the magnitude of the effect of YSM increases (see column 8 in Table 3.11). Good mental health is associated with smaller number of cigarettes smoked. As language distance increases, immigrants smoke more cigarettes per day. Women smoke less than men but the acculturation process does not differ by gender. In contrast, language distance produces different effects of length of stay. The effect of length of stay at different levels of language distance is shown in Figure 3.10.

Immigrants from English speaking countries do not change the number of cigarettes smoked per day as their length of stay in the UK increases. The greatest change is observed for immigrants with the largest language distance.

By means of the estimates in Table 3.12 we compare the effect of length of stay with national identity on the smoking intensity.

Table 3.12: The effect of national identity on smoking intensity: correlated random effects (CRE) linear probability model (LPM)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
nat_ID	-0.231	-0.301*	-0.222	-0.248	-0.343*	-0.321*	-0.330*	-0.637**	-0.406	-0.333	-0.224	0.136	-0.486*	-0.368
	(0.160)	(0.178)	(0.247)	(0.169)	(0.179)	(0.174)	(0.174)	(0.263)	(0.293)	(0.235)	(0.164)	(0.368)	(0.264)	(0.318)
africa		-0.778						-1.122						
		(0.691)						(1.011)						
asia		-0.899						-1.697						
		(0.674)						(1.398)						
south pacific		-1.055*						-0.527						
		(0.595)						(0.793)						
america		-0.833						-0.619						
		(0.595)						(0.627)						
support			-0.031					-0.120		0.061				
			(0.085)					(0.113)		(0.104)				
background			0.139					0.186			0.151			
			(0.115)					(0.139)			(0.106)			
SF12				-0.003				-0.019*				-0.001		
				(0.003)				(0.010)				(0.004)		
LS				-0.003				0.062					-0.031	
				(0.023)				(0.050)					(0.031)	
lang_distance					0.123*	0.119*	0.135*	0.285**						0.127
					(0.071)	(0.072)	(0.077)	(0.116)						(0.095)
educ_distance						-0.221	-0.151	0.477						
						(0.284)	(0.272)	(0.399)						
rel_distance							-0.151	0.076						
							(0.124)	(0.519)						
Female									-1.176***					
									(0.232)					
Female*nat_ID									0.299					
									(0.327)					
nat_ID*support										-0.178				
										(0.151)				
nat_ID*background											0.006			
											(0.152)			
nat_ID*SF12												-0.008		
												(0.006)		
nat_ID*LS													0.056	
													(0.039)	
nat_ID*lang_distance														-0.015
														(0.135)
N of individuals	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139
Rho	0.76	0.74	0.84	0.75	0.74	0.74	0.74	0.80	0.76	0.85	0.74	0.75	0.75	0.74
R^2	0.057	0.065	0.045	0.062	0.064	0.064	0.064	0.089	0.057	0.047	0.058	0.062	0.059	0.064

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level. Rho indicates the proportion of variance in the dependent variable between subjects.

The baseline model does not produce a significant result for the national identity variable. It is significant at 5% level when we control for all factors affecting acculturation. Immigrants, who identify themselves as British, smoke fewer cigarettes a day than those who do not identify themselves as British. In turn, better mental health is associated with less intense smoking. Language distance variable has a significant effect on the number of cigarettes smoked per day (see columns 5,6,7,8) but its interaction with national identity is not significant (column 14).

3.5.2 Alcohol drinking

The estimates of the effect of length of stay on alcohol drinking are shown in Table 3.13.

Table 3.13: The effect of length of stay on regular drinking: correlated random effects (CRE) linear probability model (LPM)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YSM	0.0003	-0.001	-0.0005	0.0001	-0.002	-0.002	-0.002	0.007	-0.0002	-0.0003	0.001	0.003	-0.001	-0.005
	(0.002)	(0.003)	(0.004)	(0.002)	(0.003)	(0.003)	(0.003)	(0.008)	(0.002)	(0.003)	(0.002)	(0.007)	(0.003)	(0.003)
africa		-0.051						-0.053						
		(0.067)						(0.129)						
asia		-0.161						0.610						
		(0.103)						(0.639)						
south pacific		0.073						-0.067						
		(0.082)						(0.175)						
america		0.132						0.185						
		(0.085)						(0.135)						
support			-0.025					-0.011		-0.068*				
			(0.024)					(0.030)		(0.036)				
background			-0.023					0.003			0.024			
			(0.023)					(0.032)			(0.032)			
SF12				-0.002				0.000				0.001		
				(0.002)				(0.003)				(0.003)		
LS				0.018				0.013					0.008	
				(0.011)				(0.028)					(0.014)	
lang_distance					-0.018	-0.017	-0.011	0.023						0.008
					(0.013)	(0.013)	(0.014)	(0.023)						(0.024)
educ_distance						-0.087	-0.060	0.155						
						(0.073)	(0.074)	(0.169)						
rel_distance							-0.075	-0.045						
							(0.053)	(0.543)						
Female									-0.079					
									(0.066)					
YSM*female									0.001					
									(0.003)					
YSM*support										0.002				
										(0.002)				
YSM*background											-0.001			
											(0.002)			
YSM*SF12												-0.0001		
												(0.0001)		
YSM*LS													0.0003	
													(0.0005)	
YSM*lang distance														-0.001
														(0.001)
N of individuals	227	227	227	227	227	227	227	227	227		227	227	227	227
Rho	0.47	0.44	0.40	0.46	0.44	0.45	0.44	0.27	0.47	0.40	0.46	0.45	0.46	0.44
R^2	0.049	0.102	0.092	0.055	0.082	0.085	0.092	0.190	0.049	0.098	0.057	0.053	0.053	0.090

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level. Rho indicates the proportion of variance in the dependent variable between subjects.

We do not obtain significant coefficients for YSM variable. The sign of the coefficient also varies across specifications, therefore it is difficult to make conclusions based on these results. The reason is likely to be a small sample of immigrants for whom we have information about alcohol drinking. There are also no clear effects of other variables we control for on the probability of regular drinking. There is only a sign of social support having significant effect (at 10% level) on regular drinking: for participants with lower social support, the probability of regular drinking increases by 1.7pp as YSM increases.

In the sub-sample of immigrants with YSM less than or equal to 15 years, we do not obtain any significant coefficients for YSM (see Table A6).

Table 3.14 shows the estimates of the effect of national identity on the probability of regular drinking.

Table 3.14: The effect of national identity on regular drinking: correlated random effects (CRE) linear probability model (LPM)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
nat_ID	-0.01	-0.035	-0.029	-0.014	-0.053	-0.034	-0.033	-0.071	-0.010	-0.009	-0.009	-0.348	0.030	-0.064
	(0.050)	(0.068)	(0.069)	(0.050)	(0.064)	(0.066)	(0.065)	(0.086)	(0.069)	(0.065)	(0.066)	(0.228)	(0.122)	(0.124)
africa		-0.036						-0.033						
		(0.690)						(0.131)						
asia		-0.148						0.581						
		(0.104)						(0.639)						
south pacific		0.077						-0.043						
		(0.083)						(0.177)						
america		0.139*						0.186						
		(0.084)						(0.136)						
support			-0.029					-0.018		-0.027				
			(0.024)					(0.030)		(0.025)				
background			-0.027					0.000			0.005			
			(0.023)					(0.032)			(0.021)			
SF12				-0.002				0.000				-0.002		
				(0.002)				(0.003)				(0.002)		
LS				0.018				0.013					0.016	
				(0.011)				(0.028)					(0.011)	
lang_distance					-0.018	-0.017	-0.009	0.023						-0.017
					(0.011)	(0.013)	(0.014)	(0.023)						(0.014)
educ_distance						-0.075	-0.048	0.161						
						(0.075)	(0.075)	(0.170)						
rel_distance							-0.075	-0.458						
							(0.053)	(0.398)						
female									-0.065					
									(0.046)					
female*nat_ID									0.0006					
									(0.105)					
nat_ID*support										-0.069				
										(0.065)				
nat_ID*background											-0.029			
											(0.048)			
nat_ID*SF12												0.007		
												(0.005)		
nat_ID*LS													-0.008	
													(0.021)	
nat_ID*lang_distance														-0.005
														(0.046)
N of individuals	227	227	227	227	227	227	227	227	227	227	227	227	227	227
Rho	0.46	0.44	0.39	0.45	0.45	0.45	0.45	0.26	0.46	0.41	0.45	0.45	0.46	0.45
R^2	0.049	0.101	0.098	0.056	0.081	0.083	0.089	0.188	0.049	0.100	0.057	0.052	0.052	0.081

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level. Rho indicates the proportion of variance in the dependent variable between subjects.

National identity does not have a significant effect on the probability of regular drinking either.

We also estimate the models for drinking intensity – the number of alcohol units on the day an individual drank the most. Table 3.15 shows the estimates of the effect of length of stay on drinking intensity.

Table 3.15: The effect of length of stay on drinking intensity: correlated random effects (CRE) linear probability model (LPM)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YSM	0.005	0.0007	0.012	0.004	-0.009	-0.007	-0.005	-0.019	0.016	0.010	0.002	-0.089	0.023	0.011
	(0.020)	(0.024)	(0.028)	(0.021)	(0.024)	(0.024)	(0.024)	(0.035)	-0.029	(0.027)	(0.022)	(0.176)	(0.048)	(0.032)
africa		-0.189						0.685						
		(0.815)						(1.352)						
asia		-1.588*						-8.139*						
		(0.838)						(4.237)						
south pacific		0.181						0.952						
		(0.795)						(1.502)						
america		0.218						-2.569**						
		(0.772)						(1.110)						
support			-0.144					-0.191		0.255				
			(0.239)					(0.285)		(0.597)				
background			-0.222					-0.293			-0.029			
			(0.297)					(0.316)			(0.443)			
SF12				-0.076				-0.060*				-0.097		
				(0.055)				(0.033)				(0.105)		
LS				0.311				0.318*					0.315	
				(0.238)				(0.163)					(0.312)	
lang_distance					-0.262*	-0.262*	-0.206	-0.427						-0.418*
					(0.150)	(0.150)	(0.157)	(0.270)						(0.249)
educ_distance						-0.842	-0.553	-2.195						
						(0.692)	(0.759)	(1.360)						
rel_distance							-0.578	4.169*						
							(0.467)	(2.437)						
female									-2.484***					
									(0.935)					
YSM*female									-0.022					
									(0.029)					
YSM*support										-0.014				
										(0.018)				
YSM*background											0.005			
											(0.016)			
YSM*SF12												0.002		
												(0.003)		
YSM*LS													-0.004	
													(0.008)	
YSM*lang_ distance														0.009
														(0.009)
N of individuals	350	350	350	350	350	350	350	350	350	350	350	350	350	350
Rho	0.33	0.51	0.26	0.32	0.50	0.50	0.50	0.56	0.33	0.28	0.37	0.33	0.33	0.50
R^2	0.091	0.138	0.088	0.106	0.134	0.138	0.143	0.208	0.092	0.083	0.095	0.101	0.094	0.136

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level. Rho indicates the proportion of variance in the dependent variable between subjects.

The coefficients for YSM are not statistically significant across specifications. Country of origin has a significant (at 10% level) effect on drinking intensity when we control for all factors affecting acculturation in column 8. Immigrants from Asia and America have fewer drinks than immigrants from Europe. Better mental health also reduces the number of drinks. Life satisfaction and religion distance are associated with greater number of drinks. Language distance has a significant effect on the number of alcohol units: immigrants from the most distant countries drink less. However, the interaction of length of stay with language distance does not produce a significant result. Women drink by 2.5 units less than men but the effect of length of stay does not vary by gender.

Table 3.16 shows the estimates of the effect of national identity on drinking intensity.

Table 3.16: The effect of national identity on drinking intensity: correlated random effects (CRE) linear probability model (LPM)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
nat_ID	0.007	0.059	0.363	-0.068	-0.206	0.062	0.122	0.092	1.024	0.476	-0.194	-5.278	-1.209	-0.083
	(0.549)	(0.601)	(0.747)	(0.577)	(0.565)	(0.580)	(0.578)	(0.749)	(0.907)	(0.704)	(0.651)	(4.005)	(1.503)	(0.960)
africa		-0.218						0.771						
		(0.861)						(1.368)						
asia		-1.615*						-8.047*						
		(0.868)						(4.217)						
south pacific		0.176						1.036						
		(0.798)						(1.483)						
america		0.207						-2.413**						
		(0.750)						(1.016)						
support			-0.161					-0.197		0.034				
			(0.244)					(0.280)		(0.389)				
background			-0.255					-0.282			0.041			
			(0.297)					(0.314)			(0.300)			
SF12				-0.079				-0.060*				-0.087		
				(0.055)				(0.033)				(0.059)		
LS				0.305				0.317*					0.157	
				(0.238)				(0.164)					(0.236)	
lang_distance					-0.257*	-0.257*	-0.200	-0.395						-0.265
					(0.148)	(0.148)	(0.154)	(0.249)						(0.162)
educ_distance						-0.877	-0.601	-2.267*						
						(0.707)	(0.770)	(1.343)						
rel_distance							-0.589	4.138*						
							(0.465)	(2.441)						
female									-2.508***					
									(0.598)					
female*nat_ID									-2.120**					
									(0.981)					
nat_ID*support										-0.208				
										(0.632)				
nat_ID*background											-0.052			
											(0.448)			
nat_ID*SF12												0.104		
												(0.075)		
nat_ID*LS													0.233	
													(0.291)	
nat_ID*lang_distance														0.059
														(0.341)
N of individuals	350	350	350	350	350	350	350	350	350	350	350	350	350	350
Rho	0.32	0.51	0.26	0.32	0.50	0.50	0.50	0.56	0.32	0.29	0.36	0.32	0.32	0.51
R^2	0.096	0.138	0.095	0.111	0.135	0.139	0.143	0.209	0.101	0.088	0.101	0.110	0.100	0.135

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level. Rho indicates the proportion of variance in the dependent variable between subjects.

When we look at the effect of the national identity on drinking intensity, we obtain similar results to those in Table 3.15 with respect to country of origin, mental health and life satisfaction. Education distance is also associated with lower drinking intensity. Language distance again has a negative effect on the number of alcohol units but the interaction with national identity is not significant. In contrast, interaction with gender suggests that women have a different acculturation process from men. Women who identify themselves as British drink 1.096 units less than women with other national identities (column 9). In turn, the effect of national identity on men's drinking is not significant. Therefore, we also run the model for the sub-sample of women only there (Table 3.17).

Table 3.17: The effect of national identity on drinking intensity: correlated random effects (CRE) linear probability model (LPM) (women only)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
nat_ID	-0.912*	-0.958	-0.494	-1.025**	-1.308**	-0.834	-0.843	-0.737	-0.289	-0.905	-3.115	-3.592***	-1.518	-1.721*
	(-0.499)	(0.638)	(0.706)	(0.518)	(0.568)	(0.641)	(0.643)	(0.841)	(0.649)	(0.603)	(2.064)	(1.184)	(0.993)	(0.999)
africa		-0.882						-0.084						
		(0.747)						(1.233)						
asia		-0.395						-11.546**						
		(0.816)						(4.933)						
south pacific		0.583						2.742*						
		(0.874)						(1.511)						
america		0.554						-1.221						
		(0.824)						(1.090)						
support			-0.001					-0.281	-0.242					
			(0.240)					(0.326)	(0.243)					
background			0.139					-0.079		0.207				
			(0.216)					(0.243)		(0.231)				
SF12				-0.0004				-0.036			-0.012			
				(0.028)				(0.041)			(0.029)			
LS				-0.741				0.080				-0.174		
				(0.143)				(0.230)				(0.157)		
lang_distance					-0.109	-0.091	-0.128	-0.339*					-0.094	
					(0.135)	(0.136)	(0.149)	(0.197)					(0.146)	
educ_distance						-1.249**	-1.497**	-3.093***						-1.778**
						(0.592)	(0.617)	(0.967)						(0.745)
rel_distance							0.370	7.544***						
							(0.435)	(2.906)						
nat_ID*support									1.111**					
									(0.549)					
nat_ID*background										-0.136				
										(0.487)				
nat_ID*SF12											0.0417			
											(0.411)			
nat_ID*LS												0.515**		
												(0.223)		
nat_ID*lang_distance													-0.105	
													(0.326)	
nat_ID*educ_distance														1.265
														(0.952)
N of individuals	182	182	182	182	182	182	182	182	182	182	182	182	182	182
Rho	0.28	0.33	0.24	0.30	0.33	0.32	0.32	0.287	0.29	0.27	0.30	0.28	0.33	0.32
R^2	0.093	0.151	0.099	0.107	0.143	0.157	0.159	0.206	0.094	0.096	0.109	0.099	0.143	0.160

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level. Rho indicates the proportion of variance in the dependent variable between subjects.

The baseline model suggests that immigrant women who identify themselves as British drink by almost 1 unit less than women with other national identities and, therefore, who are less oriented towards the host country. However, the magnitude of the effect and its significance changes when we control for various characteristics. Hence drinking intensity is likely to be affected by other factors more than acculturation. Education distance reduces the number of alcohol units consumed by immigrant women but the interaction with national identity variable is not significant. Although difference in social support and life satisfaction result in different acculturation trajectories. Women with British identity drink by 0.822 units more (-0.289+1.111=0.822) as their level of social support decreases. When life satisfaction increases, the number of alcohol units decreases by 3.08 units (-3.592+0.515=-3.08).

In the sub-sample of recent immigrants we find that the effect of national identity is not statistically significant (see Table A7). However, we find that national identity has a significant interaction with family background. That implies that family background has a protective effect earlier in the acculturation process but it loses its power as YSM increase.

3.5.3 Physical activity

Table 3.18 presents the estimates of the effect of length of stay on physical activity.

Table 3.18: The effect of length of stay on physical activity: correlated random effects (CRE) linear probability model (LPM)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YSM	0.002	0.002	0.007**	0.0008	0.002	0.002	0.002	0.006	0.001	0.007***	0.002	-0.002	-0.002	0.005
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.007)	(0.002)	(0.003)	(0.002)	(0.006)	(0.004)	(0.003)
africa		0.038						-0.088						
		(0.064)						(0.122)						
asia		-0.023						-0.364						
		(0.071)						(0.319)						
south pacific		0.069						0.055						
		(0.072)						(0.129)						
america		-0.025						-0.091						
		(0.072)						(0.113)						
support			-0.019					0.015		-0.021				
			(0.019)					(0.027)		(0.032)				
background			0.012					-0.023			-0.002			
			(0.019)					(0.026)			(0.019)			
SF12				0.0025				0.007**				0.001		
				(0.002)				(0.003)				(0.002)		
LS				-0.006				0.000					-0.012	
				(0.009)				(0.017)					(0.014)	
lang_distance					-0.015	-0.014	-0.013	-0.021						-0.041**
					(0.011)	(0.011)	(0.011)	(0.020)						(0.018)
educ_distance						0.026	0.034	0.130						
						(0.047)	(0.048)	(0.098)						
rel_distance							-0.015	0.188						
							(0.029)	(0.176)						
female									0.021					
									(0.041)					
YSM*female									0.0004					
									(0.002)					
YSM*support										-0.0001				
										(0.002)				
YSM*background											0.001			
											(0.001)			
YSM*SF12												0.0001		
												(0.0001)		
YSM*LS													0.001	
													(0.001)	
YSM*lang_ distance														0.002*
														(0.001)
N of individuals	556	556	556	556	556	556	556	556	556	556	556	556	556	556
Rho	0.15	0.17	0.30	0.15	0.17	0.17	0.17	0.31	0.14	0.28	0.15	0.15	0.16	0.16
R^2	0.018	0.027	0.033	0.016	0.027	0.027	0.027	0.067	0.018	0.029	0.019	0.015	0.015	0.029

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level. Rho indicates the proportion of variance in the dependent variable between subjects.

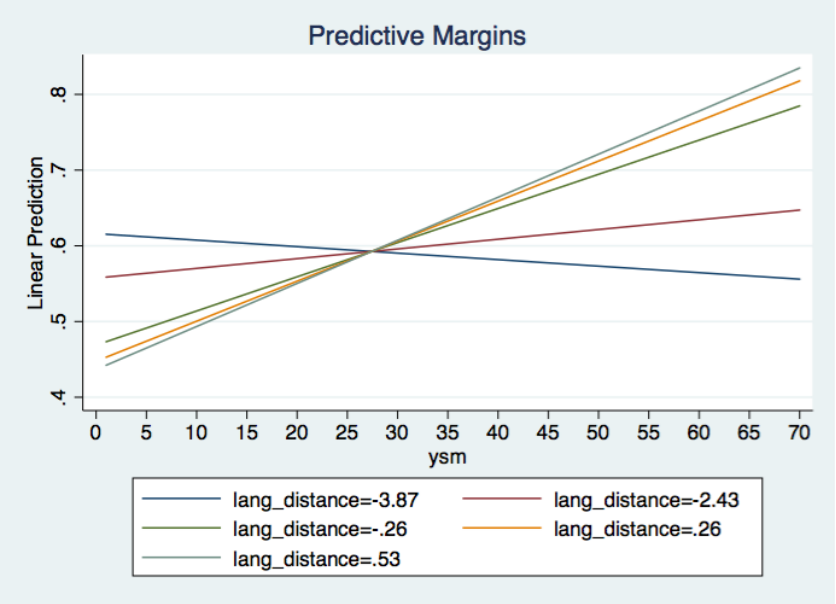

Figure 3.11: The effect of YSM on physical activity at different levels of language distance

The probability of having regular physical activity increases with length of stay in the UK as the coefficient is consistently positive across specifications. In the baseline model the effect is not statistically significant, however when we control for social support, it becomes significant at 5% significance level (see column 3 and 10). When we keep all factors affecting acculturation in column 8 constant, better mental health is associated with increased probability of regular physical activity (significant at 5% level). Language distance seem to produce different trajectories of acculturation process but it is only significant at 10% level. To explore the effect of language distance we plot marginal effects of YSM at different levels of language distance (see Figure 3.11).

Immigrants from English speaking countries, such as Ireland, experience the decline in the probability of regular physical activity over time. Immigrants from countries with slightly higher language distance from the UK (red line) experience slight increase in that probability. For other immigrants the probability of regular physical activity is predicted to

almost double over years.

The effect of YSM is not statistically significant for a sub-sample of immigrants, who spent 15 or less years in the UK (see Table A8). There are no significant interactions with other variables either. Hence, YSM has an effect on physical activity only if we take into account immigrants with longer stay in the UK.

Table 3.19 presents the estimates of the effect of national identity on physical activity.

Table 3.19: The effect of national identity on physical activity: correlated random effects (CRE) linear probability model (LPM)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
nat_ID	0.017	0.007	0.017	0.011	0.010	0.007	0.007	0.030	0.036	0.010	0.030	-0.069	0.022	0.010
	(0.029)	(0.039)	(0.049)	(0.032)	(0.038)	(0.038)	(0.038)	(0.062)	(0.040)	(0.046)	(0.034)	(0.159)	(0.097)	(0.062)
africa		0.032						-0.096						
		(0.066)						(0.122)						
asia		-0.027						-0.376						
		(0.071)						(0.319)						
south pacific		0.068						0.052						
		(0.072)						(0.130)						
america		-0.029						-0.093						
		(0.072)						(0.113)						
support			-0.012					0.016		-0.006				
			(0.019)					(0.027)		(0.022)				
background			0.008					-0.025			0.012			
			(0.019)					(0.026)			(0.014)			
SF12				0.002				0.006**				0.0017		
				(0.002)				(0.003)				(0.002)		
LS				-0.006				0.000					0.00005	
				(0.009)				(0.017)					(0.010)	
lang_distance					-0.016	-0.015	-0.014	-0.023						-0.016
					(0.011)	(0.011)	(0.011)	(0.020)						(0.012)
educ_distance						0.022	0.030	0.122						
						(0.047)	(0.049)	(0.099)						
rel_distance							-0.015	0.192						
							(0.029)	(0.176)						
female									0.040					
									(0.030)					
female*nat_ID									-0.040					
									(0.054)					
nat_ID*support										-0.042				
										(0.043)				
nat_ID*background											-0.011			
											(0.026)			
nat_ID*SF12												0.002		
												(0.003)		
nat_ID*LS													-0.001	
													(0.018)	
nat_ID*lang_distance														-0.0002
														(0.027)
N of individuals	556	556	556	556	556	556	556	556	556	556	556	556	556	556
Rho	0.14	0.17	0.31	0.15	0.17	0.17	0.17	0.31	0.14	0.29	0.15	0.15	0.16	0.17
R^2	0.018	0.026	0.025	0.016	0.026	0.026	0.026	0.066	0.018	0.021	0.019	0.016	0.014	0.026

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level. Rho indicates the proportion of variance in the dependent variable between subjects.

National identity does not appear to have a significant effect on the probability of regular physical activity as the obtained coefficients are not statistically significant. The sign of the coefficient is consistently positive so it is likely if any the effect of British identity on physical activity is positive. When we keep all factors constant, mental health has a significant effect on physical activity, same as discussed above.

The result is the same for the sub-sample of more recent immigrants (see Table A9).

3.5.4 Diet

Table 3.20 shows the estimates of the effect of length of stay on the probability of having a healthy diet.

Table 3.20: The effect of length of stay on diet: correlated random effects (CRE) linear probability model (LPM)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YSM	0.001*	0.001	-0.0002	0.001	0.001	0.001	0.001	-0.003	0.001	0.0001	0.002**	0.003	0.00002	0.002	-0.001
	(0.0008)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.001)	(0.001)	(0.001)	(0.003)	(0.002)	(0.001)	(0.013)
africa		-0.085**						-0.016							
		(0.043)						(0.075)							
asia		-0.084*						-0.025							
		(0.043)						(0.150)							
south pacific		0.204***						0.175*							
		(0.059)						(0.102)							
america		0.013						0.082							
		(0.049)						(0.085)							
support			-0.023**					-0.017		-0.048***					
			(0.010)					(0.014)		(0.016)					
background			0.013					0.000			0.002				
			(0.012)					(0.014)			(0.013)				
SF12				0.003***				0.004**				0.004***			
				(0.001)				(0.002)				(0.001)			
LS				0.007				-0.009					0.010		
				(0.006)				(0.010)					(0.008)		
lang_distance					-0.001	-0.004	-0.004	0.005						-0.004	
					(0.006)	(0.007)	(0.006)	(0.011)						(0.011)	
educ_distance						-0.092***	-0.092***	-0.057							-0.137***
						(0.022)	(0.022)	(0.042)							(0.028)
rel_distance							-0.0005	-0.005							
							(0.015)	(0.075)							
female									0.091***						
									(0.024)						
YSM*female									-0.0001						
									(0.001)						
YSM*support										0.001*					
										(0.001)					
YSM*background											0.001				
											(0.0006)				
YSM*SF12												-0.00004			
												(0.00005)			
YSM*LS													0.0002		
													(0.0003)		
YSM*lang_ distance														0.0002	
(0.0004)															
YSM*educ distance															0.002**
	(0.0009)														
N of individuals	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139
Rho	0.17	0.17	0.27	0.16	0.18	0.17	0.17	0.25	0.17	0.27	0.17	0.17	0.17	0.18	0.17
R^2	0.044	0.059	0.060	0.044	0.051	0.057	0.057	0.091	0.044	0.060	0.046	0.043	0.041	0.051	0.0584

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level. Rho indicates the proportion of variance in the dependent variable between subjects.

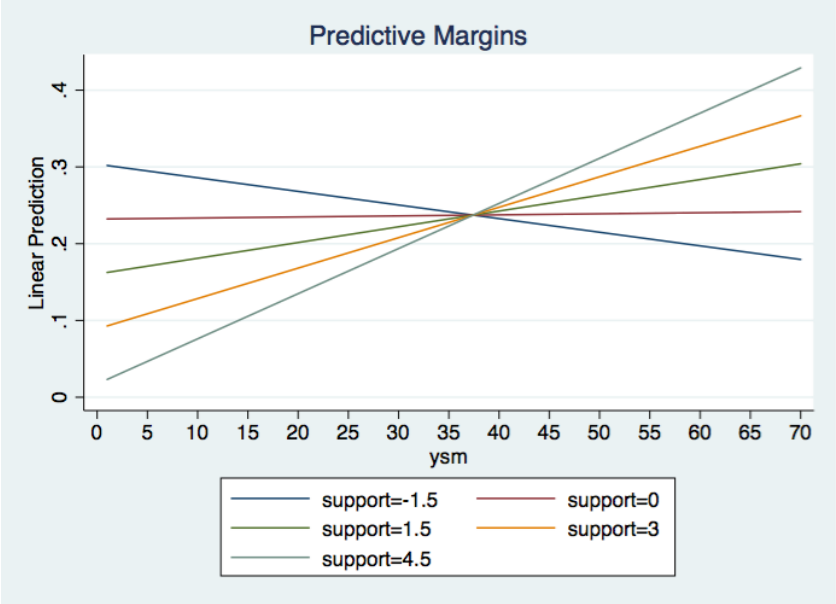

Figure 3.12: The effect of YSM on the probability of healthy diet at different levels of social support

The baseline model estimate suggests that the probability of having healthy diet increases over time (significant at 10% significance level). However, controlling for such variables as region of origin, social support and mental health condition results in the coefficient becoming small in magnitude and insignificant. Therefore, diet is likely to be more affected by other factors than acculturation. Immigrants from Africa and Asia are less likely (by approximately 8.5 pp in both cases) to have a healthy diet compared to European immigrants, whereas immigrants from South Pacific countries are more likely to eat healthy than Europeans (by 20.4 pp). Lower social support is associated with an increase in the probability of healthy diet over time by 0.1 pp. In turn, as mental health functioning improves, the probability of healthy eating increases. Social support also produces different trajectories of acculturation process. They are represented in Figure 3.12.

As the variable increases from -1.5 to 4.5, the level of social support goes down. Hence, immigrants with the highest level of social support

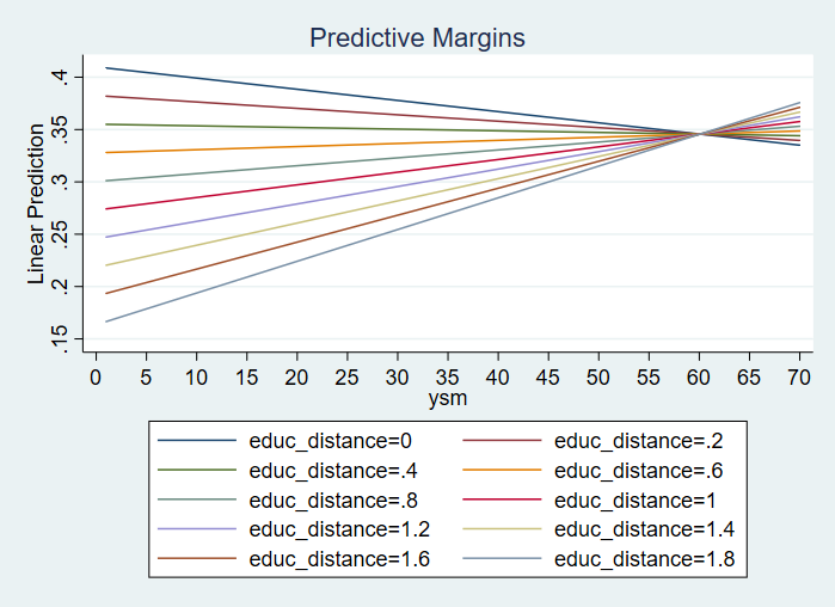

Figure 3.13: The effect of YSM on the probability of healthy eating at different levels of education distance

(blue line) experience decline in the probability of healthy eating with time spent in the UK. At zero level there is almost no change of the probability of interest and then as the level of social support decreases, the probability of healthy eating increases.

As the interaction with education distance is also significant, we plot marginal effects for it too (see Figure 3.13).

Immigrants from the countries that have low education distance from the UK experience slight decrease in the probability of healthy eating over time. As education distance goes up, the probability of healthy eating increases and at a greater rate.

The effect of YSM is significant in the sub-sample of recent immigrants and it is also larger in magnitude (see Table A10). Therefore, the probability of healthy diet changes more with each year spent in the UK in the first 15 years since arrival.

Table 3.21 presents the estimates of the effect of national identity on the probability of healthy diet.

Table 3.21: The effect of national identity on diet: correlated random effects (CRE) linear probability model (LPM)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
nat_ID	-0.041***	-0.031*	0.003	-0.040**	-0.038**	-0.029	-0.029	0.025	-0.014	0.004	-0.040**	-0.136*	-0.076	-0.024	-0.032
	(0.015)	(0.018)	(0.026)	(0.018)	(0.018)	(0.018)	(0.018)	(0.031)	(0.022)	(0.024)	(0.016)	(0.079)	(0.051)	(0.027)	(0.050)
africa		-0.084*						-0.017							
		(0.043)						(0.151)							
asia		-0.085*						-0.017							
		(0.044)						0.151							
south pacific		0.202***						0.171*							
		(0.059)						(0.102)							
america		0.014						0.075							
		(0.049)						(0.085)							
support			-0.023**					-0.016		-0.030**					
			(0.011)					(0.014)		(0.013)					
background			0.013					0.002			0.010				
			(0.012)					(0.014)			(0.009)				
SF12				0.003***				0.004**				0.002**			
				(0.001)				(0.002)				(0.001)			
LS				0.007				-0.008					0.011*		
				(0.006)				(0.010)					(0.006)		
lang_distance					-0.002	-0.004	-0.004	0.004						-0.004	
					(0.006)	(0.006)	(0.007)	(0.011)						(0.008)	
educ_distance						-0.091***	-0.089***	-0.060							-0.090***
						(0.022)	(0.023)	(0.043)							(0.026)
rel_distance							-0.003	-0.013							
							(0.015)	(0.076)							
female									0.106***						
									(0.018)						
female*nat_ID									-0.047*						
									(0.028)						
nat_ID*support										0.016					
										(0.020)					
nat_ID*background											0.017				
											(0.015)				
nat_ID*SF12												0.002			
												(0.002)			
nat_ID*LS													0.008		
													(0.009)		
nat_ID*lang_distance														0.008	
														(0.012)	
nat_ID*educ_distance															0.002
															(0.034)
N of individuals	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139	1,139
Rho	0.14	0.14	0.27	0.13	0.14	0.14	0.14	0.26	0.14	0.27	0.14	0.13	0.14	0.14	0.14
R^2	0.045	0.061	0.060	0.045	0.052	0.057	0.057	0.091	0.046	0.058	0.047	0.045	0.042	0.052	0.057

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level. Rho indicates the proportion of variance in the dependent variable between subjects.

The estimates show that British identity decreases the probability of healthy eating (by approximately 4 pp). Hence, national identity has a different direction from length of stay. Region of origin variables are statistically significant and lead to the same conclusion as those in Table 3.20: immigrants from Africa and Asia are less likely to have a healthy diet compared to European immigrants, whereas immigrants from South Pacific countries are more likely to eat healthy than Europeans. Similarly, low level of social support and increase in education distance are associated with low probability of healthy diet, whereas improvement in mental health condition is associated with higher probability of healthy diet. Women who identify themselves as British have lower probability of healthy diet than women with other national identities (-0.014-0.047=-0.061 or 6.1 pp).

As the interaction with gender is significant, we estimate the model for women separately to shed the light on the acculturation process of women (see Table 3.22).

Table 3.22: The effect of national identity on diet: correlated random effects (CRE) linear probability model (LPM) (women only)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
nat_ID	-0.057***	-0.039	-0.034	-0.057**	-0.045*	-0.033	-0.033	0.033	-0.023	-0.066***	-0.095	-0.055	-0.050	0.019
	(0.021)	(0.025)	(0.039)	(0.025)	(0.025)	(0.025)	(0.025)	(0.051)	(0.035)	(0.022)	(0.103)	(0.067)	(0.037)	(0.070)
africa		-0.058						0.076						
		(0.058)						(0.118)						
asia		-0.088						0.073						
		(0.059)						(0.228)						
south pacific		0.069						0.082						
		(0.080)						(0.152)						
america		0.047						0.169						
		(0.064)						(0.115)						
support			-0.041***					-0.039*	-0.048***					
			(0.015)					(0.022)	(0.018)					
background			0.029					0.015		0.004				
			(0.018)					(0.023)		(0.013)				
SF12				0.003***				0.003			0.004			
				(0.001)				(0.002)			(0.001)			
LS				0.015**				-0.007				0.023***		
				(0.007)				(0.014)				(0.008)		
lang_distance					-0.0008	-0.003	-0.001	0.030*					-0.0001	
					(0.008)	(0.008)	(0.009)	(0.016)					(0.009)	
educ_distance						-0.091***	-0.081**	-0.080						-0.074**
						(0.031)	(0.031)	(0.072)						(0.035)
rel_distance							-0.022	-0.057						
							(0.021)	(0.112)						
nat_ID*support									0.024					
									(0.029)					
nat_ID*background										0.028				
										(0.020)				
nat_ID*SF12											0.0008			
											(0.002)			
nat_ID*LS												0.00001		
												(0.013)		
nat_ID*lang_distance													-0.003	
													(0.017)	
nat_ID*educ_distance														-0.041
														(0.048)
N of individuals	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Rho	0.16	0.15	0.32	0.17	0.16	0.15	0.15	0.364	0.33	0.16	0.17	0.17	0.16	0.15
R^2	0.049	0.068	0.045	0.047	0.062	0.067	0.068	0.087	0.039	0.053	0.044	0.043	0.062	0.068

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level. Rho indicates the proportion of variance in the dependent variable between subjects.

The effects of social support, mental health condition, life satisfaction and education distance that we observe for the whole sample are the same for the sample of women. None of the interactions are statistically significant.

We find that the effect of national identity on diet is statistically significant (at 1% significance level) in the sub-sample of immigrants, who arrived 15 years ago or earlier (see Table A11). The magnitude of the effect is also larger than in the case of the full sample. Family background has a protective effect on diet in the first 15 years since immigration. However, the interaction with background is not significant in the full sample.

We estimate a model that explores if labour force participation has an effect on women's acculturation process. We hypothesise that women, who are from cultural backgrounds different from the UK, may start working after arriving in the UK and this would make them adopt health behaviours from the native population, such as smoking and alcohol drinking. However, we do not find significant effect of labour force participation on women's acculturation. Hence, our hypothesis is not confirmed and the results are not presented.

3.6 Conclusion

The study aims at exploring the effect of acculturation on immigrants' health behaviours in the UK. We use two proxies for acculturation: length of stay as the most commonly used and national identity. We find clear effect of length of stay on the probability of smoking and smoking intensity, healthy diet and somewhat on the probability of regular physical activity. We observe that there is a decrease in the probability of smoking and in smoking intensity, healthy diet and physical activity over time. National identity has a significant effect on the probability of smoking and smoking intensity, women's intensity of alcohol consumption and the probability of

healthy diet. Overall, both proxies go in the same direction except healthy diet, where national identity is associated with a decline in the probability of healthy diet.

We contribute to the literature by applying the measure of cultural distance to the analysis of acculturation: how immigrants' culture of origin is different from that in the UK. Language distance generates different acculturation trajectories with respect to smoking, smoking intensity and physical activity. We do not find any change in the probability of smoking and number of cigarettes smoked per day for immigrants from English speaking countries as time spent in the UK increases. In contrast, immigrants with a culture distant from the UK one experience a greater decline in the probability of smoking and smoking intensity over time. With regards to physical activity, immigrants from English speaking countries experience a decrease in physical activity, whereas for all other groups of immigrants we predict an increase in the probability of regular physical activity. Education distance determines the acculturation trajectories with respect to healthy diet. For immigrants from countries close to the UK with respect to education level we predict a decline in the probability of healthy eating, whereas as the distance increases that probability goes up.

Allowing for different trajectories based on immigrants' social support and family background showed that social support has more impact on the acculturation process than family background.

Social support is important for the probability of healthy diet and women's alcohol consumption. Immigrants who have a high level of social support are less likely to have a healthy diet over time. As the level of social support goes down, the probability of having a healthy diet increases over time. However, as the level of social support decreases, immigrant women who identify themselves as British drink more units of alcohol compared to women who have other national identities. Women with British identity also drink fewer units of alcohol as their life satisfaction

increases.

The sub-sample analysis of immigrants, who spent 15 or less years in the UK, provided some interesting insights. The effect of one year spent in the UK is larger in the sub-sample of recent immigrants than in full sample. This suggests that acculturation is not a linear processes and length of stay has a greater impact on behaviours earlier in the process. We do not observe the same in case of national identity, it tends to have the same effect on both the full sample and the sub-sample (except diet). Also, we find that family background has a protective effect with respect to health behaviours (is associated with healthier lifestyle) but only in the sub-sample of recent immigrants.

The study has several limitations. The panel model is more efficient compared to a cross section or a pooled model, however, as we are interested in time invariant variable (YSM), we cannot estimate the fixed effects model and thus eliminate all time-invariant unobserved variables from the model. The sample of immigrants is rather low, especially for alcohol consumption and we are likely not to have much variation in the outcome of alcohol drinking and alcohol units consumed as these variables have a lot of zero values. We do not observe immigrants as a cohort from the moment they arrive in the UK and until 5, 10, 15 and more years. Instead we have individuals with different length of stay in the UK and by controlling for individual characteristics we try to make them as comparable as possible to isolate the effect of YSM on health behaviours. This is what usually happens in the literature as the data on immigrants is scarce. It is important to fit not only OLS, but also quantile regression model to the data on the intensity of smoking and alcohol drinking. The distribution of these variables is of interest, how each respondent can be classified (as light, moderate or heavy smoker/drinker). This is a plan for future research.

Our study contributes to the literature by providing evidence for the UK, where there is a significant proportion of immigrant population but

little evidence on how acculturation affects immigrants' health behaviours. To our best knowledge this is the first study of acculturation to date that uses a longitudinal dataset and able to observe how immigrants' and natives' health behaviours change over time. This provides more reliable estimates of the effect of acculturation on health behaviours. We use an alternative proxy of acculturation, specifically national identity and also a measure of cultural distance that allows for a richer analysis of the process of acculturation. We observe that both length of stay and national identity have effect only on some health behaviours, but not all of them. We also find that immigrants' whose culture is close to the British one do not change their behaviour over time almost at all, whereas those with distant cultures experience a considerable change in behaviours. However, this change is towards healthier lifestyle: they are less likely to smoke and drink alcohol, they are more likely to exercise regularly and eat healthy. It is important to pay attention to the group of immigrants from the countries that are close to the UK with respect to language and education as they do not change their behaviours considerably but when they do, it is for a less healthy lifestyle (lower level of physical activity and less healthy diet). This group of immigrants would benefit from targeted public health campaigns to quit smoking, exercise regularly and consume more fruit and vegetables.

Appendix A

Table A1: Variable description

Variable	Description	N	n	Mean	SD	Min	Max
	Dependent variables						
smoking	Smoking status (1 if current smoker, 0 otherwise)	3,563	1,139	0.09	0.28	0	1
ncigs	Number of cigarettes smoked per day	3,563	1,139	0.81	3.29	0	45
drink	Alcohol drinking (1 if had alcohol most days last week, 0 otherwise)	628	227	0.21	0.41	0	1
alc_units	Number of units of alcohol (on the day you drank the most)	633	350	5.75	6.04	0	92
sport	Physical activity (1 if moderate physical activity at least once a week, 0 otherwise)	1,410	556	0.55	0.49	0	1
healthy_diet	Healthy diet (1 if eats 5 portions of fruit/veg a day, 0 otherwise)	2,896	1,139	0.33	0.47	0	1
	Immigrants characteristics						
age_arrival	Age at arrival (in years)	3,563	1,139	27.7	7.6	18	67
YSM	Years since migration (in years)	3,563	1,139	19.6	13.7	1	64
YSM_4	YSM category (1 if 1-4 years since arrival, 0 otherwise)	3,563	1,139	0.03	0.16	0	1
YSM_9	YSM category (1 if 5-9 years since arrival, 0 otherwise)	3,563	1,139	0.21	0.41	0	1
YSM_14	YSM category (1 if 10-14 years since arrival, 0 otherwise)	3,563	1,139	0.26	0.44	0	1
YSM_15+	YSM category (1 if 15+ years since arrival, 0 otherwise)	3,563	1,139	0.50	0.50	0	1
nat_ID	National identity (1 if British, 0 otherwise)	3,563	1,139	0.33	0.47	0	1
	Factors affecting acculturation						
LS	Life satisfaction (scale 1-7)	3,563	1,139	5.22	1.42	1	7
SF-12	Short Form-12 Health Survey score Mental Health Component Summary	3,563	1,139	50.4	8.84	0	100
support	Social support*	3,563	1,139	0.007	0.98	-1.56	4.47
background	Combined parental education*	3,563	1,139	0.38	1.11	-1.01	2.42
lang_distance	Language distance**	3,563	1,139	-1.75	1.49	-3.87	0.53
educ_distance	Education distance**	3,563	1,139	1.05	0.61	0.04	1.84
rel_ distance	Religious distance**	3,563	1,139	0.24	0.86	-1.03	1.27
	Socio-economic characteristics						
age	Age (in years)	3,563	1,139	47.3	13.1	24	92
SAH	Self-assessed health (1 if very good or good health, 0 otherwise)	3,563	1,139	0.87	0.34	0	1
chronic	Having chronic condition (1 if has chronic condition, 0 otherwise)	3,563	1,139	0.22	0.41	0	1
married	Marital status (1 if married, 0 otherwise)	3,563	1,139	0.92	0.27	0	1
kids	Having children (1 if has children, 0 otherwise)	3,563	1,139	0.58	0.49	0	1
white	Ethnicity (1 if white, 0 otherwise)	3,563	1,139	0.34	0.47	0	1
mixed	Ethnicity (1 if mixed, 0 otherwise)	3,563	1,139	0.04	0.19	0	1
asian	Ethnicity (1 if asian, 0 otherwise)	3,563	1,139	0.44	0.49	0	1
black	Ethnicity (1 if black, 0 otherwise)	3,563	1,139	0.10	0.31	0	1
other	Ethnicity (1 if other, 0 otherwise)	3,563	1,139	0.08	0.27	0	1
employed	Employment status (1 if employed, 0 otherwise)	3,563	1,139	0.68	0.46	0	1
university	Education level (1 if university degree or above, 0 otherwise)	3,563	1,139	0.64	0.48	0	1
school	Education level (1 if graduated from high school, 0 otherwise)	3,563	1,139	0.20	0.40	0	1
no_qual	Education level (1 if no education qualification, 0 otherwise)	3,563	1,139	0.16	0.37	0	1
income Q1	Income level (1 if in the first quartile, 0 otherwise)	3,563	1,139	0.23	0.42	0	1
income Q2	Income level (1 if in the second quartile, 0 otherwise)	3,563	1,139	0.20	0.40	0	1
income Q3	Income level (1 if in the third quartile, 0 otherwise)	3,563	1,139	0.24	0.43	0	1
income Q4	Income level (1 if in the fourth quartile, 0 otherwise)	3,563	1,139	0.33	0.47	0	1

Note: N - total number of individual-time observations, n - the number of individuals that are observed over time. SD is standard deviation. * obtained using factor analysis, see section 3.3. ** obtained from Dow (2012).

Table A2: Factor analysis applied to Parents' Education - Principal component factors

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	1.574	1.148	0.787	0.787
Factor 2	0.426	-	0.213	1

Table A3: Factor analysis applied to Social Support - Principal component factors

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	3.307	1.401	0.368	0.368
Factor 2	1.906	0.427	0.212	0.579
Factor 3	1.479	0.864	0.164	0.743
Factor 4	0.615	0.197	0.068	0.812
Factor 5	0.418	0.011	0.046	0.858
Factor 6	0.407	0.073	0.045	0.904
Factor 7	0.333	0.043	0.037	0.941
Factor 8	0.29	0.047	0.032	0.973
Factor 9	0.243	-	0.027	1

Table A4: The effect of YSM on smoking: correlated random effects (CRE) linear probability model (LPM) - immigrants with YSM <15 years only

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YSM	-0.008***	-0.009***	-0.006*	-0.005**	-0.009***	-0.009***	-0.009***	-0.007	-0.013***	-0.008**	-0.008***	0.027***	-0.004	-0.011***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.005)	(0.003)	(0.003)	(0.002)	(0.009)	(0.006)	(0.004)
africa		-0.164***						-0.095						
		(0.058)						(0.080)						
asia		-0.154						-0.109						
		(0.06)						(0.125)						
south pacific		-0.077						0.064						
		(0.129)						(0.174)						
america		-0.157***						-0.090						
		(0.052)						(0.072)						
support			0.002					0.002		0.041				
			(0.012)					(0.017)		(0.026)				
background			0.008					0.011			0.010			
			(0.010)					(0.014)			(0.018)			
SF12				0.000				-0.002				0.007***		
				(0.001)				(0.001)				(0.002)		
LS				-0.001				0.008					0.001	
				(0.003)				(0.008)					(0.011)	
lang_distance					0.029***	0.027***	0.029***	0.029**						0.042**
					(0.007)	(0.008)	(0.008)	(0.011)						(0.018)
educ_distance						-0.037	-0.028	-0.024						
						(0.032)	(0.030)	(0.043)						
rel_distance							-0.025*	-0.017						
							(0.015)	(0.057)						
female									-0.167***					
									(0.046)					
YSM*female									0.008**					
									(0.004)					
YSM*support										0.004*				
										(0.002)				
YSM*background											0.001			
											(0.001)			
YSM*SF12												-0.001***		
												(0.000)		
YSM*LS													(0.000)	
													(0.001)	
YSM*lang_ distance														-0.001
														(0.002)
constant	0.415***	0.543***	0.264**	0.371***	0.449***	0.505***	0.511***	0.469**	0.465***	0.303***	0.430***	0.032	0.371***	0.464***
	(0.070)	(0.094)	(0.113)	(0.083)	(0.082)	(0.097)	(0.097)	(0.183)	(0.077)	(0.109)	(0.076)	(0.118)	(0.093)	(0.083)
N of individuals	685	685	685	685	685	685	685	685	685	685	685	685	685	685
R^2	0.084	0.125	0.054	0.086	0.122	0.125	0.127	0.118	0.083	0.063	0.084	0.086	0.087	0.124

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level.

Table A5: The effect of national identity on smoking: correlated random effects (CRE) linear probability model (LPM) - immigrants with YSM <15 years only

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
nat_ID	-0.033*	-0.017	0.002	-0.032	-0.029	-0.023	-0.024	0.006	-0.055*	-0.012	-0.021	0.115	-0.046	-0.028
	(0.019)	(0.021)	(0.028)	(0.020)	(0.020)	(0.020)	(0.021)	(0.031)	(0.033)	(0.026)	(0.020)	(0.078)	(0.036)	(0.039)
africa		-0.172***						-0.103						
		(0.060)						(0.081)						
asia		-0.162***						-0.122						
		(0.062)						(0.128)						
south pacific		-0.084						0.066						
		(0.129)						(0.176)						
america		-0.171***						-0.098						
		(0.052)						(0.072)						
support			0.002					0.003		0.006				
			(0.012)					(0.017)		(0.014)				
background			0.010					0.013			0.021**			
			(0.010)					(0.014)			(0.008)			
SF12				0.000				-0.001				0.001		
				(0.001)				(0.001)				(0.001)		
LS				-0.001				0.009					-0.003	
				(0.003)				(0.008)					(0.004)	
lang_distance					0.029***	0.028***	0.030***	0.029**						0.029***
					(0.008)	(0.008)	(0.008)	(0.011)						(0.009)
educ_distance						-0.034	-0.023	-0.024						
						(0.032)	(0.030)	(0.043)						
rel_distance							-0.026*	-0.011						
							(0.015)	(0.060)						
female								0.351**	-0.094***					
								(0.157)	(0.023)					
female*nat_ID									0.037					
									(0.039)					
nat_ID*support										-0.007				
										(0.018)				
nat_ID*background											-0.003			
											(0.019)			
nat_ID*SF12												-0.003**		
												(0.001)		
nat_ID*LS													0.004	
													(0.006)	
nat_ID*lang_distance														0.001
														(0.016)
constant	0.300***	0.412***	0.170*	0.293***	0.312***	0.361***	0.367***	0.351**	0.304***	0.182*	0.308***	0.268***	0.319***	0.311***
	(0.067)	(0.088)	(0.101)	(0.080)	(0.076)	(0.090)	(0.091)	(0.157)	(0.067)	(0.097)	(0.072)	(0.081)	(0.077)	(0.077)
N of individuals	685	685	685	685	685	685	685	685	685	685	685	685	685	685
R^2	0.082	0.124	0.054	0.084	0.121	0.123	0.126	0.118	0.083	0.058	0.082	0.086	0.086	0.121

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level.

Table A6: The effect of YSM on alcohol drinking: correlated random effects (CRE) linear probability model (LPM) - immigrants with YSM <15 years only

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YSM	0.004	0.000	0.009	0.002	0.000	0.000	0.000	0.009	0.020*	0.011	0.011	0.027	0.029	-0.005
	(0.008)	(0.008)	(0.010)	(0.008)	(0.008)	(0.008)	(0.008)	(0.013)	(0.011)	(0.010)	(0.009)	(0.046)	(0.028)	(0.013)
africa		-0.108						0.091						
		(0.066)						(0.180)						
asia		-0.095						0.584						
		(0.129)						(0.692)						
south pacific		0.038						0.163						
		(0.129)						(0.203)						
america		0.170						0.258						
		(0.133)						(0.199)						
support			-0.021					0.036		-0.128*				
			(0.028)					(0.031)		(0.073)				
background			-0.001					0.063			0.089			
			(0.025)					(0.038)			(0.059)			
SF12				-0.002				0.000				0.004		
				(0.003)				(0.004)				(0.010)		
LS				0.018				0.011					0.056	
				(0.019)				(0.041)					(0.045)	
lang_distance					-0.002	-0.003	-0.003	0.043*						0.027
					(0.022)	(0.022)	(0.022)	(0.022)						(0.049)
educ_distance						-0.177*	-0.176*	-0.115						
						(0.092)	(0.100)	(0.257)						
rel_distance							-0.002	-0.313						
							(0.068)	(0.403)						
female									0.270**					
									(0.133)					
YSM*female									-0.029**					
									(0.012)					
YSM*support										0.009				
										(0.008)				
YSM*background											-0.007			
											(0.005)			
YSM*SF12												0.000		
												(0.001)		
YSM*LS													-0.005	
													(0.005)	
YSM*lang_ distance														-0.003
														(0.005)
constant	-0.095	0.209	-0.048	-0.017	0.073	0.292	0.290	-0.184	-0.275	0.030	-0.313	-0.248	-0.396	0.095
	(0.240)	(0.345)	(0.279)	(0.251)	(0.312)	(0.348)	(0.349)	(0.563)	(0.247)	(0.278)	(0.262)	(0.562)	(0.356)	(0.312)
N of individuals	126	126	126	126	126	126	126	126	126	126	126	126	126	126
R^2	0.068	0.115	0.113	0.074	0.077	0.099	0.099	0.169	0.095	0.138	0.084	0.073	0.076	0.082

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level.

Table A7: The effect of national identity on alcohol drinking: correlated random effects (CRE) linear probability model (LPM) - immigrants with YSM <15 years only

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
nat_ID	-0.022	-0.057	-0.013	-0.018	-0.095	-0.04	-0.041	-0.029	0.063	0.000	0.111	-0.380	0.001	0.061
	(0.063)	(0.072)	(0.100)	(0.065)	(0.072)	(0.067)	(0.068)	(0.134)	(0.106)	(0.090)	(0.135)	(0.287)	(0.216)	(0.155)
africa		-0.090						0.080						
		(0.069)						(0.171)						
asia		-0.086						0.607						
		(0.131)						(0.697)						
south pacific		0.036						0.146						
		(0.130)						(0.208)						
america		0.176						0.258						
		(0.133)						(0.199)						
support			-0.021					0.034		-0.046				
			(0.028)					(0.032)		(0.031)				
background			-0.002					0.063			0.038*			
			(0.027)					(0.039)			(0.022)			
SF12				-0.002				0.000				-0.002		
				(0.003)				(0.004)				(0.003)		
LS				0.018				0.011					0.016	
				(0.019)				(0.040)					(0.015)	
lang_distance					-0.005	-0.005	-0.004	0.042*						-0.009
					(0.022)	(0.022)	(0.022)	(0.022)						0.022
educ_distance						-0.163*	-0.160	-0.097						
						(0.094)	(0.101)	(0.255)						
rel_distance							-0.005	-0.341						
							(0.068)	(0.416)						
female									0.009					
									(0.057)					
female*nat_ID									-0.186					
									(0.121)					
nat_ID*support										0.012				
										(0.085)				
nat_ID*background											-0.146*			
											(0.080)			
nat_ID*SF12												0.007		
												(0.006)		
nat_ID*LS													-0.004	
													(0.041)	
nat_ID*lang_distance														0.069
														(0.058)
constant	-0.030	0.193	0.097	0.026	0.070	0.273	0.272	-0.064	-0.026	0.211	-0.224	0.110	-0.101	0.061
	(0.226)	(0.343)	(0.266)	(0.236)	(0.306)	(0.351)	(0.352)	(0.570)	(0.228)	(0.264)	(0.242)	(0.250)	(0.223)	(0.307)
N of individuals	126	126	126	126	126	126	126	126	126	126	126	126	126	126
R^2	0.069	0.115	0.109	0.074	0.08	0.099	0.099	0.167	0.076	0.128	0.093	0.073	0.072	0.087

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level.

Table A8: The effect of YSM on physical activity: correlated random effects (CRE) linear probability model (LPM) - immigrants with YSM <15 years only

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
YSM	0.002	0.001	0.005	0.002	0.001	0.001	0.001	-0.005	0.002	0.005	0.008	0.027	0.030	0.002
	(0.007)	(0.008)	(0.010)	(0.007)	(0.008)	(0.008)	(0.008)	(0.014)	(0.008)	(0.010)	(0.008)	(0.031)	(0.019)	(0.010)
africa		0.076						-0.046						
		(0.080)						(0.146)						
asia		0.062						-0.322						
		(0.093)						(0.373)						
south pacific		0.036						-0.007						
		(0.078)						(0.175)						
america		0.061						0.026						
		(0.108)						(0.164)						
support			-0.016					0.027		0.039				
			(0.026)					(0.036)		(0.065)				
background			0.000					-0.039			0.052			
			(0.022)					(0.031)			(0.042)			
SF12				0.002				0.005				0.007		
				(0.002)				(0.004)				(0.006)		
LS				-0.011				-0.007					0.038	
				(0.012)				(0.022)					(0.032)	
lang_distance					-0.028**	-0.027*	-0.030*	-0.011						-0.038
					(0.014)	(0.015)	(0.015)	(0.029)						0.034
educ_distance						0.028	0.011	0.198						
						(0.060)	(0.061)	(0.131)						
rel_distance							0.033	0.173						
							(0.042)	(0.205)						
female									0.038					
									(0.090)					
YSM*female									-0.001					
									(0.009)					
YSM*support										-0.006				
										(0.007)				
YSM*background											-0.006			
											(0.004)			
YSM*SF12												-0.001		
												(0.001)		
YSM*LS													-0.005	
													(0.003)	
YSM*lang_ distance														0.001
														(0.004)
constant	0.679***	0.462*	0.593**	0.640***	0.504**	0.469*	0.463*	0.173	0.675***	0.589**	0.627***	0.351	0.445*	0.495**
	(0.182)	(0.247)	(0.281)	(0.218)	(0.236)	(0.247)	(0.248)	(0.205)	(0.187)	(0.266)	(0.196)	(0.368)	(0.258)	(0.236)
N of individuals	371	371	371	371	371	371	371	371	371	371	371	371	371	371
R^2	0.024	0.028	0.022	0.02	0.034	0.034	0.035	0.062	0.024	0.023	0.027	0.019	0.022	0.034

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level.

Table A9: The effect of national identity on physical activity: correlated random effects (CRE) linear probability model (LPM) - immigrants with YSM <15 years only

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
nat_ID	-0.007	-0.005	0.016	0.000	0.001	-0.004	-0.004	0.084	0.007	0.022	-0.004	0.230	-0.004	-0.001
	(0.043)	(0.054)	(0.067)	(0.047)	(0.052)	(0.054)	(0.054)	(0.081)	(0.059)	(0.063)	(0.052)	(0.269)	(0.149)	(0.081)
africa		0.078						-0.056						
		(0.081)						(0.145)						
asia		0.063						-0.357						
		(0.094)						(0.372)						
south pacific		0.035						0.021						
		(0.079)						(0.177)						
america		0.061						0.029						
		(0.108)						(0.164)						
support			-0.016					0.031		-0.004				
			(0.026)					(0.036)		(0.027)				
background			-0.001					-0.039			-0.004			
			(0.022)					(0.031)			(0.015)			
SF12				0.002				0.005				0.002		
				(0.002)				(0.004)				(0.002)		
LS				-0.011				-0.007					-0.009	
				(0.012)				(0.022)					(0.013)	
lang_distance					-0.029**	-0.027*	-0.030*	-0.012						-0.028*
					(0.014)	(0.015)	(0.015)	(0.029)						(0.016)
educ_distance						0.029	0.012	0.184						
						(0.062)	(0.063)	(0.131)						
rel_distance							0.033	0.196						
							(0.042)	(0.207)						
female									0.036					
									(0.036)					
female*nat_ID									-0.032					
									(0.082)					
nat_ID*support										-0.073				
										(0.063)				
nat_ID*background											0.003			
											(0.038)			
nat_ID*SF12												-0.005		
												(0.005)		
nat_ID*LS													0.000	
													(0.028)	
nat_ID*lang_distance														-0.001
														(0.038)
constant	0.717***	0.481**	0.675***	0.671***	0.518***	0.482**	0.478**	0.195	0.717***	0.644***	0.763***	0.611***	0.752***	0.519***
	(0.135)	(0.197)	(0.210)	(0.168)	(0.180)	(0.198)	(0.198)	(0.395)	(0.135)	(0.201)	(0.144)	(0.171)	(0.151)	(0.182)
N of individuals	371	371	371	371	371	371	371	371	371	371	371	371	371	371
R^2	0.024	0.028	0.022	0.02	0.034	0.034	0.035	0.066	0.024	0.022	0.025	0.019	0.02	0.034

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level.

Table A10: The effect of YSM on diet: correlated random effects (CRE) linear probability model (LPM) - immigrants with YSM <15 years only

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YSM	0.023***	0.023***	0.009	0.025***	0.023***	0.022***	0.022***	0.002	0.020***	0.007	0.023***	0.013	0.006	0.021***	0.034***
	(0.004)	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.007)	(0.005)	(0.006)	(0.004)	(0.016)	(0.011)	(0.006)	(0.009)
africa		-0.182***						-0.084							
		(0.052)						(0.083)							
asia		-0.137**						-0.169							
		(0.054)						(0.184)							
south pacific		0.250*						0.258							
		(0.132)						(0.179)							
america		0.000						0.161							
		(0.081)						(0.125)							
support			-0.040***					-0.049***		-0.027					
			(0.013)					(0.017)		(0.035)					
background			0.009					-0.005			-0.008				
			(0.014)					(0.017)			(0.026)				
SF12				0.004***				0.004*				0.002			
				(0.001)				(0.002)				(0.003)			
LS				0.01				-0.027*					-0.017		
				(0.008)				(0.014)					(0.020)		
lang_distance					-0.005	-0.013	-0.016*	0.001						0.005	
					(0.009)	(0.009)	(0.009)	(0.016)						0.023	
educ_distance						-0.133***	-0.145***	-0.049							-0.035
						(0.031)	(0.031)	(0.054)							(0.057)
rel_distance							0.028	0.068							
							(0.022)	(0.102)							
female									0.044						
									(0.052)						
YSM*female									0.005						
									(0.005)						
YSM*support										-0.001					
										(0.004)					
YSM*background											0.002				
											(0.002)				
YSM*SF12												0.000			
												(0.000)			
YSM*LS													0.004*		
													(0.002)		
YSM*lang_ distance														-0.001	
														(0.002)	
YSM*educ_distance															-0.009*
															(0.005)
constant	-0.180*	-0.165	0.043	-0.380***	-0.268**	-0.077	-0.083	0.229	-0.153	0.099	-0.212*	-0.229	-0.027	-0.255*	-0.181
	(0.109)	(0.139)	(0.165)	(0.135)	(0.133)	(0.141)	(0.142)	(0.254)	(0.111)	(0.156)	(0.115)	(0.206)	(0.158)	(0.136)	(0.158)
N of individuals	745	745	745	745	745	745	745	745	745	745	745	745	745	745	745
R^2	0.053	0.076	0.069	0.064	0.062	0.075	0.076	0.112	0.054	0.061	0.055	0.063	0.06	0.062	0.074

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level.

Table A11: The effect of national identity on diet: correlated random effects (CRE) linear probability model (LPM) - immigrants with YSM <15 years only

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
nat_ID	-0.063***	-0.024	0.009	-0.062**	-0.041	-0.020	-0.020	0.028	-0.067*	-0.001	-0.074***	-0.152	-0.058	-0.041	0.021
	(0.023)	(0.028)	(0.037)	(0.028)	(0.028)	(0.029)	(0.029)	(0.043)	(0.034)	(0.034)	(0.025)	(0.133)	(0.080)	(0.041)	(0.098)
africa		-0.164***						-0.081							
		(0.052)						(0.083)							
asia		-0.128**						-0.159							
		(0.054)						(0.187)							
south pacific		0.250*						0.257							
		(0.136)						(0.181)							
america		0.023						0.160							
		(0.078)						(0.125)							
support			-0.041***					-0.049***		-0.044***					
			(0.014)					(0.017)		(0.014)					
background			0.007					-0.004			0.002				
			(0.014)					(0.017)			(0.012)				
SF12				0.004***				0.004*				0.004***			
				(0.001)				(0.002)				(0.001)			
LS				0.01				-0.027*					0.018**		
				(0.008)				(0.014)					(0.008)		
lang_distance					-0.008	-0.015*	-0.017*	0.001						-0.008	
					(0.009)	(0.009)	(0.009)	(0.016)						(0.01)	
educ_distance						-0.131***	-0.140***	-0.053							-0.113***
						(0.031)	(0.032)	(0.055)							(0.033)
rel_distance							0.024	0.059							
							(0.023)	(0.106)							
female									0.094***						
									(0.023)						
female*nat_ID									0.007						
									(0.045)						
nat_ID*support										0.02					
										(0.031)					
nat_ID*background											0.043*				
											(0.022)				
nat_ID*SF12												0.002			
												(0.003)			
nat_ID*LS													0.000		
													(0.015)		
nat_ID*lang_distance														0.000	
														(0.019)	
nat_ID*educ_distance															-0.031
															(0.063)
constant	0.242***	0.255**	0.197	0.072	0.156	0.328***	0.323***	0.262	0.243***	0.229*	0.224***	0.119	0.218**	0.156	0.330***
	(0.082)	(0.113)	(0.127)	(0.108)	(0.102)	(0.113)	(0.114)	(0.221)	(0.082)	(0.122)	(0.087)	(0.110)	(0.098)	(0.102)	(0.113)
N of individuals	745	745	745	745	745	745	745	745	745	745	745	745	745	745	745
R^2	0.048	0.068	0.068	0.059	0.056	0.068	0.068	0.112	0.048	0.061	0.051	0.058	0.053	0.056	0.065

Note: robust standard errors in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% respectively. All specifications control for age group binary variables, female, married, white, uni, school (no qualification is a reference category), kids (binary variable), urban and income level.

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CHAPTER 4

DOES HEALTHY IMMIGRANT EFFECT HOLD FOR POLITICAL IMMIGRANTS? EVIDENCE FROM THE COLLAPSE OF THE USSR

4.1 Introduction

Migration to a new country is a traumatic experience that involves acculturation in the new society, finding a place in a job market of the host country and often losing social connections in the country of origin. Therefore, it requires certain level of willingness to take risks, strong motivation and good health. All of the above makes immigrants a highly selected group of individuals including selectivity on health. This is one of the most common mechanisms that is used to explain the so-called "healthy immigrant effect" (HIE): immigrants arrive being healthier than their native counterparts but immigrants' health deteriorates over time and often at a greater speed than natives' health. There are other mechanisms that may be able to explain the HIE: host countries' migration policies, medical examinations of immigrants at the point of arrival, healthier lifestyle in the origin countries and difference in reporting health due to different

cultural background (Constant et al., 2018). A number of empirical studies found evidence of HIE in countries with considerable share of immigrant population, namely Canada, Australia, Germany, the United Kingdom (UK) and United States (US) (Antecol et al., 2006; Alarcon, 2015; Kennedy et al., 2015; Costa-Font & Sato, 2016; Ljunge, 2016). These countries normally experience inflow of economic immigrants – people who seek to improve their socio-economic status compared to the one they have in their country of origin. In this paper, we aim to explore a different immigrant population – immigrants, who immigrated due to exogenous political reasons, and investigate if HIE holds for this kind of immigrants, as well.

We study immigrant population in the Russian Federation (RF), specifically a group of immigrants, who arrived after the collapse of the Soviet Union from former Soviet Union republics such as Ukraine, Belarus, Kazakhstan etc. Right after the collapse in 1991 and until 2001 citizens of the Commonwealth of Independent States (CIS) could enter the RF without visas and claim Russian citizenship (Federal Law of the RFSR N 1948-I). The collapse of the Soviet Union and the associated negative attitude towards ethnically Russian people created a unique population of individuals born outside of the current territory of the RF, but who are ethnically Russian, speak Russian language and have very similar cultural background to native Russians. They are also similar in terms of education due to homogeneous educational standards across the Soviet Union. We assume the reason for migration to be exogenous to economic and health factors as ethnic Russians were forced to move after the collapse due to Russian language not being official language any more, loss of voting rights, destruction of existing jobs and negative attitude from local authorities (Brubaker, 1992). This situation forced people to move disrespectful of their age, gender or socio-economic status. Hence, we expect that foreign-born and native-born groups will be similar to a great extent but differ by the country of origin. We also expect that political

immigrants do not exhibit positive selection on health and have different assimilation process from economic immigrants. We use the collapse of the Soviet Union as a quasi-experiment to remove many factors that are likely to be associated with health and health behaviours but are often unobserved in other immigrant populations: cultural background, health perception, language proficiency, personality traits that tend to be inherited from parents etc. We also aim to compare the assimilation of political immigrants in the RF with that of economically motivated immigrants, who arrived before the collapse of the Soviet Union (any time before 1989). The research questions are: 1) do economic immigrants in the RF exhibit HIE as it is observed in other countries? 2) does the HIE hold for political immigrants in the RF, as well?

We exploit the Russian Longitudinal Monitoring Survey (RLMS) to obtain the data on native Russian citizens and foreign-born individuals who arrived either before 1989 or after the collapse of the Soviet Union, specifically between 1989[1] and 2001. We construct a panel dataset following individuals from 2010 to 2016 that contains information about individuals' socio-economic characteristics, health and health behaviours. We conduct a multivariate regression analysis and thanks to the longitudinal data we are likely to avoid the temporal bias common for cross-sectional studies. As our two immigrant groups and the native group are not as homogeneous as expected, we control for a range of other variables that are likely to explain the difference in health and health behaviours (such as gender, age, marital and employment status, nationality, income, having children, area of residence). We find support of HIE in the economic immigrant sub-sample and a partial support of the effect in the political immigrant sub-sample. In political immigrants, young age at arrival and Islamic country of origin have a protective effect on assimilation process

[1]Tensions started growing after the collapse of the Berlin Wall in November 1989 marking the end of the Communist era in Eastern Europe. Around the same time Lithuania adopted autonomous citizenship law, the first out of all Soviet Republics (Brubaker, 1992). Hence, already in 1989 people were likely to immigrate due to political reasons.

because they are associated with change to healthier lifestyle over time. The greatest deterioration is experienced by political immigrants, who arrived in Russia later in life (after 30 years old).

The rest of the paper is organised as follows: section 2 provides some background information, section 3 provide the description of the RLMS and descriptive analysis of the data, section 4 introduces empirical strategy used to answer the question of interest, section 5 presents the results and section 6 concludes.

4.2 Background

The Soviet Union was officially called the Union of Soviet Socialist Republics (USSR) and existed from 1922 to 1991. It included 15 republics[2] that were subordinated directly to the Government of the Soviet Union. The Government was ruled by one party – the Communist party or Bolsheviks. Joseph Stalin, who was General Secretary from 1922 to 1952, initiated a centrally planned economy where the distribution and production of goods were centralised and directed by the government. He also started rapid industrialisation that transformed the USSR from agrarian economy into a great industrial power. However, World War II affected the economy in significant ways and it required a major reconstruction. The economy did recover and was in growth in 1950s and 1960s after Stalin's death, however later it was steadily declining. Mikhail Gorbachev made considerable changes in the economy thanks to his program called perestroika. Although this did not prevent the Revolutions of 1989 taking place and in 1990 a new law allowed republics to secede if more than two-thirds of its residents voted for it in a referendum. In December 1991

[2]The republics of the Soviet Union were: Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kirghizia, Latvia, Lithuania, Moldavia, Russian Soviet Federative Socialist Republic, Tajikistan, Turkmenia, Ukraine and Uzbekistan.

the USSR was dissolved and the Commonwealth of Independent States (CIS) was formed instead.

When tensions started in 1989, ethnic Russians were associated with Soviet misrule, they lost their privileges and advantages of freely moving to other republics where they had full access to Russian-language schools, newspapers and other facilities. They used to be able to get a job without knowing the local language. After the republic gained independence, Russian language was not an official language any longer and ethnic Russians lost their jobs, their rights to own a property, to vote and in some cases a right to reside in a former Soviet Union republic (Brubaker, 1992). This caused one of the large population movements in history with 2.7 million ethnic Russians moving to the RF between 1989 and 1999. Locher (2002) shows that ethnic sorting was a major determinant of migration to Russia between 1989 and 1999. Ethnic sorting is defined as migration from countries in which people's ethnic group is small to countries where their ethnic group is larger. This supports our assumption that immigration in this period was due to political rather than economic reasons.

There is one study in the existing literature on HIE that explores the effect in the RF. Buckley et al. (2011) used 2004 Russian Generations and Gender Survey to explore if foreign-born in the RF have a health advantage compared to native-born and if it is true for both first- and second-generation immigrants. The authors find a support towards HIE in Russia, except for individuals born in Ukraine, Moldova and Belarus, who are not significantly different from native Russians. This supports our hypothesis of individuals coming from the former Soviet Union republics are not selected on health and they are not likely to have any protective behaviours. The study by Buckley et al. (2011) does not focus on the immigrants arriving after the collapse of the Soviet Union, however they do acknowledge the fact that a great share of immigrants in the data could come around that time. The greatest limitation of their study is the use of cross-sectional data that is often temporarily biased as shown in

the literature (Borjas, 1985). Cross-sectional analysis assumes that all immigrants are on the same track except the length of stay in the host country. However, the effect estimated in the cross-sectional analysis is explained not only by the length of stay but also by immigrants' birth cohort and time of arrival. Birth cohort is associated with the condition of labour and housing market at the time, when individuals reach adulthood, whereas time of arrival - with the chances of employment and attitude towards immigrants.

Therefore, we aim to build on the existing evidence and make use of the collapse of the Soviet Union as a quasi-experiment that makes immigration exogenous and two groups (foreign-born and native-born) as homogenous as possible, along with very valuable panel dimension. We also study the HIE in the sample of political immigrants, whereas the existing literature largely focuses on economic immigrants (Antecol et al., 2006; Alarcon, 2015; Kennedy et al., 2015; Costa-Font & Sato, 2016; Farré, 2016; Ljunge, 2016).

4.3 Data

We exploit the RLMS conducted by National Research University "Higher School of Economics" and OOO "Demoscope" together with Carolina Population Centre, University of North Carolina at Chapel Hill and the Institute of Sociology of the Federal Centre of Theoretical and Applied Sociology of the Russian Academy of Sciences. Its goal is to explore the effect of reforms on the health and economic welfare of individuals in the Russian Federation ('Russian Longitudinal Monitoring Survey - HSE', 2018). It was officially started in 1992 but the ongoing longitudinal survey was started in 1994 (Kozyreva, Kosolapov, & Popkin, 2016). RLMS surveys about 10,000 individuals each wave. Currently, information is available for 21 waves. The sample is a multistage stratified probability sample of

households. 1850 districts were allocated into 38 strata, including very large units such as Moscow city, Moscow region and St Petersburg city. The total of 98 primary sampling units (PSUs) were selected: 63 PSUs in three large units mentioned above and 35 PSUs in the rest strata. Interviews are conducted by interviewers in person by visiting each selected dwelling. All individuals residing the household and aged 14 years and above are interviewed.

An interesting feature of the design is that it is a repeated sample with a split panel. There is a number of households that are followed over time, however some households are added to each wave to make the sample representative of the entire population of the RF in that particular year. As we are interested in following the same individuals over time, we exploit the panel component of the sample.

We define immigrants as foreign-born individuals arrived in the RF being 18 years or older. Therefore, foreign-born individuals who arrived as children are excluded from the analysis. We also exclude native individuals who are younger than 18 years. We use data from waves 15-21 (2010-2016) as this gives us large enough sample of immigrants, who arrived before and after the collapse of the Soviet Union.

4.3.1 Descriptive analysis

After excluding individuals who are younger than 18 and immigrants, who arrived as children (younger than 18), individuals with missing data on health outcomes, immigrants with missing country of birth, we obtain an analytic sample that contains 119 political immigrants, 80 economic immigrants and 2,889 natives. The panel is constructed as balanced so we follow all these individuals across 6 years. Only 34.8% of individuals from the original sample are included in the analytic sample. Hence, the data may not represent the Russian population as well as we initially expected.

Table 4.1 presents the description of the variables used in the subsequent analysis.

Table 4.1: Variable description

Variable	Description	N(n)	Waves
	Dependent variables		
good health	Reported being in good or very good health (1=yes, 0=no)	19,847 (3,088)	15-21
health problems	Did you have any health problems in the last 30 days? (1=yes, 0=no)	21,559 (3,088)	15-21
chronic condition	Do you have a chronic condition? (1=yes, 0=no)	21,616 (3,088)	15-21
disability	Do you have disability? (1=yes, 0=no)	21,599 (3,088)	15-21
obesity	Is respondent obese? (1 if BMI>=30, 0 otherwise)	20,573 (3,070)	15-21
smoking	Do you currently smoke? (1=yes, 0=no)	21,607 (3,088)	15-21
alcohol	Did you have an alcoholic drink 4 times a week or more within last 30 days? (1=yes, 0=no)	14,064 (2,670)	15-21
life dissatisfaction	Satisfaction with life at present (scale 1-5)	21,501 (3,088)	15-21
	Immigrant characteristics		
age at arrival	Age at arrival in Russia	21,616 (3,088)	15-21
YSM	Years since migration	1,393 (199)	15-21
Eastern Europe	Country of origin (1=Eastern European country, 0 otherwise)	1,393 (199)	15-21
Islamic countries	Country of origin (1=Islamic country, 0 otherwise)	1,393 (199)	15-21
	Socio-economic characteristics		
age	Age of respondent at present	21,616 (3,088)	15-21
female	Gender (1=female, 0=male)	21,616 (3,088)	15-21
nationality	Nationality (1=other, 0 if Russian)	21,570 (3,088)	15-21
married	Marital status (1=married, 0 otherwise)	21,608 (3,088)	15-21
higher education	Education level (1=higher education or higher, 0 otherwise)	21,590 (3,088)	15-21
unemployed	Employment status (1=unemployed, 0 otherwise)	21,604 (3,088)	15-21
total income	Total personal income (incl. salary, pension, benefits etc.)	21,307 (3,083)	15-21
kids	Do you have children? (1=yes, 0=no)	21,605 (3,088)	15-21
nkids	Number of children	19,277 (2,834)	15-21
urban	Area of residence (1=urban, 0=rural)	21,616 (3,088)	15-21

Note: N shows number of person-year observations and n shows number of individuals. Eastern European countries are Armenia, Belarus, Estonia, Georgia, Latvia, Lithuania, Moldova and Ukraine. Islamic countries are Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. Waves 15-21 cover period from 2010-2016.

The outcomes of interest are self-reported health status, having health problems in the last 30 days, chronic condition, disability, obesity, self-reported health behaviours (smoking, drinking) and life dissatisfaction.

Self-assessed health was measured using the widely used question: "How do you assess your health at present?" The respondents assess their health on the scale from 1 (very good) to 5 (very bad). This variable is often converted into a binary variable that distinguishes individuals with very good or good health (report value 1 or 2) from people, who reported having average, bad or very bad health (report values 3, 4 or 5). Such binary variable has been widely used in the literature as it ensures an easy interpretation of probability of being in good health. Moreover, it has been confirmed that the analysis using binary variable, and hence logistic

regression model, yielded the same results as the analysis of categorical variable taking values 1 to 5 using appropriate methods (Manor et al., 2000; Doiron et al., 2015).

Variables for the probability of having health problems in the last 30 days, having a chronic condition and disability are also binary.

Obesity is an important health outcome to consider as it presents significant risk to health. Obesity is proved to lead to type 2 diabetes, coronary heart disease, breast cancer, bowel cancer and stroke (National Health Service, 2019). The most commonly used measure of obesity is the Body Mass Index (BMI) (World Health Organization, 2019). However, BMI does not reflect very well the percentage of body fat, and waist circumference is considered a more suitable measure to diagnose obesity (National Health Service, 2019). However, waist circumference is not available in the RLMS.

BMI is measured as kg/m^2 and we calculate it using individuals' height and weight. Then, we create a binary variable *obesity* distinguishing between obese individuals with BMI 30 and higher and others with BMI lower than 30. As height and weight are self-reported, the data possibly underestimate the true BMI and consequently the prevalence of obesity in the population. To check if this is the case, we compare the prevalence of obesity we obtain using our data with the prevalence of obesity obtained by World Health Organisation (WHO). WHO used measured height and weight to calculate individual values of BMI and estimate obesity prevalence. Their estimate for the RF in 2010 is 23.2% (95% confidence interval is 20.1-26.1%). This is slightly lower than our estimate of obesity prevalence in 2010 - 26.8%. Therefore, we do not worry about underestimation in our analysis.

Health behaviours are represented by smoking (if an individual is currently a smoker) and alcohol consumption. The variable alcohol distinguishes between regular and occasional drinkers. We define regular drinkers as those who have an alcoholic drink 4 times a week or more.

Finally, we use life dissatisfaction as an outcome of interest that was reported on a scale from 1 (fully satisfied with life at present) to 5 (not at all satisfied).

We also collect information on natives' and immigrants' socio-economic characteristics: age, gender, nationality (Russian vs. any other), marital status, education, employment status, income level, whether has children and how many and urban/rural area of residence. Specifically for immigrants, we have age at arrival, years since migration (YSM) to Russia and country of origin in the dataset.

As the dataset is panel, we will focus on one year for descriptive analysis – 2010. As expected the main sending countries in this period are former Soviet Union republics: the greatest number of immigrants in the sample came from Kazakhstan, Ukraine, Belarus, Tajikistan and Azerbaijan (see Table 4.2 and 4.3).

Table 4.2: The distribution of political immigrants by country of origin (wave 15)

Country of birth	Freq.	Percent
Kazakhstan	48	40.34
Azerbaijan	15	12.61
Tajikistan	15	12.61
Ukraine	11	9.24
Uzbekistan	8	6.72
Belarus	5	4.2
Armenia	5	4.2
Kyrgyzstan	5	4.2
Georgia	3	2.52
Turkmenistan	2	1.68
Latvia	1	0.84
Moldova	1	0.84
Total	119	100

Even though they were parts of the same country, the republics differ mainly due to religion that largely affects attitudes, norms and behaviours. Therefore, we distinguish two groups of origin countries that are likely to differ slightly by socio-economic and health characteristics: Eastern

Table 4.3: The distribution of economic immigrants by country of origin (wave 15)

Country of birth	Freq.	Percent
Ukraine	36	45
Belarus	10	12.5
Kazakhstan	10	12.5
Uzbekistan	5	6.25
Azerbaijan	4	5
Armenia	4	5
Georgia	2	2.5
Moldova	2	2.5
Tajikistan	2	2.5
Estonia	2	2.5
Kyrgyzstan	1	1.25
Turkmenistan	1	1.25
Total	80	100

European countries that have Christianity as major religion and Asian countries that have either both Christianity and Islam as major religions (such as Kazakhstan and Kyrgyzstan) and Islamic countries. The Eastern European group includes Armenia, Belarus, Estonia, Georgia, Latvia, Lithuania, Moldova and Ukraine. The Islamic group includes Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

Table 4.4 presents health outcomes and socio-economic characteristics for political and economic immigrants in comparison with Russian-born individuals.

The descriptive statistics of the raw data suggests that political immigrants are very similar to native Russians with respect to health. There is statistically significant difference only with respect to smoking (immigrants are more likely to smoke) and life dissatisfaction (it is higher for immigrants). In the ideal dataset we would like to observe immigrants right after their arrival. However, this is often not possible. In our case the survey starts in 1994 but a large enough sample of immigrants is available only from year 2010. Hence, immigrants can spend between 9 (if arrived in 2001) and 21 (if arrived in 1989) years in the RF before we observe

Table 4.4: Health outcomes and socio-economic characteristics of political and economic immigrants

Variable	Natives			Political immigrants				Economic immigrants				Pol. vs. eco
	N	Mean	SD	N	Mean	SD	t	N	Mean	SD	t	t
Health and health behaviours												
good health	2,889	0.249	0.432	119	0.202	0.403		80	0.113	0.318	***	*
health problems	2,887	0.399	0.490	119	0.412	0.494		80	0.500	0.503	*	
chronic	2,889	0.562	0.496	119	0.555	0.499		80	0.688	0.466	**	*
disability	2,884	0.106	0.308	119	0.092	0.291		80	0.263	0.443	***	***
obesity	2,761	0.265	0.441	113	0.301	0.461		79	0.367	0.485	*	
smoking	2,888	0.256	0.437	119	0.336	0.474	*	80	0.288	0.455		
alcohol	2,024	0.038	0.191	90	0.033	0.181		54	0.037	0.191		
LS	2,873	2.858	1.107	119	3.134	1.142	**	80	3.175	1.134	**	
Socio-economic characteristics												
age	2,889	49.906	16.016	119	49.378	11.148		80	57.950	9.916	***	***
female	2,889	0.656	0.475	119	0.529	0.501	***	80	0.613	0.490		
nation	2,874	0.154	0.361	119	0.261	0.441	**	79	0.544	0.501	***	***
married	2,886	0.701	0.458	119	0.798	0.403	**	80	0.688	0.466		*
higher_educ	2,888	0.211	0.408	119	0.160	0.368		80	0.238	0.428		
unemploy	2,887	0.424	0.494	119	0.420	0.496		80	0.513	0.503		
total income	2,849	11895.04	10598.55	114	11952.86	11297.92		79	12825.51	12633.43		
kids	2,882	0.878	0.327	119	0.908	0.291		80	0.938	0.244	**	
nkids	2,530	1.851	0.900	108	2.111	0.765	***	74	2.176	0.998	***	
urban	2,889	0.518	0.500	119	0.378	0.487	***	80	0.588	0.495		***
age_arrival	NA	NA	NA	119	33.832	11.563		80	24.088	5.810		***
YSM	NA	NA	NA	119	15.672	3.173		80	33.938	8.770		***

their health outcomes and socio-economic characteristics. Therefore, we have to acknowledge the fact that a part of health outcomes is explained by assimilation process that has already taken place.

In contrast, economic immigrants are different from native-born with respect to almost all health outcomes of interest: they are less likely to report good health, more likely to have health problems, chronic conditions, disability and obesity. They are also less satisfied with their life than native-born Russians. All of the above differences are largely explained by the economic immigrants group being significantly older than the native Russians group (58 years vs. 50 years old). This group is older as they arrived in the RF before 1989 being at least 18 years if age and, therefore, spent a long time there by the time we observe them. Again, the above comment about the assimilation applies here. Economic immigrants are more likely to report other nationality rather than Russian, they are more likely to have children and greater number of children. Political

immigrants are not different from the natives with respect to age but there are more men in this group, they are more likely to report different nationality (similar to economic immigrants), more likely to be married and have more children. They are less likely to leave in urban areas compared to native-born.

The last column of Table 4.4 provides a different comparison: political vs. economic immigrants. As expected, the average length of stay is significantly higher for economic immigrants (33 years vs. 16 years). Economic immigrants also arrived considerably younger: 24 years old at arrival compared to 34 years old for political immigrants. Political immigrants are different from the economic immigrants with respect to self-assessed health but not with respect to health behaviours. Economic immigrants are less likely to report good health and more likely to report health problems, have chronic conditions and disability. These differences are likely to be due to the difference in age as health normally deteriorates over time. The two groups are not too different with respect to socio-economic characteristics. Except the major difference in average age (58 years old for economic vs. 49 years old for political immigrants), economic immigrants are more likely to report different nationality, less likely to be married and more likely to reside in urban areas than political immigrants. It is expected that economic immigrants are more likely to reside in urban areas as their goal is to improve their socio-economic status so they are more likely to find well-paid jobs in urban areas. In contrast, political immigrants came to Russia to avoid negative attitude and loss of rights, therefore they would be ready to settle anywhere, including rural areas.

To sum up, even though we expect political immigrants to be similar to natives, they differ in certain characteristics such as national identity, marital status and area of residence. Hence, it is important to control for them in the regression analysis. Economic immigrants differ from natives considerably with respect to their health outcomes, however it is likely to be explained by them being significantly older. Therefore, we keep age

constant in Table 4.5 to check if the difference in age explains differences in health outcomes and socio-economic characteristics. We take a group of native Russians aged between 50 and 60 and a group of immigrants aged between 50 and 60.

Table 4.5: Health outcomes and socio-economic characteristics of political and economic immigrants (keeping age constant 50-60 years old)

Variable	Natives			Political immigrants				Economic immigrants				Pol. vs. eco
	N	Mean	SD	N	Mean	SD	t	N	Mean	SD	t	t
Health and health behaviours												
good health	664	0.127	0.333	29	0.138	0.351		31	0.129	0.341		
health problems	664	0.459	0.499	29	0.448	0.506		31	0.387	0.495		
chronic	664	0.664	0.472	29	0.551	0.506		31	0.548	0.505		
disability	662	0.099	0.299	29	0.138	0.351		31	0.194	0.401		
obesity	640	0.365	0.482	26	0.192	0.402	**	31	0.354	0.486		*
smoking	664	0.247	0.432	29	0.448	0.506	**	31	0.323	0.475		
alcohol	476	0.044	0.206	22	0.000	0.000	***	23	0.043	0.208		
LS	662	2.955	1.095	29	3.310	1.038		31	3.161	1.128		
Socio-economic characteristics												
age	664	55.390	2.859	29	55.240	3.110		31	54.967	2.927		
female	664	0.672	0.469	29	0.482	0.508	*	31	0.581	0.501		
nation	661	0.136	0.343	29	0.241	0.435		31	0.548	0.505	***	**
married	663	0.739	0.439	29	0.896	0.309	**	31	0.838	0.374		
higher_educ	664	0.189	0.392	29	0.000	0.000	***	31	0.225	0.425		***
unemploy	664	0.393	0.488	29	0.552	0.506		31	0.355	0.486		
total income	652	12,588.03	10,594.47	29	10,404.48	10,856.75		31	13,123.87	9,122.77		
kids	660	0.945	0.227	29	0.931	0.257		31	1.000	0.000	***	
nkids	624	2.059	0.965	27	2.000	0.679		31	2.355	1.226		
urban	664	0.519	0.499	29	0.379	0.493		31	0.645	0.486		**
age_arrival	NA	NA	NA	29	39.724	4.942	NA	31	22.870	3.575	NA	***
ysm	NA	NA	NA	29	15.621	3.499	NA	31	32.161	4.838	NA	***

*, ** and *** indicate significance at 10%, 5% and 1% respectively.

Despite keeping age constant, political immigrants differ from the native Russian population in their health behaviours: immigrants are more likely to be obese and be smokers but less likely to drink alcohol regularly. There are fewer women in the group of political immigrants, they are more likely to be married but less likely to have higher education. Although there is statistically significant difference in the level of education, income and employment status are not different between political immigrants and natives. The difference in health behaviours can be potentially explained here by the difference in education level.

Economic immigrants are not different from the native-born Russian in their health outcomes. Hence, all the differences we observed in Table

4.4 are likely to be explained by immigrants being older than natives. Economic immigrants are more likely than native Russians to report their nationality as non-Russian and are more likely to have kids.

When we compare two immigrant groups, there is almost no difference in health outcomes (except obesity prevalence, but it is only significant at 10% significance level). Economic immigrants are more likely to report their nationality as other than Russian, to have higher education and to live in urban areas and to have longer length of stay than political immigrants. Economic immigrants also arrived significantly younger than political immigrants.

Individuals arriving in destination country in young age are more likely to assimilate to the native population and it probably happens faster. In contrast, if individuals arrive as mature adults with health behaviours established long ago, they are not expected to change their behaviour considerably. In Table 4.6 we check if age of arrival explains the difference between political and economic immigrants. We take a group of political immigrants who arrived in the RF 18-30 years of age and a group of economic immigrants who arrived in the same age.

Keeping age at arrival constant still results in some difference in health outcomes between the two groups. Economic immigrants have lower probability of reporting good health, but higher probability of having a chronic condition and disability. These differences can be explained by age differences (56 in economic vs. 40 years old in political immigrants), length of stay in the RF (34 years in economic immigrants vs. 16 years in political immigrants), lower share of economic immigrants who report their nationality as Russian, higher probability of being unemployed and living in urban areas.

To conclude, the two groups are clearly different from the native population in their health outcomes even keeping age and age at arrival constant, therefore it is worth studying the determinants of these differences using regression analysis. The group of political immigrants and

Table 4.6: Health outcomes and socio-economic characteristics of political and economic immigrants (same age of arrival)

Variable	Natives			Political immigrants (age of arrival 18-30)			Economic immigrants (age of arrival 18-30)			
	N	Mean	SD	N	Mean	SD	N	Mean	SD	t
Health and health behaviours										
good health	2,889	0.249	0.432	55	0.309	0.466	70	0.114	0.321	**
health problems	2,887	0.399	0.490	55	0.327	0.474	70	0.457	0.502	
chronic	2,889	0.562	0.496	55	0.455	0.503	70	0.657	0.478	**
disability	2,884	0.106	0.308	55	0.000	0.000	70	0.229	0.422	***
obesity	2,761	0.267	0.008	51	0.254	0.062	70	0.371	0.487	
smoking	2,888	0.256	0.437	55	0.364	0.485	70	0.314	0.474	
alcohol	2,024	0.038	0.191	45	0.067	0.252	50	0.040	0.197	
LS	2,873	2.858	1.107	55	3.091	1.175	70	3.071	1.121	
Socio-economic characteristics										
age	2,889	49.91	16.02	55	40.15	5.23	70	56.50	9.50	***
female	2,889	0.656	0.475	55	0.473	0.504	70	0.586	0.496	
nation	2,874	0.154	0.361	55	0.273	0.449	70	0.565	0.499	***
married	2,886	0.701	0.458	55	0.818	0.389	70	0.729	0.448	
higher_educ	2,888	0.211	0.408	55	0.291	0.458	70	0.257	0.440	
unemploy	2,887	0.424	0.494	55	0.200	0.404	70	0.471	0.503	***
total income	2,849	11,895.04	10,598.55	51	14,676.33	13,445.96	70	13,273.94	13,398.04	
kids	2,882	0.878	0.327	55	0.855	0.356	70	0.942	0.233	
nkids	2,530	1.851	0.900	47	2.021	0.847	65	2.185	0.983	
urban	2,889	0.518	0.500	55	0.364	0.485	70	0.571	0.498	**
age_arrival	NA	NA	NA	55	23.891	3.705	70			
YSM	NA	NA	NA	55	16.364	3.205	70	34.300	9.057	***

*, ** and *** indicate significance at 10%, 5% and 1% respectively.

native-born Russians are not completely homogeneous based on their socio-economic characteristics, hence we need to control for those characteristics in our models. Political immigrants are different from natives mostly with respect to their health behaviours so we expect significant results in regression analysis also in relation to health behaviours. Based on the raw data we observe that economic immigrants are mostly different from their native counterparts and political immigrant group due to older age. Therefore, they are likely to be assimilated already but multiple regression analysis will shed the light on the direction of the assimilation process.

4.3.2 Health outcomes by year, age and nativity

In this section we look at the health outcomes of interest: probability of reporting good health, probability of having health problems in the last

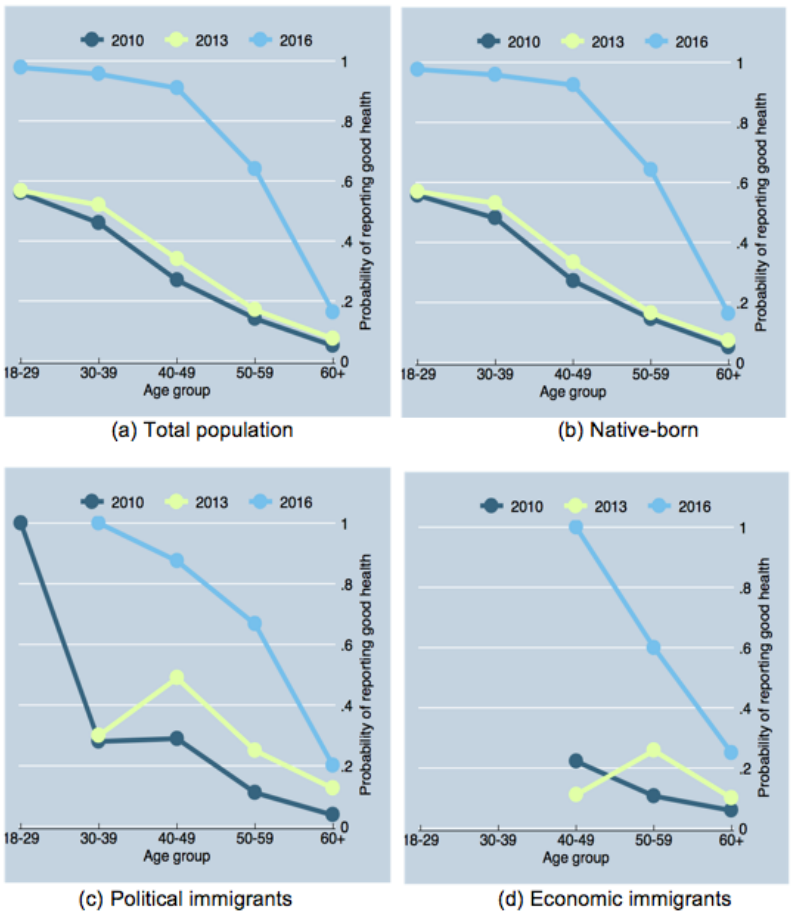


Figure 4.15: Probability of reporting good health by age group

30 days, probability of having a chronic condition, probability of having a disability, obesity, smoking and regular alcohol drinking prevalence and life dissatisfaction. In section 3.1 we only looked at cross-sectional differences between native-born, political and economic immigrants. Here we present the change of outcomes over time and attempt to account for important factors: age, nativity and reason for immigration. Figure 4.15 shows the panel of graphs for the probability of reporting good health.

Graph 4.15a shows the total population by age group in year 2010, 2013 and 2016. Graph 1b is for native-born individuals, 1c is for foreign-born individuals, who arrived after the collapse of the Soviet Union and 1d is for foreign-born individuals, who arrived before the collapse of the

Soviet Union. The description of graphs a, b, c and d are true for the rest of the figures in this section.

Graphs for total population and native-born individuals mostly reveal the same pattern as natives comprise the majority of the sample. With respect to good health, it has an increasing trend over the period 2010-2016 for the total population and for the natives and for all age groups. The overall change for immigrants (from 2010 to 2016) also suggests improvement of self-assessed health. However, economic immigrants experience a slight decline in health from 2010 to 2013 (40-49 age group). This can be potentially explained by the consequences of the financial crisis that hit Russia as the rest of the world in 2008. As expected, younger individuals assess their health better than older ones in all nativity groups. To sum up, there is an improvement in self-assessed health over time for all age and nativity groups.

Figure 4.16 shows a panel of graphs for the probability of having health problems in the last 30 days.

There is no considerable change in the probability of having health problems over time. However, we can see a clear trend of the probability of having health problems increasing with age. This corresponds to the discussion of Figure 4.15. The average probabilities are higher for political immigrants compared to native group but there is no such difference between economic immigrants and natives.

Figure 4.17 shows a panel of graphs for the probability of having a chronic condition.

Total population and native-born individuals exhibit a clear effect of age on the prevalence of chronic conditions: older age groups are more likely to report having a chronic condition. There is a slight increase over time from 2010 to 2013 but no change from 2013 to 2016. Political immigrants have a similar pattern to native-born individuals, the prevalence of chronic conditions increases with age and there is some increase in the probability over time but it is not consistent across age groups. Economic

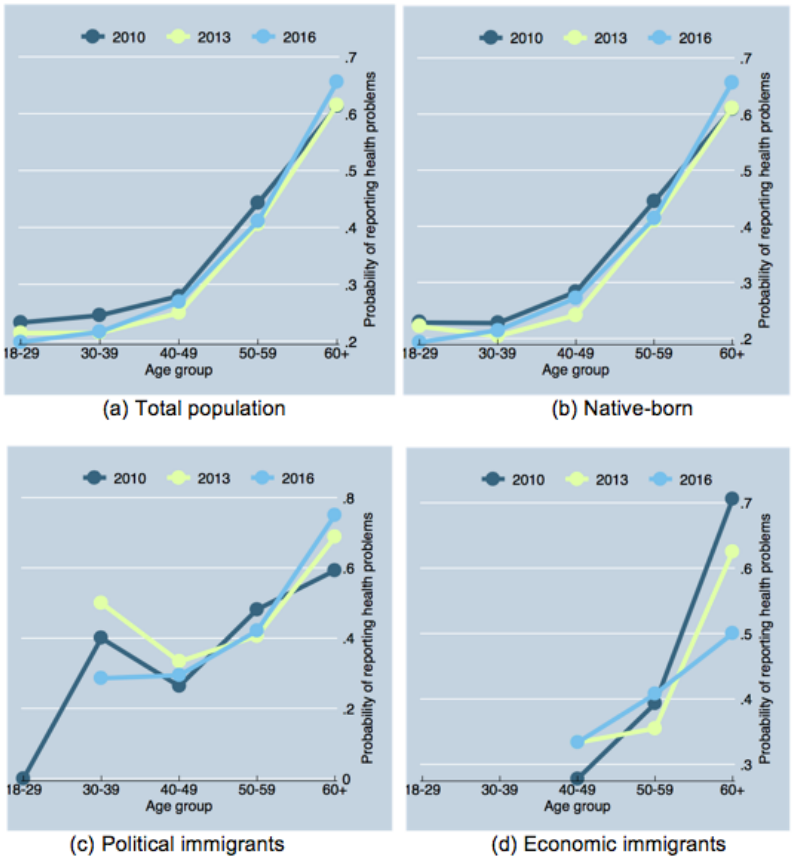


Figure 4.16: Probability of having health problems in the last 30 days by age group

immigrants experience an increase over time (from 2010 to 2016) but there is no clear effect of age on the prevalence of chronic conditions.

To sum up, the prevalence of chronic conditions goes up with age but not so much with time.

Figure 4.18 shows a panel of graphs for the probability of having a disability by age group.

The graphs for total population and native-born individuals show no effect of time on the probability of having a disability. However, the probability undoubtedly rises with age for all nativity groups. It is interesting to note that for some groups of immigrants the prevalence of disability decreases slightly over time, e.g. in political immigrant group 40-49 years

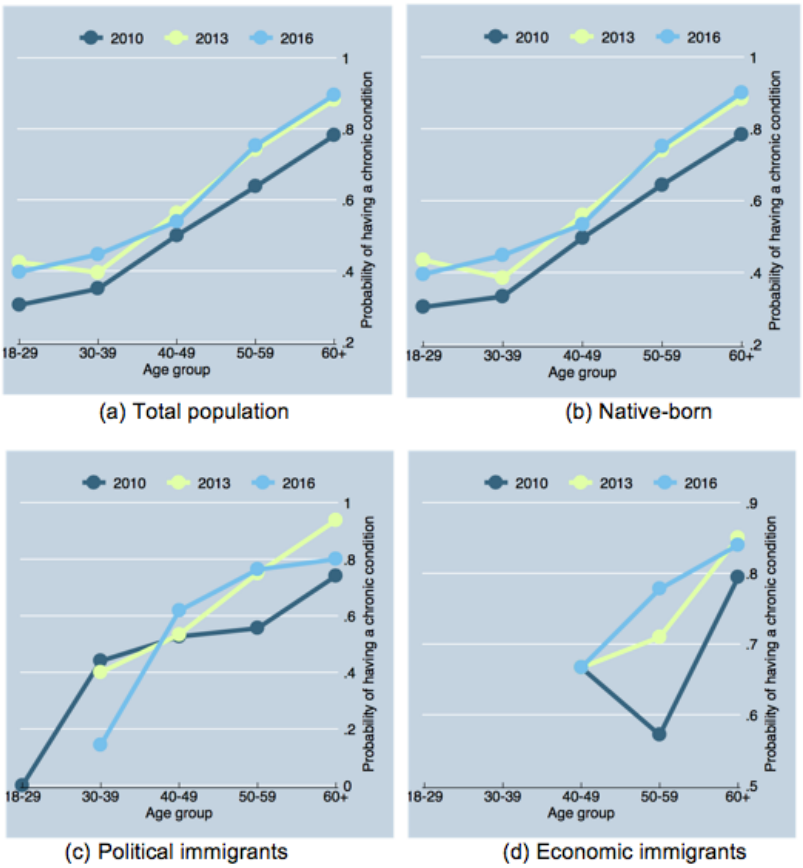


Figure 4.17: Probability of having a chronic condition by age group

old and all age groups of economic immigrants. Political immigrants have consistently lower levels of disability compared to native Russians. Economic immigrants have higher levels in 2010 but the decrease of them over time can suggest healthy assimilation towards lower levels of disability of natives.

Figure 4.19 shows a panel of graphs for obesity prevalence by age groups.

The graphs are considerably different between all three groups of interest. Native-born individuals are more likely to be obese as age increases and there is slight increase over time. However, political immigrants exhibit a U-shape curve, especially it is clearly seen in 2010. Younger individuals are even more likely to be obese than older group (60+), while

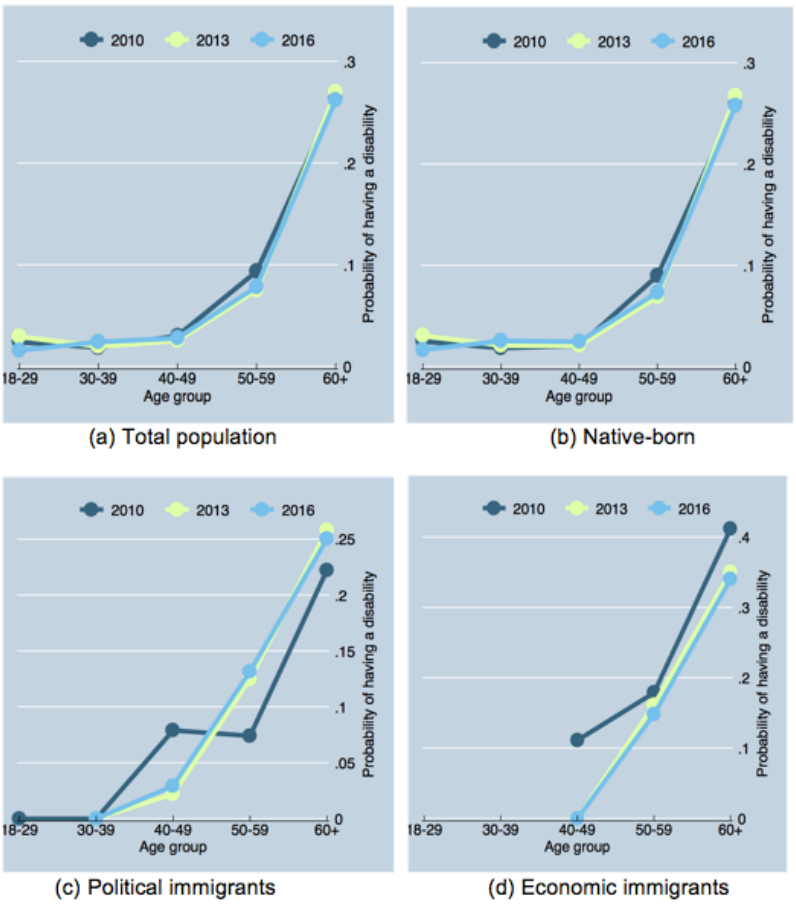


Figure 4.18: Probability of having a disability by age group

other groups (30-39 years, 40-49 and 50-59 years) have rather low levels even compared to natives. The overall levels of prevalence of obesity are higher for both political and economic immigrants compared to natives. Some age groups experience an increase in obesity prevalence (30-39 years old and 50-59 years old), whereas other experience a decrease (40-49 years old and 60+). Economic immigrants have an opposite pattern to natives: obesity prevalence goes down with age. But all groups experience a clear growth of obesity prevalence over time. There are higher levels observed in immigrant groups compared to native population. Therefore, here we possibly observe healthy assimilation to native individuals.

Figure 4.20 shows a panel of graphs for smoking prevalence by age

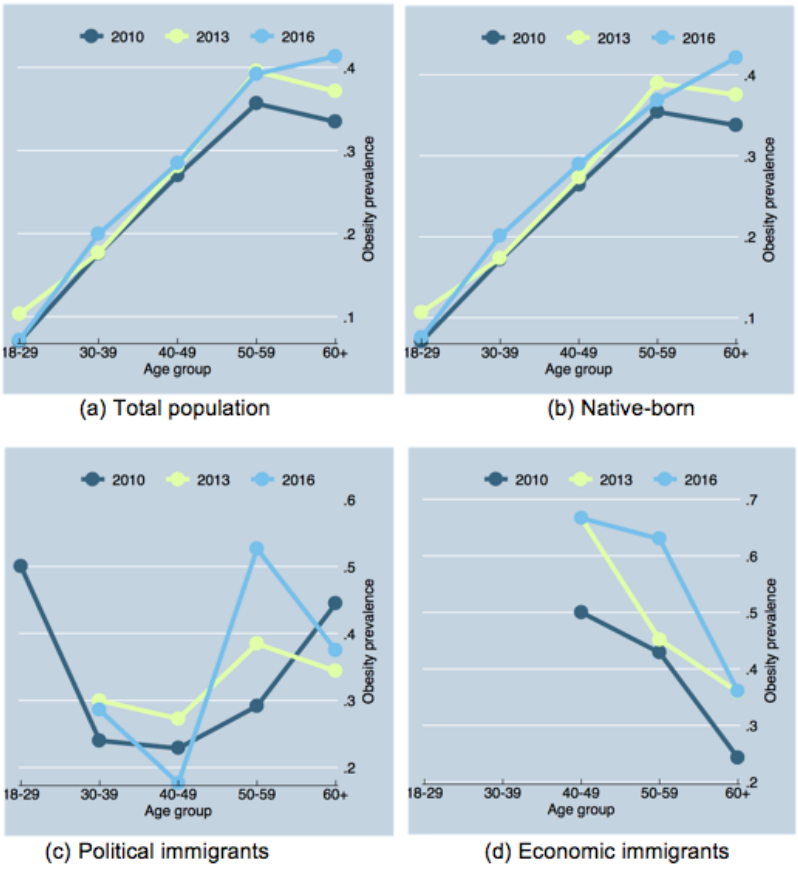


Figure 4.19: Obesity prevalence by age group

groups.

Native-born and economic immigrant groups exhibit clearer patterns with respect to smoking prevalence compared to political immigrants. Both groups are less likely to smoke as they age and there is some decrease in the smoking prevalence over time for each age group. However, in political immigrants we observe a reversed U-shape graph: the youngest and the oldest groups are the least likely to smoke, while the others have higher prevalence that is also higher than that of natives. There is no clear change over time for the age groups as some experience a decline, while some experience a rise in smoking prevalence.

Figure 4.21 shows a panel of graphs for the prevalence of regular alcohol drinking by age groups.

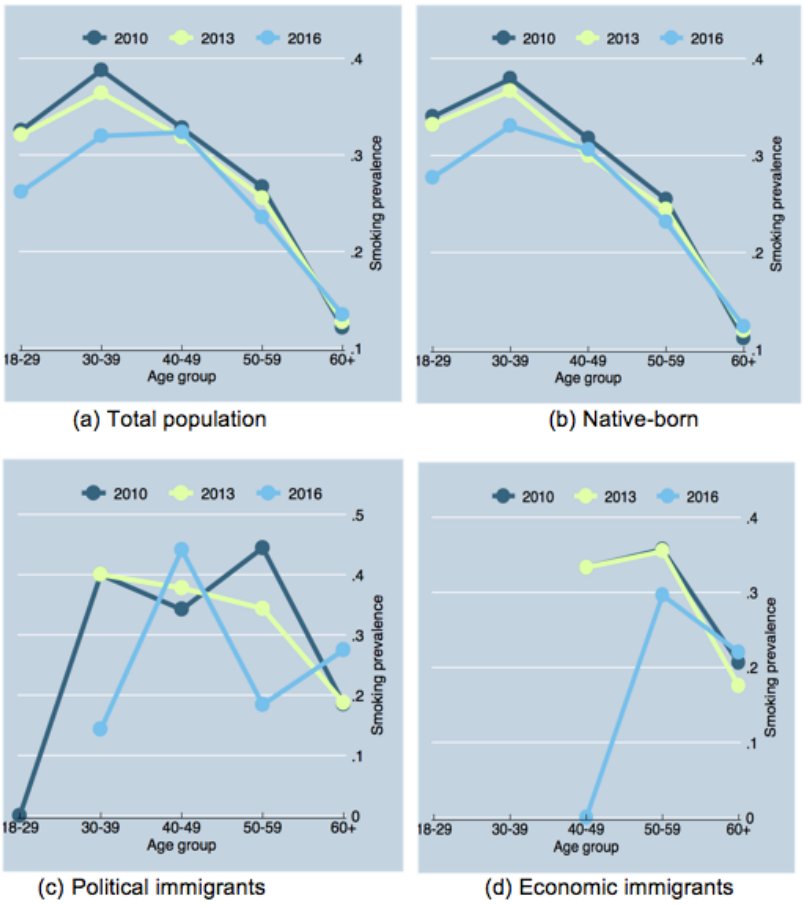


Figure 4.20: Smoking prevalence by age group

From the graphs we can conclude that there is no clear effect of age on the probability of regular alcohol drinking. However, over time this probability clearly declines for native individuals but goes up for some immigrant groups, namely political immigrants aged 50-59 years and 60+ years and economic immigrants 50-59 years. It is also rising to higher levels than we observe in natives, therefore we are likely to observe some unhealthy assimilation taking place here.

Figure 4.22 shows a panel of graphs for life dissatisfaction by age groups.

Unlike other health outcomes, life satisfaction is measured continuously on a scale from 1 to 5 that shows an increase in life dissatisfaction

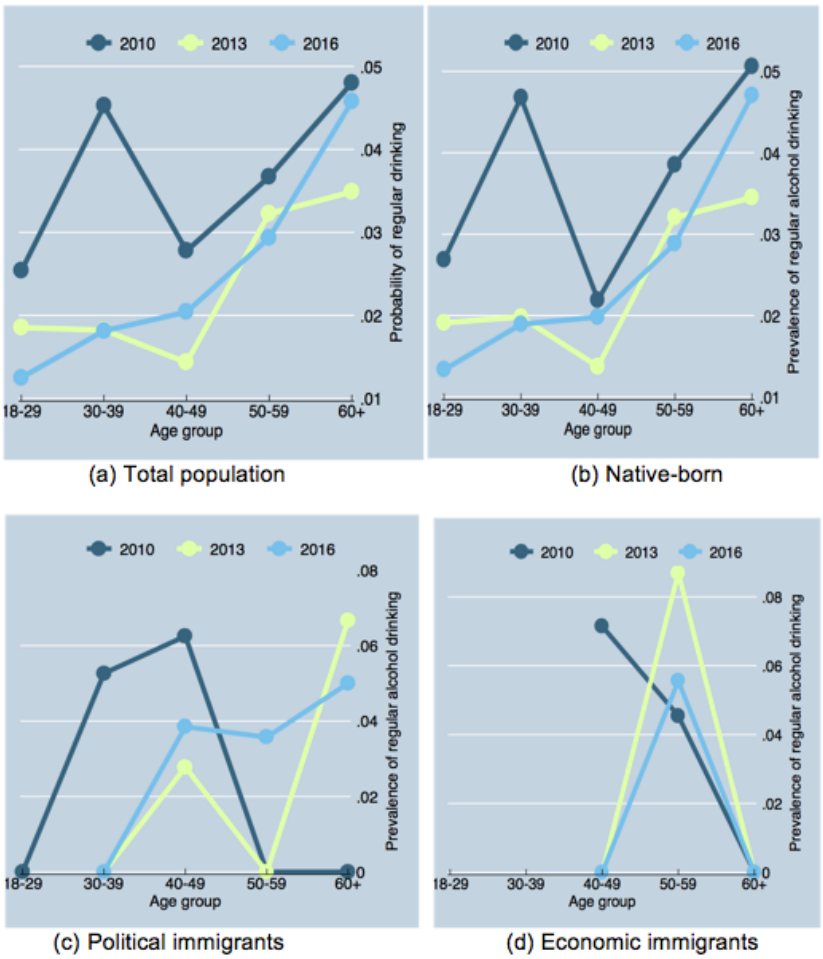


Figure 4.21: Prevalence of regular alcohol drinking by age group

as reported score increases. Therefore, the graphs suggest that life dissatisfaction mostly increases with age, but decreases over time. In political immigrants, however, there is a very high level of dissatisfaction in 30-39 years of age compared to all other age groups. Although it decreases over time as all others except 40-49 year olds that become even more dissatisfied with their life over time. It is similar for economic immigrants: life dissatisfaction goes down over time for 50-59 year olds and 60+ year olds but goes up for 40-49 year olds. The levels of both immigrants are higher than for natives but the decrease over time brings them closer to the natives suggesting positive assimilation.

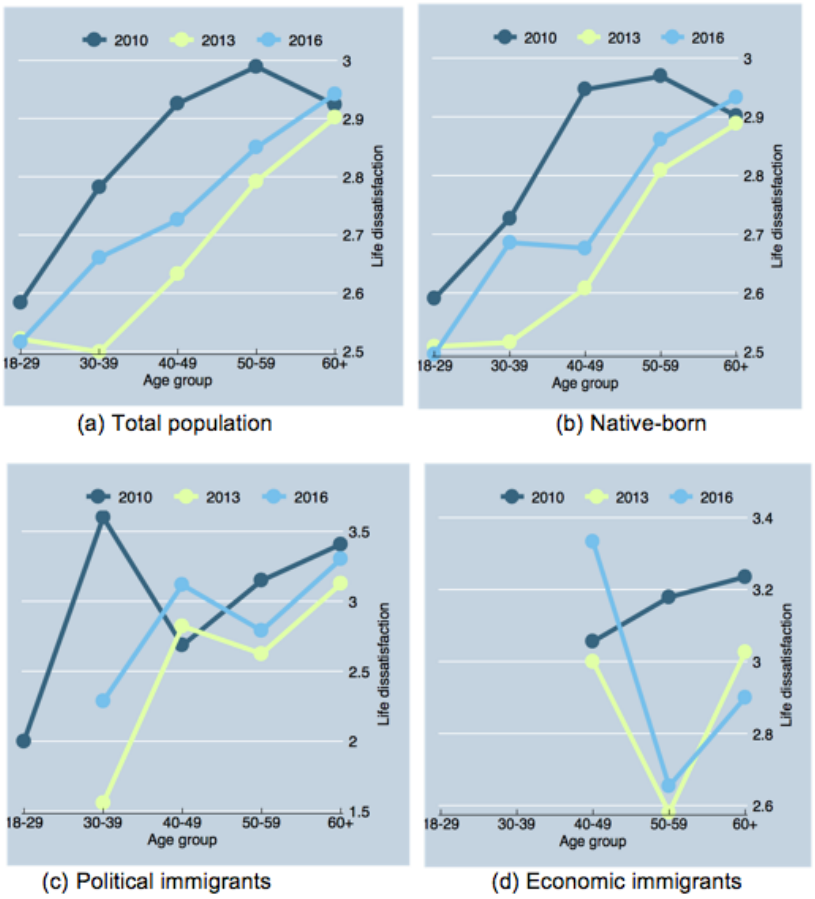


Figure 4.22: Life dissatisfaction by age group

To conclude, the difference in levels of health outcomes that are still present even though both immigrant groups spent a considerable time in the RF confirms that some kind of convergence or divergence process is still going on and the difference in patterns between political and economic immigrants prove that their assimilation processes differ.

4.4 Empirical strategy

It is important to account for two changes that take place simultaneously: aging of both immigrants and natives and increasing duration of immigrants' stay in the RF. Cross-sectional data was proved to be often

temporarily biased in the existing literature (Borjas, 1985). There have been attempts to improve the analysis by using a repeated cross-sectional data (Park et al., 2009), whereas we built on their results and apply the methodology to a longitudinal panel dataset. Multiple regression analysis allows us to control for a set of important factors simultaneously, unlike in the analysis in section 4.3, where we can only fix one factor at the same time (for example age or age at arrival).

We estimate a set of five models for all health outcomes of interest. For each outcome there are models comparing political immigrants and native-born Russians as well as comparing economic immigrants with native-born Russians. The goal is to explore how political immigrants assimilate in the RF and if this assimilation is different from that of economic immigrants.

The first model assumes a linear effect of YSM on health outcomes and identifies the effect of one more year spent in the RF on health status and health behaviours.

$$Health\_outcome_{it} = \alpha_0 + \alpha_1 \cdot YSM_{it} + \alpha_2 \cdot age\_immigrant_{it} + \\ + \alpha_3 \cdot age\_native_{it} + \alpha_4 \cdot X_{it} + \alpha_5 \cdot survey\_year_t + \alpha_6 \cdot region_{it} + \epsilon_{it} \tag{4.1}$$

where YSM_{it} is years since migration (equals 0 for native-born individuals), $survey\_year_t$ is a set of dummy variables representing survey years (2011-2016) [3], $region_{it}$ is a set of dummy variables representing regions of Russia where respondents reside. X_{it} is a vector of controls that includes gender, marital status, education level, whether has children, income level, employment status, urban area of residence. Finally, ϵ_{it} is the error term.

We allow for different aging effects for immigrants and natives. Given the stressful experience of immigrants at the time of arrival, it is likely to have a great effect on their future lives including health outcomes and make the aging process different from people who never immigrated.

[3] 2010 is a reference year.

By including survey year fixed effects we control for the macroeconomic processes that take place during this time and may affect health (e.g. the consequences of the financial crisis of 2008, sanctions imposed on Russia in 2014 etc.). It is also important to control for the place of residence as regions in Russia have largely diverse climates, different average wages and health care facilities. All of the above affect health outcomes.

Model 2 allows YSM to have a non-linear effect on health outcomes, specifically quadratic relationship between YSM and health outcomes. Previous research has shown that socio-economic characteristics change linearly with time spent in the destination country, however it is usually different with health (Hawkins et al., 2008).

Model 3 introduces an interaction term of YSM with age at arrival. This model aims to answer the question: "Does YSM association with health outcomes vary with age of the individual at arrival?". YSM and age of immigrants together will implicitly account for immigrants' age at arrival. We expect that the effect will be greater for individuals who arrived in younger age than for those who arrived older.

Model 4 introduces an interaction term of YSM with country of origin and aims to answer the question: "Does YSM association with health outcomes vary with country of origin?". We add variables $Eastern\_Europe_i$ (equal to zero for Russian-born citizens and 1 if an individual is born in an Eastern European country [4]) and $Islamic\_countries_i$ (equal to 1 if an individual is born in an Islamic country [5] and 0 otherwise). Due to the way interaction terms work, YSM shows the effect of one year spent in Russian for immigrants from Islamic countries.

Model 5 builds up on the previous model by allowing YSM to have a non-linear effect of health outcomes. As in model 2, we add quadratic term for YSM.

[4] classified as Eastern European countries are Armenia, Belarus, Estonia, Georgia, Latvia, Lithuania, Moldova or Ukraine

[5] classified as Islamic countries are Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan or Uzbekistan

We estimate the models using pooled linear probability model (LPM), random-effects LPM and correlated random effects LPM as well as pooled probit model, random-effects probit model and correlated random effects probit model as a robustness check.

Pooled model does not take into account the fact that the same individuals in the sample are followed over time. The only way we account for the panel structure of the data is by clustering standard errors by ID number of an individual.

Random effects (RE) model is specific for panel data. Panel data allows us to account for unobserved individual heterogeneity thanks to following the same individuals over time. Widely used fixed effects model cannot be used in this case as we are interested in a coefficient for YSM variable that is constant over time (it only includes a time trend as it increases as we move along waves by 1 year). Other coefficients we are interested in do not vary over time either: age at arrival and country of origin. In the RE model individual effects are random variables drawn from a distribution (Greene, 2002). It is of crucial importance that RE model has a strong assumption that becomes a considerable limitation: it assumes that random individual effects are independent of the regressors and of errors. Therefore, we must assume that random effects are not correlated with our controls such as age, gender, marital status, having children, unemployment status, income level and area of residence. This assumption is unlikely to be realistic as the above characteristics are likely to correlate with such unobserved characteristics of individuals as ability, risk attitude, family background etc. Hence to relax this assumption we use an approach developed by Mundlak (1978) and Chamberlain (1982). This approach replaces "the unobserved effect with its linear projection onto the explanatory variables in all time periods (plus the projection error)" (Wooldridge, 2002, p.324). The difference from the standard RE model is that correlated random effects (CRE) model adds group-means of variables that vary between individuals.

Linear probability model has a limitation of not accounting for the main property of probability concept: probability can only take values between 0 and 1. Therefore, it can predict probabilities outside of this range, i.e. probabilities greater than 1 and negative probabilities. This limitation cannot be overcome but the model is the easiest to interpret. Following Giuntella & Mazzonna (2015), we present the results of the linear model but check the robustness of the results using a RE probit model. The results of the LPM are not significantly different from probit model, therefore we present them in the next section.

4.5 Results

We present the results in three sections: self-assessed health, health behaviours and life dissatisfaction.

4.5.1 Self-assessed health

We group four measures that are related to individual's assessment of his/her health. The probability of reporting good health is the most subjective as the question is asking respondent to assess their health on the scale from 1 (very good) to 5 (very bad). The response to this question depends on people's perception of health, which in turn varies with culture, age, gender etc. The next measure is the probability of having health problems in the last 30 days that is more objective but the definition of health problems can vary between individuals. The probability of having a chronic condition and having a disability are more objective and they have been shown to produce reliable results despite being self-reported (Suziedelyte & Johar, 2013). However, the results in terms of disability may be subject to justification bias as they appear after the questions about labour market participation (Black, Johnston & Suziedelyte, 2017).

We estimated both LPM and probit models, but as the results are similar we present only LPMs that are easier to interpret. All coefficients are shown in Tables 4.7 and 4.8 for the probability of good health, Tables 4.9 and 4.10 - for the probability of health problems, Tables 4.11 and 4.12 - for the probability of having a chronic condition, Tables 4.13 and 4.14 - for disability.

We also present the results graphically as our models contain interaction terms that are sometimes difficult to interpret based on coefficients (see Appendix A). Some graphs show predicted probabilities lower than zero due to the limitation of LPM. We are not concerned with this as it is a small proportion of probabilities that are predicted as negative. The probabilities are predicted using CRE model as we believe this provides the most reliable estimates.

As discussed in section 4.4, we first estimate the effect of YSM on health outcomes controlling for a number of socio-economic characteristics.

We observe that immigrants have consistently worse health than natives: they are less likely to report good health but more likely to have health problems, chronic conditions and disability (see Figure A1). Political immigrants are very similar with economic immigrants with respect to the probability of good health and chronic conditions but they have higher probability of health problems and disability. Therefore, the results suggest that immigrants have worse self-assessed health than natives. Political immigrants either have worse self-assessed health than economic immigrants (when we measure it as having health problems or disability) or are not different from economic immigrants (when we measure it as good health or chronic conditions). Despite spending more time in Russia and being older, economic immigrants have better health outcomes (when we control for age and other characteristics).

Looking at the overall change over time, none of the groups experience considerable change in health outcomes over time except in case of chronic conditions (see Figure A1c).

Age at arrival had a greater effect on political immigrants than on economic immigrants. The interaction term for YSM and age of immigrants is significant (at 10% level) only in the group of political immigrants. This is an expected result as there is not much variation in their age at the time of arrival (the mostly arrived in their twenties).

Older age at arrival for political immigrants is associated with worse health outcomes. The exception is the youngest group (18-30) for whom disability does not change as YSM increase. It is interesting to note that almost everyone in 41+ group of political immigrants have a chronic condition (see Figure A2).

When we distinguish by country of origin, the health of economic immigrants becomes worse over time no matter what measure we use. Economic immigrants from European countries always have worse health than immigrants from Islamic countries. Therefore, Islamic origin has a protective effect on health of economic immigrants.

The probability of good health for political immigrants increases over time if they are from Islamic countries (see Table 4.7). The probability of chronic conditions rises over time for political immigrants from Islamic countries. However, both Islamic and Eastern European immigrants have a lower probability of chronic condition than natives.

The probability of having a disability is increasing over time for economic immigrants from Eastern European countries (see Table 4.14).

Being from Eastern Europe is associated with higher probability of good health and lower probability of health problems, which implies better self-assessed health, but also with higher probability of chronic conditions. In contrast, for immigrants from Islamic countries health outcomes worsen as length of stay increases.

To sum up, immigrants assess their health as worse compared to their native counterparts. Some outcomes are worse for political immigrants than for economic immigrants (probability of good health and chronic conditions). This indicates that if the HIE holds, than health of political

immigrants deteriorates even faster than health of economic immigrants, who spent more time in Russia. Age at arrival determines the assimilation process of political but not economic immigrants. This is due to low variation of age at the time of arrival in the group of economic immigrants. Islamic country of origin has a protective effect on economic immigrants and the opposite - on political immigrants.

Table 4.7: Political immigrants' assimilation in terms of the probability of reporting good health

	Model 1			Model 2			Model 3			Model 4			Model 5		
	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YSM	0.002	0.004	0.004	0.017	0.013	0.013	0.006	0.005	0.006	0.000	0.005	0.005	0.081*	0.077**	0.078**
	(0.004)	(0.005)	(0.005)	(0.014)	(0.013)	(0.013)	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)	(0.006)	(0.046)	(0.036)	(0.036)
YSM^2				-0.001	0.000	0.000							-0.002*	-0.002**	-0.002**
				(0.000)	(0.000)	(0.000)							(0.001)	(0.001)	(0.001)
YSM*age_imm							-0.00015	-0.00004	-0.00004						
							(0.00015)	(0.00014)	(0.00014)						
EE										0.320	0.087	0.089	-0.415	-0.582	-0.586
										(0.359)	(0.249)	(0.249)	(0.523)	(0.413)	(0.413)
EE*YSM										-0.011	-0.005	-0.005	-0.009	-0.003	-0.003
										(0.017)	(0.013)	(0.013)	(0.017)	(0.013)	(0.013)
Islam										0.089	-0.032	-0.023	-0.614	-0.653*	-0.649*
										(0.160)	(0.143)	(0.143)	(0.432)	(0.338)	(0.338)
age_native	-0.011***	-0.011***	0.002	-0.011***	-0.011***	0.002	-0.011***	-0.011***	0.008	-0.011***	-0.011***	0.002	-0.011***	-0.011***	0.002
	(0.000)	(0.000)	(0.009)	(0.000)	(0.000)	(0.009)	(0.000)	(0.000)	(0.011)	(0.000)	(0.000)	(0.009)	(0.000)	(0.000)	(0.009)
age_imm	-0.012***	-0.013***	0.000	-0.013***	-0.014***	-0.001	-0.010***	-0.012***	0.007	-0.013***	-0.013***	0.000	-0.013***	-0.013***	0.000
	(0.002)	(0.002)	(0.009)	(0.002)	(0.002)	(0.009)	(0.002)	(0.002)	(0.011)	(0.002)	(0.002)	(0.010)	(0.002)	(0.002)	(0.010)
constant	0.651***	0.788***	0.589***	0.648***	0.786***	0.516***	0.690***	0.787***	0.630***	0.650***	0.789***	0.590***	0.650***	0.790***	0.519***
	(0.080)	(0.059)	(0.116)	(0.080)	(0.060)	(0.118)	(0.075)	(0.060)	(0.111)	(0.080)	(0.060)	(0.116)	(0.080)	(0.060)	(0.118)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	16,877	16,877	16,877	16,877	16,877	16,877	16,877	16,877	16,877	16,877	16,877	16,877	16,877	16,877	16,877
N of ind		2,982	2,982		2,982	2,982		2,982	2,982		2,982	2,982		2,982	2,982
R^2		0.246	0.246		0.246	0.247		0.246	0.247		0.246	0.247		0.246	0.247
rho		0.391	0.391		0.391	0.391		0.390	0.390		0.391	0.391		0.391	0.391

Standard errors are reported in parentheses. All specifications control for gender, marital status, education, income, employment status, nationality, children, urban area of residence. Rho indicates the proportion of variance in the dependent variable between subjects.

Note: * significant at 10%, ** significant at 5%, *** significant at 1%. YSM - years since migration, EE - Eastern European immigrants, Islam - Islamic immigrants, FE - fixed effects, imm - immigrant.

Table 4.8: Economic immigrants' assimilation in terms of the probability of reporting good health

	Model 1			Model 2			Model 3			Model 4			Model 5		
	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YSM	0.007	0.008	0.008	-0.009	-0.009	-0.008	-0.004	-0.004	-0.004	0.007	0.009	0.009	0.027	0.032	0.032
	(0.005)	(0.006)	(0.006)	(0.011)	(0.012)	(0.012)	(0.008)	(0.009)	(0.009)	(0.007)	(0.007)	(0.007)	(0.020)	(0.024)	(0.024)
YSM^2				0.000*	0.000	0.000							0.000	0.000	0.000
				(0.000)	(0.000)	(0.000)							(0.000)	(0.000)	(0.000)
YSM*age_imm							0.00013*	0.00014*	0.00013*						
							(0.00007)	(0.00008)	(0.00008)						
EE										-0.34	-0.337*	-0.334*	-0.709*	-0.745	-0.747
										(0.215)	(0.202)	(0.202)	(0.425)	(0.459)	(0.459)
EE * YSM										-0.004	-0.007	-0.007	-0.004	-0.008	-0.007
										(0.006)	(0.007)	(0.007)	(0.005)	(0.007)	(0.007)
Islam										-0.490***	-0.627**	-0.615**	-0.872**	-1.048**	-1.039**
										(0.188)	(0.281)	(0.281)	(0.398)	(0.509)	(0.509)
age_native	-0.011***	-0.011***	0.004	-0.011***	-0.011***	0.004	-0.011***	-0.011***	0.011	-0.011***	-0.011***	0.004	-0.011***	-0.011***	0.005
	(0.000)	(0.000)	(0.009)	(0.000)	(0.000)	(0.009)	(0.000)	(0.000)	(0.011)	(0.000)	(0.000)	(0.009)	(0.000)	(0.000)	(0.009)
age_imm	-0.016***	-0.016***	0.000	-0.010**	-0.011**	0.005	-0.014***	-0.014***	0.008	-0.008*	-0.007	0.009	-0.008*	-0.007	0.009
	(0.003)	(0.003)	(0.010)	(0.004)	(0.005)	(0.010)	(0.003)	(0.004)	(0.011)	(0.004)	(0.005)	(0.011)	(0.004)	(0.005)	(0.011)
constant	0.664***	0.875***	0.625***	0.666***	0.875***	0.626***	0.680***	0.790***	0.625***	0.666***	0.876***	0.685***	0.666***	0.876***	0.626***
	(0.080)	(0.063)	(0.123)	(0.080)	(0.063)	(0.123)	(0.075)	(0.060)	(0.111)	(0.080)	(0.063)	(0.120)	(0.080)	(0.063)	(0.123)
Survey year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	16,681	16,681	16,681	16,681	16,681	16,681	16,681	16,681	16,681	16,676	16,676	16,676	16,676	16,676	16,676
N of ind		2,945	2,945		2,945	2,945		2,945	2,945		2,944	2,944		2,944	2,944
R^2		0.247	0.249		0.248	0.249		0.248	0.249		0.248	0.249		0.248	0.249
rho		0.392	0.392		0.392	0.392		0.392	0.392		0.392	0.392		0.392	0.392

Standard errors are reported in parentheses. All specifications control for gender, marital status, education, income, employment status, nationality, children, urban area of residence. Rho indicates the proportion of variance in the dependent variable between subjects.

Note: * significant at 10%, ** significant at 5%, *** significant at 1%. YSM - years since migration, EE - Eastern European immigrants, Islam - Islamic immigrants, FE - fixed effects, imm - immigrant.

Table 4.9: Political immigrants' assimilation in terms of the probability of having health problems

	Model 1			Model 2			Model 3			Model 4			Model 5		
	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YSM	0.005	0.004	0.004	-0.014	-0.01	-0.007	-0.004	-0.004	-0.003	0.011	0.009	0.009	0.028	0.011	0.016
	(0.005)	(0.005)	(0.005)	(0.014)	(0.014)	(0.014)	(0.006)	(0.007)	(0.007)	(0.008)	(0.007)	(0.007)	(0.051)	(0.045)	(0.045)
YSM^2				0.001	0.000	0.000							0.000	0.000	0.000
				(0.000)	(0.000)	(0.000)							(0.001)	(0.001)	(0.001)
YSM*age_imm							0.00035**	0.00025	0.00023						
							(0.00016)	(0.00016)	(0.00016)						
EE										-0.332	-0.047	-0.011	-0.48	-0.068	-0.072
										(0.325)	(0.294)	(0.294)	(0.542)	(0.505)	(0.505)
EE*YSM										0.005	-0.008	-0.009	0.005	-0.008	-0.008
										(0.018)	(0.016)	(0.016)	(0.018)	(0.016)	(0.016)
Islam										-0.237	-0.198	-0.176	-0.379	-0.217	-0.233
										(0.153)	(0.162)	(0.162)	(0.431)	(0.418)	(0.418)
age_native	0.008***	0.009***	0.012	0.008***	0.009***	0.012	0.008***	0.009***	-0.004	0.008***	0.009***	0.011	0.008***	0.009***	0.011
	(0.000)	(0.000)	(0.012)	(0.000)	(0.000)	(0.012)	(0.000)	(0.000)	(0.014)	(0.000)	(0.000)	(0.012)	(0.000)	(0.000)	(0.012)
age_imm	0.007***	0.007***	0.010	0.008***	0.009***	0.011	0.003	0.005**	-0.007	0.009***	0.009***	0.012	0.009***	0.009***	0.012
	(0.002)	(0.002)	(0.012)	(0.002)	(0.002)	(0.012)	(0.002)	(0.002)	(0.014)	(0.002)	(0.002)	(0.012)	(0.002)	(0.002)	(0.012)
constant	-0.373***	-0.246***	-0.446***	-0.369***	-0.242***	-0.389***	-0.273***	-0.240***	-0.432***	-0.369***	-0.241***	-0.443***	-0.369***	-0.241***	-0.443***
	(0.081)	(0.069)	(0.123)	(0.081)	(0.069)	(0.124)	(0.075)	(0.069)	(0.119)	(0.081)	(0.069)	(0.123)	(0.081)	(0.069)	(0.123)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	16,838	16,838	16,838	16,838	16,838	16,838	16,838	16,838	16,838	16,838	16,838	16,838	16,838	16,838	16,838
N of ind		2,982	2,982		2,982	2,982		2,982	2,982		2,982	2,982		2,982	2,982
R^2		0.184	0.186		0.184	0.186		0.184	0.187		0.184	0.186		0.184	0.186
rho		0.251	0.251		0.251	0.251		0.251	0.251		0.251	0.251		0.251	0.251

Standard errors are reported in parentheses. All specifications control for gender, marital status, education, income, employment status, nationality, children, urban area of residence. Rho indicates the proportion of variance in the dependent variable between subjects.

Note: * significant at 10%, ** significant at 5%, *** significant at 1%. YSM - years since migration, EE - Eastern European immigrants, Islam - Islamic immigrants, FE - fixed effects, imm - immigrant.

Table 4.10: Economic immigrants' assimilation in terms of the probability of having health problems

	Model 1			Model 2			Model 3			Model 4			Model 5		
	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YSM	-0.002	-0.002	-0.002	-0.004	-0.002	0	-0.005	-0.004	-0.003	-0.009	-0.009	-0.008	0.007	0.008	0.009
	(0.005)	(0.006)	(0.006)	(0.011)	(0.013)	(0.013)	(0.008)	(0.009)	(0.009)	(0.009)	(0.008)	(0.008)	(0.027)	(0.027)	(0.027)
YSM^2				0.000	0.000	0.000							0.000	0.000	0.000
				(0.000)	(0.000)	(0.000)							(0.000)	(0.000)	(0.000)
YSM*age_imm							0.00003	0.00002	0.00001						
							(0.00007)	(0.00008)	(0.00008)						
EE										-0.183	-0.193	-0.138	-0.474	-0.500	-0.444
										(0.163)	(0.215)	(0.215)	(0.431)	(0.517)	(0.516)
EE * YSM										0.010	0.010	0.009	0.010	0.010	0.009
										(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Islam										0.127	0.137	0.154	-0.174	-0.18	-0.161
										(0.330)	(0.300)	(0.300)	(0.589)	(0.570)	(0.569)
age_native	0.008***	0.009***	0.011	0.008***	0.009***	0.011	0.008***	0.009***	-0.006	0.008***	0.009***	0.011	0.008***	0.009***	0.011
	(0.000)	(0.000)	(0.012)	(0.000)	(0.000)	(0.012)	(0.000)	(0.000)	(0.014)	(0.000)	(0.000)	(0.012)	(0.000)	(0.000)	0.012
age_imm	0.010***	0.010***	0.013	0.010**	0.010**	0.013	0.010***	0.011***	-0.004	0.011**	0.012**	0.014	0.011**	0.012**	0.014
	(0.003)	(0.004)	(0.012)	(0.005)	(0.005)	(0.013)	(0.003)	(0.004)	(0.015)	(0.005)	(0.006)	(0.013)	(0.005)	(0.006)	(0.013)
constant	-0.376***	-0.361***	-0.551***	-0.376***	-0.361***	-0.588***	-0.251***	-0.218***	-0.412***	-0.378***	-0.360***	-0.590***	-0.378***	-0.360***	-0.590***
	(0.081)	(0.073)	(0.130)	(0.081)	(0.074)	(0.127)	(0.076)	(0.070)	(0.120)	(0.081)	(0.074)	(0.127)	(0.081)	(0.074)	(0.127)
Survey year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	16,642	16,642	16,642	16,642	16,642	16,642	16,642	16,642	16,642	16,637	16,637	16,637	16,637	16,637	16,637
N of ind		2,945	2,945		2,945	2,945		2,945	2,945		2,944	2,944		2,944	2,944
R^2		0.185	0.188		0.185	0.188		0.185	0.188		0.186	0.189		0.186	0.189
rho		0.247	0.247		0.247	0.247		0.247	0.247		0.247	0.247		0.247	0.247

Standard errors are reported in parentheses. All specifications control for gender, marital status, education, income, employment status, nationality, children, urban area of residence. Rho indicates the proportion of variance in the dependent variable between subjects.

Note: * significant at 10%, ** significant at 5%, *** significant at 1%. YSM - years since migration, EE - Eastern European immigrants, Islam - Islamic immigrants, FE - fixed effects, imm - immigrant.

Table 4.11: Political immigrants' assimilation in terms of the probability of having a chronic condition

	Model 1			Model 2			Model 3			Model 4			Model 5		
	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YSM	-0.003	-0.004	-0.004	-0.005	0.005	0.007	-0.006	-0.007	-0.007	-0.006	-0.007	-0.007	0.045	0.073*	0.075**
	(0.006)	(0.006)	(0.006)	(0.017)	(0.015)	(0.015)	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)	(0.063)	(0.038)	(0.038)
YSM^2				0.000	0.000	0.000							-0.001	-0.002**	-0.002**
				(0.001)	(0.000)	(0.000)							(0.002)	(0.001)	(0.001)
YSM*age_imm								0.00009	0.00008						
								(0.00016)	(0.00016)						
EE										-0.529	-0.311	-0.297	-0.982	-1.060**	-1.060**
										(0.404)	(0.275)	(0.275)	(0.700)	(0.445)	(0.445)
EE*YSM										0.028	0.018	0.018	0.029	0.021	0.020
										(0.021)	(0.014)	(0.014)	(0.021)	(0.014)	(0.014)
Islam										0.019	0.034	0.044	-0.413	-0.658*	-0.661*
										(0.209)	(0.162)	(0.163)	(0.581)	(0.362)	(0.362)
age_native	0.011***	0.011***	0.008	0.011***	0.011***	0.008	0.011***	0.011***	-0.003	0.011***	0.011***	0.008	0.011***	0.011***	0.008
	(0.000)	(0.000)	(0.010)	(0.000)	(0.000)	(0.010)	(0.000)	(0.000)	(0.011)	(0.000)	(0.000)	(0.010)	(0.000)	(0.000)	(0.010)
age_imm	0.012***	0.013***	0.010	0.012***	0.011***	0.008	0.011***	0.012***	-0.002	0.013***	0.013***	0.010	0.013***	0.013***	0.010
	(0.002)	(0.002)	(0.010)	(0.003)	(0.003)	(0.010)	(0.002)	(0.002)	(0.011)	(0.003)	(0.003)	(0.010)	(0.003)	(0.003)	(0.010)
constant	-0.111	-0.111*	-0.164	-0.110	-0.113*	-0.167	-0.110	-0.112*	-0.220	-0.111	-0.111*	-0.223	-0.112	-0.110	-0.225
	(0.094)	(0.067)	(0.140)	(0.094)	(0.067)	(0.140)	(0.094)	(0.067)	(0.142)	(0.094)	(0.067)	(0.142)	(0.094)	(0.067)	(0.142)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	16,877	16,877	16,877	16,877	16,877	16,877	16,877	16,877	16,877	16,877	16,877	16,877	16,877	16,877	16,877
N of ind		2,982	2,982		2,982	2,982		2,982	2,982		2,982	2,982		2,982	2,982
R^2		0.218	0.218		0.218	0.218		0.219	0.219		0.218	0.218		0.218	0.218
rho		0.491	0.491		0.491	0.491		0.491	0.491		0.491	0.491		0.491	0.491

Standard errors are reported in parentheses. All specifications control for gender, marital status, education, income, employment status, nationality, children, urban area of residence. Rho indicates the proportion of variance in the dependent variable between subjects.

Note: * significant at 10%, ** significant at 5%, *** significant at 1%. YSM - years since migration, EE - Eastern European immigrants, Islam - Islamic immigrants, FE - fixed effects, imm - immigrant.

Table 4.12: Economic immigrants' assimilation in terms of the probability of having a chronic condition

	Model 1			Model 2			Model 3			Model 4			Model 5		
	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YSM	-0.003	-0.005	-0.005	0.005	0.007	0.007	0.001	0.002	0.002	-0.009	-0.012	-0.012	0.005	-0.004	-0.004
	(0.006)	(0.007)	(0.007)	(0.013)	(0.015)	(0.015)	(0.009)	(0.011)	(0.011)	(0.011)	(0.009)	(0.009)	(0.034)	(0.028)	(0.028)
YSM^2				0.000	0.000	0.000							0.000	0.000	0.000
				(0.000)	(0.000)	(0.000)							(0.000)	(0.000)	(0.000)
YSM*age_imm							-0.00005	-0.00008	-0.00008						
							(0.00008)	(0.0001)	(0.0001)						
EE										-0.005	0.029	0.044	-0.276	-0.113	-0.097
										(0.257)	(0.242)	(0.242)	(0.698)	(0.526)	(0.527)
EE * YSM										0.011	0.012	0.012	0.01	0.012	0.012
										(0.010)	(0.009)	(0.009)	(0.010)	(0.009)	(0.009)
Islam										0.312	0.407	0.404	0.032	0.261	0.26
										(0.371)	(0.335)	(0.335)	(0.698)	(0.586)	(0.586)
age_native	0.011***	0.011***	0.01	0.011***	0.011***	0.01	0.011***	0.011***	-0.001	0.011***	0.011***	0.01	0.011***	0.011***	0.01
	(0.000)	(0.000)	(0.010)	(0.000)	(0.000)	(0.010)	(0.0005)	(0.0004)	(0.011)	(0.000)	(0.000)	(0.010)	(0.000)	(0.000)	(0.010)
age_imm	0.012***	0.014***	0.013	0.010*	0.010	0.008	0.012***	0.013***	0.0007	0.010*	0.010	0.009	0.010*	0.010	0.009
	(0.004)	(0.004)	(0.011)	(0.005)	(0.006)	(0.011)	(0.004)	(0.004)	(0.012)	(0.005)	(0.006)	(0.012)	(0.005)	(0.006)	(0.012)
constant	-0.103	-0.193***	-0.320**	-0.104	-0.194***	-0.320**	-0.158*	-0.098	-0.253*	-0.106	-0.192***	-0.316**	-0.106	-0.192***	-0.315**
	(0.094)	(0.072)	(0.149)	(0.094)	(0.072)	(0.149)	(0.089)	(0.068)	(0.134)	(0.094)	(0.072)	(0.149)	(0.094)	(0.072)	(0.149)
Survey year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	16,681	16,681	16,681	16,681	16,681	16,681	16,681	16,681	16,681	16,676	16,676	16,676	16,676	16,676	16,676
N of ind		2,945	2,945		2,945	2,945		2,945	2,945		2,944	2,944		2,944	2,944
R^2		0.217	0.218		0.217	0.218		0.217	0.218		0.217	0.218		0.217	0.218
rho		0.491	0.491		0.491	0.491		0.491	0.491		0.491	0.491		0.491	0.491

Standard errors are reported in parentheses. All specifications control for gender, marital status, education, income, employment status, nationality, children, urban area of residence. Rho indicates the proportion of variance in the dependent variable between subjects.

Note: * significant at 10%, ** significant at 5%, *** significant at 1%. YSM - years since migration, EE - Eastern European immigrants, Islam - Islamic immigrants, FE - fixed effects, imm - immigrant.

Table 4.13: Political immigrants' assimilation in terms of the probability of disability

	Model 1			Model 2			Model 3			Model 4			Model 5		
	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YSM	0.002	0.000	0.001	0.003	0.006	0.010	0.0009	-0.0078	-0.0048	-0.004	0.000	0.001	0.030	0.014	0.016
	(0.005)	(0.003)	(0.003)	(0.012)	(0.010)	(0.009)	(0.0068)	(0.0064)	(0.0064)	(0.006)	(0.003)	(0.003)	(0.045)	(0.013)	(0.013)
YSM^2				0.000	0.000	0.000							-0.001	0.000	0.000
				(0.000)	(0.000)	(0.000)							(0.001)	(0.000)	(0.000)
YSM*age_imm							0.00005	0.00013	0.00009						
							(0.0002)	(0.00009)	(0.00009)						
EE										-0.4	0.065	0.109	-0.701	-0.071	-0.031
										(0.246)	(0.136)	(0.135)	(0.430)	(0.184)	(0.183)
EE*YSM										0.030**	0.000	0.000	0.031**	0.001	0.000
										(0.015)	(0.005)	(0.005)	(0.014)	(0.005)	(0.005)
Islam										0.077	-0.025	0.020	-0.211	-0.148	-0.107
										(0.127)	(0.098)	(0.097)	(0.427)	(0.149)	(0.148)
age_native	0.003***	0.006***	-0.004	0.003***	0.006***	-0.004	0.003***	0.006***	-0.005	0.003***	0.006***	-0.004	0.003***	0.006***	-0.004
	(0.000)	(0.000)	(0.004)	(0.000)	(0.000)	(0.004)	(0.0004)	(0.0003)	(0.004)	(0.000)	(0.000)	(0.004)	(0.000)	(0.000)	(0.004)
age_imm	0.003	0.005***	-0.005	0.003	0.004**	-0.006	0.002	0.006***	-0.006	0.003	0.006**	-0.006	0.003	0.006**	-0.005
	(0.002)	(0.001)	(0.004)	(0.002)	(0.002)	(0.004)	(0.002)	(0.001)	(0.004)	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.004)
constant	-0.514***	-0.269***	-0.360***	-0.514***	-0.270***	-0.364***	-0.415***	-0.272***	-0.676***	-0.511***	-0.268***	-0.356***	-0.511***	-0.268***	-0.678***
	(0.067)	(0.045)	(0.122)	(0.067)	(0.045)	(0.122)	(0.061)	(0.042)	(0.108)	(0.067)	(0.045)	(0.122)	(0.067)	(0.045)	(0.120)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	16,862	16,862	16,862	16,862	16,862	16,862	16,572	16,862	16,862	16,862	16,862	16,862	16,862	16,862	16,862
N of ind		2,982	2,982		2,982	2,982		2,982	2,982		2,982	2,982		2,982	2,982
R^2		0.166	0.202		0.166	0.202		0.166	0.200		0.167	0.203		0.167	0.203
rho		0.884	0.884		0.884	0.884		0.884	0.884		0.884	0.884		0.884	0.884

Standard errors are reported in parentheses. All specifications control for gender, marital status, education, income, employment status, nationality, children, urban area of residence. Rho indicates the proportion of variance in the dependent variable between subjects.

Note: * significant at 10%, ** significant at 5%, *** significant at 1%. YSM - years since migration, EE - Eastern European immigrants, Islam - Islamic immigrants, FE - fixed effects, imm - immigrant.

Table 4.14: Economic immigrants' assimilation in terms of the probability of disability

	Model 1			Model 2			Model 3			Model 4			Model 5		
	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YSM	0.003	-0.003	-0.004	0.009	0.001	0.004	0.0029	-0.0005	0.0018	-0.008	-0.006	-0.005	0.029	-0.009	-0.007
	(0.009)	(0.005)	(0.005)	(0.019)	(0.011)	(0.011)	(0.015)	(0.009)	(0.009)	(0.012)	(0.007)	(0.007)	(0.037)	(0.014)	(0.013)
YSM^2				0.000	0.000	0.000							0.000	0.000	0.000
				(0.000)	(0.000)	(0.000)							(0.000)	(0.000)	(0.000)
YSM*age_imm							0.00000	-0.00003	-0.00005						
							(0.00012)	(0.00007)	(0.00007)						
EE										-0.372	-0.05	0.032	-1.036*	-0.003	0.071
										(0.274)	(0.169)	(0.169)	(0.614)	(0.263)	(0.262)
EE * YSM										0.022**	0.010**	0.009*	0.021**	0.010**	0.009*
										(0.011)	(0.005)	(0.005)	(0.010)	(0.005)	(0.005)
Islam										0.459	0.36	0.394*	-0.227	0.409	0.434
										(0.401)	(0.220)	(0.219)	(0.795)	(0.301)	(0.300)
age_native	0.003***	0.006***	-0.004	0.003***	0.006***	-0.004	0.003***	0.0033***	0.0056***	-0.00492	0.006***	-0.004	0.003***	0.006***	-0.004
	(0.000)	(0.000)	(0.004)	(0.000)	(0.000)	(0.004)	(0.000)	(0.004)	(0.0003)	(0.004)	(0.000)	(0.004)	(0.000)	(0.000)	(0.004)
age_imm	0.003	0.009***	0.000	0.001	0.007	-0.003	0.023	0.003	0.0083**	-0.00268	0.006	-0.005	0.002	0.006	-0.005
	(0.006)	(0.003)	(0.005)	(0.008)	(0.005)	(0.006)	(0.014)	(0.006)	(0.003)	(0.005)	(0.005)	(0.006)	(0.009)	(0.005)	(0.006)
constant	-0.193*	-0.271***	-0.685***	-0.193*	-0.271***	-0.685***	-0.188*	-0.419***	-0.278***	-0.70257***	-0.272***	-0.381***	-0.510***	-0.272***	-0.688***
	(0.102)	(0.046)	(0.122)	(0.102)	(0.046)	(0.122)	(0.101)	(0.063)	(0.043)	(0.111)	(0.046)	(0.125)	(0.067)	(0.046)	(0.122)
Survey year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	16,667	16,667	16,667	16,667	16,667	16,667	16,667	16,667	16,667	16,662	16,662	16,662	16,662	16,662	16,662
N of ind		2,945	2,945		2,945	2,945		2,945	2,945		2,944	2,944		2,944	2,944
R^2		0.172	0.209		0.172	0.21		0.172	0.208		0.174	0.211		0.174	0.211
rho		0.885	0.885		0.885	0.885		0.885	0.885		0.884	0.884		0.884	0.884

Standard errors are reported in parentheses. All specifications control for gender, marital status, education, income, employment status, nationality, children, urban area of residence. Rho indicates the proportion of variance in the dependent variable between subjects.

Note: * significant at 10%, ** significant at 5%, *** significant at 1%. YSM - years since migration, EE - Eastern European immigrants, Islam - Islamic immigrants, FE - fixed effects, imm - immigrant.

4.5.2 Health behaviours

Health behaviours are measured as obesity, smoking and regular drinking prevalence. Obesity is included as health behaviour because it is mostly caused by lifestyle choices unhealthy diet and lack of physical exercise.

All coefficients shown in Tables 4.15 and 4.16 for the prevalence of obesity, Tables 4.17 and 4.18 for the prevalence of smoking, Tables 4.19 and 4.20 for the prevalence of regular alcohol drinking. Figures in Appendix A are obtained using selected CRE models.

Political immigrants smoke less than natives and economic immigrants. Smoking prevalence increases with time spent in the RF (see Table 4.17). The level of obesity prevalence is the same for economic and political immigrants. This level is much higher than that for natives. Similarly, the prevalence declines over time. There is no effect of YSM on the probability of drinking alcohol in political immigrants but it increases with time in economic immigrants.

To sum up, immigrants have less healthy lifestyles than natives. And the change over time is towards unhealthier lifestyle. Political immigrants are more likely to smoke over time, whereas economic immigrants are more likely to drink alcohol over time.

We do not observe any significant coefficients for the interaction of YSM with age of immigrants. But based on the predicted probabilities, age of arrival determines the assimilation process for political immigrants but not for economic immigrants (see Figure A5). For political immigrants, obesity prevalence and prevalence of regular alcohol drinking increases with age at arrival. We observe different trends of behaviours with time spent in Russia. Political immigrants become more obese as length of stay increases, but healthier with respect to other behaviours (less likely to smoke and drink alcohol). Economic immigrants are drinking more alcohol as time spent in Russia increases, but otherwise they become healthier (less likely to smoke and less likely to be obese).

Political immigrants from Eastern European countries are less likely to smoke over time (see Table 4.17). In economic immigrants group, we observe increase in obesity over time for both Islamic and Eastern European countries of origin. Eastern European economic immigrants are also more likely to drink alcohol over time (see Table 4.20).

Based on predicted probabilities, political immigrants become more obese as time spent in Russia increases. Obesity prevalence change over time has a U-shape for Eastern European immigrants and it constantly increases for Islamic immigrants (see Figure A6). Smoking and alcohol drinking prevalence go down for both Eastern European and Islamic immigrants. However, Eastern Europeans are more likely to smoke than Islamic immigrants. They, in turn, are more likely to drink than Eastern Europeans. Economic immigrants tend to improve their lifestyle over time in Russia. However, Eastern European immigrants are more likely to drink as YSM increase and they start smoking more after 50 years in Russia.

To sum up, immigration has different effect on health behaviours of economic and political immigrants. Political immigrants become more obese with time spent in Russia, whereas economic immigrants are more likely to drink alcohol. With respect to other behaviours, both groups improve their lifestyles.

Table 4.15: Political immigrants' assimilation in terms of the obesity prevalence

	Model 1			Model 2			Model 3			Model 4			Model 5		
	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YSM	0.001	-0.001	-0.001	0.007	0.003	0.003	0.004	0.008	0.009	-0.007	-0.001	-0.001	-0.037	-0.014	-0.014
	(0.008)	(0.006)	(0.006)	(0.021)	(0.016)	(0.016)	(0.010)	(0.010)	(0.010)	(0.011)	(0.006)	(0.006)	(0.070)	(0.032)	(0.032)
YSM^2				0.000	0.000	0.000							0.001	0.000	0.000
				(0.001)	(0.000)	(0.000)							(0.002)	(0.001)	(0.001)
YSM*age_imm							-0.00013	-0.00019	-0.0002						
							(0.0003)	(0.0002)	(0.0002)						
EE										-0.258	0.196	0.178	0.034	0.329	0.308
										(0.557)	(0.260)	(0.261)	(0.845)	(0.400)	(0.400)
EE*YSM										0.026	-0.004	-0.004	0.024	-0.005	-0.004
										(0.029)	(0.013)	(0.013)	(0.029)	(0.013)	(0.013)
Islam										0.184	0.061	0.060	0.442	0.178	0.175
										(0.247)	(0.164)	(0.164)	(0.625)	(0.312)	(0.312)
age_native	0.005***	0.005***	0.014*	0.005***	0.005***	0.014*	0.00457***	0.0049***	0.017*	0.005***	0.005***	0.014*	0.005***	0.005***	0.014*
	(0.001)	(0.000)	(0.008)	(0.001)	(0.001)	(0.008)	(0.0005)	(0.0005)	(0.009)	(0.001)	(0.001)	(0.008)	(0.001)	(0.001)	(0.008)
age_imm	0.005*	0.006***	0.015*	0.004	0.005*	0.014*	0.006	0.0063***	0.018**	0.004	0.004	0.013	0.004	0.004	0.013
	(0.003)	(0.002)	(0.008)	(0.003)	(0.003)	(0.008)	(0.004)	(0.002)	(0.009)	(0.003)	(0.003)	(0.008)	(0.003)	(0.003)	(0.008)
constant	-0.392***	-0.096	-0.361**	-0.394***	-0.097	-0.363**	-0.27366***	-0.101	-0.395**	-0.394***	-0.098	-0.497***	-0.394***	-0.098	-0.496***
	(0.103)	(0.067)	(0.166)	(0.103)	(0.067)	(0.166)	(0.095)	(0.067)	(0.155)	(0.103)	(0.067)	(0.164)	(0.103)	(0.067)	(0.164)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	16,027	16,027	16,027	16,027	16,027	16,027	160,27	16,027	16,027	16,027	16,027	16,027	16,027	16,027	16,027
N of ind		2,962	2,962		2,962	2,962		2,962	2,962		2,962	2,962		2,962	2,962
R^2		0.087	0.09		0.087	0.09		0.087	0.090		0.087	0.09		0.087	0.09
rho		0.725	0.725		0.725	0.725		0.726	0.726		0.726	0.726		0.726	0.726

Standard errors are reported in parentheses. All specifications control for gender, marital status, education, income, employment status, nationality, children, urban area of residence. Rho indicates the proportion of variance in the dependent variable between subjects.

Note: * significant at 10%, ** significant at 5%, *** significant at 1%. YSM - years since migration, EE - Eastern European immigrants, Islam - Islamic immigrants, FE - fixed effects, imm - immigrant.

Table 4.16: Economic immigrants' assimilation in terms of the obesity prevalence

	Model 1			Model 2			Model 3			Model 4			Model 5		
	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YSM	-0.002	-0.004	-0.004	0.044**	0.032*	0.031*	0.027**	0.023*	0.022*	-0.002	0.006	0.005	-0.007	-0.004	-0.004
	(0.008)	(0.008)	(0.008)	(0.017)	(0.017)	(0.017)	(0.014)	(0.013)	(0.013)	(0.010)	(0.010)	(0.010)	(0.042)	(0.027)	(0.027)
YSM^2				-0.000**	-0.000**	-0.000**							0.000	0.000	0.000
				(0.000)	(0.000)	(0.000)							(0.000)	(0.000)	(0)
YSM*age_imm							-0.00034***	-0.00029***	-0.00028**						
							(0.0001)	(0.0001)	(0.0001)						
EE										0.739**	0.734***	0.708***	0.835	0.895*	0.871*
										(0.332)	(0.268)	(0.269)	(0.829)	(0.507)	(0.507)
EE * YSM										0.011	0.001	0.001	0.011	0.001	0.001
										(0.010)	(0.009)	(0.009)	(0.010)	(0.009)	(0.009)
Islam										1.093***	0.739**	0.716**	1.192	0.903	0.882
										(0.416)	(0.365)	(0.365)	(0.919)	(0.571)	(0.571)
age_native	0.005***	0.005***	0.016**	0.005***	0.005***	0.016**	0.005***	0.005***	0.017**	0.005***	0.005***	0.016**	0.005***	0.005***	0.016**
	(0.001)	(0.001)	(0.008)	(0.001)	(0.001)	(0.008)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.008)	(0.001)	(0.001)	(0.008)
age_imm	0.007	0.009*	0.019**	-0.008	-0.004	0.007	0.003	0.003	0.016*	-0.011	-0.009	0.002	-0.011	-0.009	0.002
	(0.005)	(0.005)	(0.009)	(0.007)	(0.007)	(0.010)	(0.005)	(0.005)	(0.010)	(0.008)	(0.008)	(0.011)	(0.008)	(0.008)	(0.011)
constant	-0.226*	-0.258***	-0.652***	-0.228*	-0.260***	-0.655***	-0.265***	-0.102	-0.378**	-0.403***	-0.260***	-0.656***	-0.403***	-0.260***	-0.656***
	(0.127)	(0.073)	(0.170)	(0.126)	(0.073)	(0.170)	(0.095)	(0.068)	(0.157)	(0.103)	(0.073)	(0.170)	(0.103)	(0.073)	(0.170)
Survey year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	15,860	15,860	15,860	15,860	15,860	15,860	15,860	15,860	15,860	15,855	15,855	15,855	15,855	15,855	15,855
N of ind		2,926	2,926		2,926	2,926		2,926	2,926		2,925	2,925		2,925	2,925
R^2		0.088	0.091		0.09	0.093		0.091	0.093		0.091	0.093		0.091	0.093
rho		0.724	0.724		0.724	0.724		0.724	0.724		0.724	0.724		0.724	0.724

Standard errors are reported in parentheses. All specifications control for gender, marital status, education, income, employment status, nationality, children, urban area of residence. Rho indicates the proportion of variance in the dependent variable between subjects.

Note: * significant at 10%, ** significant at 5%, *** significant at 1%. YSM - years since migration, EE - Eastern European immigrants, Islam - Islamic immigrants, FE - fixed effects, imm - immigrant.

Table 4.17: Political immigrants' assimilation in terms of the smoking prevalence

	Model 1			Model 2			Model 3			Model 4			Model 5		
	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YSM	-0.001	-0.007*	-0.007	-0.006	0.017	0.017	-0.0029	-0.0007	-0.0003	0.004	-0.003	-0.002	0.056	0.044**	0.044**
	(0.006)	(0.004)	(0.004)	(0.016)	(0.013)	(0.013)	(0.008)	(0.008)	(0.008)	(0.009)	(0.005)	(0.005)	(0.058)	(0.022)	(0.022)
YSM^2				0.000	-0.001**	-0.001**							-0.001	-0.001**	-0.001**
				(0.001)	(0.000)	(0.000)							(0.002)	(0.001)	(0.001)
YSM*age_imm							0.00008	-0.00012	-0.00012						
							(0.0002)	(0.00012)	(0.00012)						
EE										0.184	0.511***	0.508***	-0.279	0.068	0.068
										(0.374)	(0.190)	(0.190)	(0.631)	(0.276)	(0.275)
EE*YSM										-0.013	-0.021**	-0.021**	-0.012	-0.019**	-0.019**
										(0.020)	(0.009)	(0.009)	(0.020)	(0.009)	(0.009)
Islam										-0.155	0.006	-0.001	-0.597	-0.398*	-0.402*
										(0.199)	(0.128)	(0.128)	(0.556)	(0.223)	(0.223)
age_native	-0.006***	-0.005***	-0.003	-0.006***	-0.005***	-0.003	-0.006***	-0.005***	-0.003	-0.006***	-0.005***	-0.003	-0.006***	-0.005***	-0.003
	(0.001)	(0.000)	(0.006)	(0.001)	(0.000)	(0.006)	(0.0005)	(0.0004)	(0.006)	(0.001)	(0.000)	(0.006)	(0.001)	(0.000)	(0.006)
age_imm	-0.005**	-0.003*	-0.001	-0.005*	-0.007***	-0.005	-0.006**	-0.003*	-0.0005	-0.005*	-0.005*	-0.003	-0.005*	-0.005*	-0.003
	(0.002)	(0.002)	(0.006)	(0.003)	(0.002)	(0.006)	(0.003)	(0.002)	(0.006)	(0.003)	(0.003)	(0.006)	(0.003)	(0.003)	(0.006)
constant	1.183***	0.805***	1.244***	1.184***	0.799***	1.237***	1.121***	0.802***	1.327***	1.192***	0.804***	1.248***	1.191***	0.805***	1.247***
	(0.106)	(0.053)	(0.139)	(0.106)	(0.053)	(0.139)	(0.087)	(0.054)	(0.130)	(0.106)	(0.054)	(0.139)	(0.106)	(0.054)	(0.139)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	16,870	16,870	16,870	16,870	16,870	16,870	16,870	16,870	16,870	16,870	16,870	16,870	16,870	16,870	16,870
N of ind		2,982	2,982		2,982	2,982		2,982	2,982		2,982	2,982		2,982	2,982
R^2		0.29	0.296		0.29	0.296		0.290	0.296		0.29	0.296		0.291	0.296
rho		0.798	0.798		0.798	0.798		0.798	0.798		0.798	0.798		0.799	0.799

Standard errors are reported in parentheses. All specifications control for gender, marital status, education, income, employment status, nationality, children, urban area of residence. Rho indicates the proportion of variance in the dependent variable between subjects.

Note: * significant at 10%, ** significant at 5%, *** significant at 1%. YSM - years since migration, EE - Eastern European immigrants, Islam - Islamic immigrants, FE - fixed effects, imm - immigrant.

Table 4.18: Economic immigrants' assimilation in terms of the smoking prevalence

	Model 1			Model 2			Model 3			Model 4			Model 5		
	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YSM	0.003	-0.002	-0.002	0.004	-0.004	-0.003	0.002	-0.002	-0.001	-0.004	-0.005	-0.004	0.044	-0.007	-0.005
	0.007	0.006	0.006	0.016	0.014	0.014	0.012	0.011	0.011	0.008	0.008	0.008	0.033	0.020	0.020
YSM^2				0.000	0.000	0.000							-0.001	0.000	0.000
				0.000	0.000	0.000							0.000	0.000	0.000
YSM*age_imm							0.00001	-0.00001	-0.00001						
							0.00011	0.00009	0.00009						
EE										-0.017	0.060	0.082	-0.885	0.088	0.108
										0.245	0.217	0.218	0.635	0.379	0.379
EE * YSM										0.007	0.003	0.002	0.006	0.003	0.002
										0.008	0.007	0.007	0.008	0.007	0.007
Islam										0.334	0.284	0.277	-0.562	0.312	0.304
										0.350	0.292	0.292	0.631	0.432	0.432
age_native	-0.006***	-0.005***	-0.002	-0.006***	-0.005***	-0.002	-0.00577***	-0.005***	-0.001	-0.006***	-0.005***	-0.002	-0.006***	-0.005***	-0.002
	0.001	0.000	0.006	0.001	0.000	0.006	0.00051	0.000	0.006	0.001	0.000	0.006	0.001	0.000	0.006
age_imm	-0.007*	-0.004	-0.001	-0.007	-0.003	0.000	-0.00698	-0.00371	-0.00027	-0.008	-0.006	-0.003	-0.008	-0.006	-0.003
	0.004	0.004	0.007	0.006	0.006	0.008	0.004	0.004	0.007	0.007	0.007	0.009	0.007	0.007	0.009
constant	1.038***	1.182***	1.835***	1.038***	1.182***	1.835***	1.129***	0.799***	1.360***	1.040***	1.181***	1.838***	1.040***	1.181***	1.838***
	0.086	0.058	0.149	0.086	0.058	0.149	0.08805	0.054	0.132	0.086	0.058	0.149	0.086	0.058	0.149
Survey year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	16,673	16,673	16,673	16,673	16,673	16,673	16,673	16,673	16,673	16,668	16,668	16,668	16,668	16,668	16,668
N of ind		2,945	2,945		2,945	2,945		2,945	2,945		2,944	2,944		2,944	2,944
R^2		0.285	0.292		0.285	0.292		0.285	0.292		0.286	0.292		0.286	0.292
rho		0.801	0.801		0.801	0.801		0.801	0.801		0.801	0.801		0.801	0.801

Standard errors are reported in parentheses. All specifications control for gender, marital status, education, income, employment status, nationality, children, urban area of residence. Rho indicates the proportion of variance in the dependent variable between subjects.

Note: * significant at 10%, ** significant at 5%, *** significant at 1%. YSM - years since migration, EE - Eastern European immigrants, Islam - Islamic immigrants, FE - fixed effects, imm - immigrant.

Table 4.19: Political immigrants' assimilation in terms of the prevalence of regular alcohol drinking

	Model 1			Model 2			Model 3			Model 4			Model 5		
	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YSM	0.000	0.000	0.000	0.001	0.001	0.000	-0.0005	-0.0005	-0.0005	0.001	0.001	0.001	0.020	0.008	0.008
	(0.001)	(0.002)	(0.002)	(0.004)	(0.005)	(0.005)	(0.002)	(0.003)	(0.003)	(0.001)	(0.003)	(0.003)	(0.015)	(0.018)	(0.018)
YSM^2				0.000	0.000	0.000							-0.001	0.000	0.000
				(0.000)	(0.000)	(0.000)							(0.000)	(0.001)	(0.001)
YSM*age_imm							0.00002	0.00002	0.00002						
							(0.00004)	(0.00007)	(0.00007)						
EE										0.061	0.048	0.043	-0.113	-0.019	-0.026
										(0.122)	(0.112)	(0.112)	(0.212)	(0.203)	(0.203)
EE*YSM										-0.005	-0.004	-0.004	-0.004	-0.004	-0.004
										(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Islam										-0.018	-0.018	-0.021	-0.179	-0.079	-0.084
										(0.027)	(0.063)	(0.063)	(0.127)	(0.166)	(0.166)
age_native	0.000	0.000	-0.007**	0.000	0.000	-0.006**	0.0003	0.0002	-0.0019	0.000	0.000	-0.007**	0.000	0.000	-0.007**
	(0.000)	(0.000)	(0.003)	(0.000)	(0.000)	(0.003)	(0.0002)	(0.0002)	(0.006)	(0.000)	(0.000)	0.003	(0.000)	(0.000)	(0.003)
age_imm	0.000	0.000	-0.007**	0.000	0.000	-0.007**	-0.0001	-0.0001	-0.0022	0.001	0.000	-0.007**	0.001	0.000	-0.007**
	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.003)	(0.0006)	(0.0009)	(0.006)	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.003)
constant	0.076**	0.083***	0.063	0.075**	0.083***	0.063	0.071**	0.083***	0.072	0.075**	0.083***	0.063	0.075**	0.083***	0.062
	(0.033)	(0.028)	(0.046)	(0.033)	(0.028)	(0.046)	(0.032)	(0.028)	(0.047)	(0.033)	(0.028)	(0.047)	(0.033)	(0.028)	(0.047)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	11,151	11,151	11,151	11,151	11,151	11,151	11,151	11,151	11,151	11,151	11,151	11,151	11,151	11,151	11,151
N of ind		2,550	2,550		2,550	2,550		2,550	2,550		2,550	2,550		2,550	2,550
R^2		0.040	0.041		0.040	0.041		0.040	0.041		0.040	0.041		0.040	0.041
rho		0.217	0.217		0.217	0.217		0.217	0.217		0.217	0.217		0.217	0.217

Standard errors are reported in parentheses. All specifications control for gender, marital status, education, income, employment status, nationality, children, urban area of residence. Rho indicates the proportion of variance in the dependent variable between subjects.

Note: * significant at 10%, ** significant at 5%, *** significant at 1%. YSM - years since migration, EE - Eastern European immigrants, Islam - Islamic immigrants, FE - fixed effects, imm - immigrant.

Table 4.20: Economic immigrants' assimilation in terms of the prevalence of regular alcohol drinking

	Model 1			Model 2			Model 3			Model 4			Model 5		
	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM	LPM	RE LPM	CRE LPM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YSM	0.005**	0.005**	0.005**	0.013	0.011*	0.010*	0.010	0.009**	0.009**	-0.002	-0.001	-0.001	0.002	0.002	0.002
	(0.002)	(0.003)	(0.003)	(0.011)	(0.006)	(0.006)	(0.006)	(0.004)	(0.004)	(0.007)	(0.004)	(0.004)	(0.014)	(0.012)	(0.012)
YSM^2				0.000	0.000	0.000							0.000	0.000	0.000
				(0.000)	(0.000)	(0.000)							(0.000)	(0.000)	(0.000)
YSM*age_imm							-0.00006	-0.00004	-0.00004						
							(0.00008)	(0.00004)	(0.00004)						
EE										0.129	0.108	0.105	0.046	0.06	0.062
										(0.117)	(0.088)	(0.088)	(0.175)	(0.212)	(0.212)
EE * YSM										0.009	0.006*	0.006*	0.009	0.006*	0.006*
										(0.009)	(0.004)	(0.004)	(0.008)	(0.004)	(0.004)
Islam										0.532	0.415***	0.417***	0.450	0.368	0.375
										(0.445)	(0.139)	(0.139)	(0.466)	(0.233)	(0.233)
age_native	0.000	0.000	-0.007**	0.000	0.000	-0.007**	0.00024	0.00016	-0.00326	0.000	0.000	-0.007**	0.000	0.000	-0.007**
	(0.000)	(0.000)	(0.003)	(0.000)	(0.000)	(0.003)	(0.0002)	(0.0002)	(0.006)	(0.000)	(0.000)	(0.003)	(0.000)	(0.000)	(0.003)
age_imm	-0.002*	-0.003*	-0.010***	-0.005	-0.005**	-0.012***	-0.003**	-0.003**	-0.007	-0.006**	-0.005**	-0.012***	-0.006**	-0.005**	-0.012***
	(0.001)	(0.002)	(0.003)	(0.003)	(0.002)	(0.004)	(0.001)	(0.002)	(0.006)	(0.003)	(0.002)	(0.004)	(0.003)	(0.002)	(0.004)
constant	0.082**	0.134***	0.114**	0.081**	0.134***	0.128***	0.073**	0.082***	0.083*	0.079**	0.134***	0.120**	0.080**	0.134***	0.120**
	(0.035)	(0.031)	(0.050)	(0.035)	(0.031)	(0.048)	(0.033)	(0.029)	(0.048)	(0.035)	(0.030)	(0.050)	(0.035)	(0.030)	(0.050)
Survey year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	10,964	10,964	10,964	10,964	10,964	10,964	10,964	10,964	10,964	10,962	10,962	10,962	10,962	10,962	10,962
N of ind		2,509	2,509		2,509	2,509		2,509	2,509		2,508	2,508		2,508	2,508
R^2		0.041	0.042		0.041	0.042		0.041	0.041		0.043	0.044		0.043	0.044
rho		0.23	0.23		0.23	0.23		0.230	0.230		0.228	0.228		0.228	0.228

Standard errors are reported in parentheses. All specifications control for gender, marital status, education, income, employment status, nationality, children, urban area of residence. Rho indicates the proportion of variance in the dependent variable between subjects.

Note: * significant at 10%, ** significant at 5%, *** significant at 1%. YSM - years since migration, EE - Eastern European immigrants, Islam - Islamic immigrants, FE - fixed effects, imm - immigrant.

4.5.3 Life dissatisfaction

The estimation results are presented in Tables 4.21 and 4.22.

Native individuals are the most satisfied with their life, while political immigrants - the least satisfied (see Figure A7). Life dissatisfaction decreases for all groups from 2010 to 2013 and then increases. This is likely to be due to the conflict with Ukraine and sanctions imposed on Russia around this time. Based on the results in Table 4.22, we can only conclude that life dissatisfaction decreases over time spent in the RF for economic immigrants. There is no statistically significant effect for political immigrants.

There is no effect of age at arrival on both groups: all lines overlap and there is no clear pattern. Overall life dissatisfaction rises for political immigrants and goes down for economic immigrants.

There is no effect of country of birth on life dissatisfaction. Overall trend is the same for political and economic immigrants as described above.

To sum up, political immigrants become less satisfied with their life as their time spent in Russia increases, while economic immigrants become more satisfied. However, their levels are still lower than that of native individuals. Literature shows similar results (Yaman & Cubi-Molla, 2017).

Table 4.21: Political immigrants' assimilation in terms of life satisfaction

	Model 1			Model 2			Model 3			Model 4			Model 5		
	OLS	RE OLS	CRE OLS	OLS	RE OLS	CRE OLS	OLS	RE OLS	CRE OLS	OLS	RE OLS	CRE OLS	OLS	RE OLS	CRE OLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YSM	0.019	0.010	0.011	-0.020	0.008	0.004	0.009	0.011	0.010	0.036*	0.006	0.008	0.056	-0.050	-0.052
	(0.013)	(0.013)	(0.013)	(0.041)	(0.034)	(0.034)	(0.019)	(0.018)	(0.018)	(0.020)	(0.016)	(0.016)	(0.115)	(0.098)	(0.097)
YSM^2				0.001	0.000	0.000							-0.001	0.002	0.002
				(0.001)	(0.001)	(0.001)							0.003	0.003	0.003
YSM*age_imm							0.00039	-0.00004	0.0000						
							(0.0005)	(0.0004)	(0.0004)						
EE										-0.607	-0.198	-0.212	-0.787	0.321	0.34
										(0.645)	(0.672)	(0.671)	(1.205)	(1.117)	(1.116)
EE*YSM										-0.001	0.013	0.012	-0.001	0.011	0.011
										(0.034)	(0.036)	(0.035)	(0.034)	(0.036)	(0.036)
Islam										-0.519	0.122	0.074	-0.69	0.603	0.586
										(0.464)	(0.385)	(0.385)	(0.968)	(0.913)	(0.912)
age_native	0.003**	0.002*	-0.043*	0.002**	0.002*	-0.043*	0.002**	0.002*	-0.028	0.002**	0.002*	-0.043*	0.002**	0.002*	-0.043*
	(0.001)	(0.001)	0.026	(0.001)	(0.001)	(0.026)	(0.001)	(0.001)	(0.030)	(0.001)	(0.001)	(0.026)	(0.001)	(0.001)	(0.026)
age_imm	-0.002	0.000	-0.045*	0.002	0.001	-0.044*	-0.006	0.001	-0.030	0.003	0.000	-0.045*	0.003	0.000	-0.045*
	(0.005)	(0.005)	(0.026)	(0.006)	(0.006)	(0.026)	(0.006)	(0.005)	(0.031)	(0.006)	(0.006)	(0.026)	(0.006)	(0.006)	(0.026)
constant		4.620***	6.037***		4.621***	6.039***	5.297***	4.619***	5.982***		4.617***	6.276***		4.616***	6.034***
		(0.161)	(0.318)		(0.161)	(0.318)	(0.206)	(0.161)	(0.300)		(0.161)	(0.314)		(0.161)	(0.318)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	16,795	16,795	16,795	16,795	16,795	16,795	16,795	16,795	16,795	16,795	16,795	16,795	16,795	16,795	16,795
N of ind		2,982	2,982		2,982	2,982		2,982	2,982		2,982	2,982		2,982	2,982
R^2		0.119	0.124		0.119	0.124		0.119	0.124		0.119	0.124		0.119	0.124
rho		0.393	0.393		0.393	0.393		0.392	0.392		0.393	0.393		0.393	0.393

Standard errors are reported in parentheses. All specifications control for gender, marital status, education, income, employment status, nationality, children, urban area of residence. Rho indicates the proportion of variance in the dependent variable between subjects.

Note: * significant at 10%, ** significant at 5%, *** significant at 1%. YSM - years since migration, EE - Eastern European immigrants, Islam - Islamic immigrants, FE - fixed effects, imm - immigrant.

Table 4.22: Economic immigrants' assimilation in terms of life satisfaction

	Model 1			Model 2			Model 3			Model 4			Model 5		
	OLS	RE OLS	CRE OLS	OLS	RE OLS	CRE OLS	OLS	RE OLS	CRE OLS	OLS	RE OLS	CRE OLS	OLS	RE OLS	CRE OLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YSM	-0.048***	-0.052***	-0.051***	-0.013	-0.015	-0.015	-0.029	-0.029	-0.027	-0.050**	-0.047**	-0.045**	0.002	-0.06	-0.057
	(0.014)	(0.015)	(0.015)	(0.032)	(0.033)	(0.032)	(0.024)	(0.024)	(0.024)	(0.020)	(0.020)	(0.020)	(0.065)	(0.066)	(0.066)
YSM^2				0.000	0.000	0.000							-0.001	0.000	0.000
				(0.000)	(0.000)	(0.000)							(0.001)	(0.001)	(0.001)
YSM*age_imm							-0.0002	-0.0003	-0.0003						
							(0.0002)	(0.0002)	(0.0002)						
EE										0.174	0.462	0.469	-0.770	0.683	0.678
										(0.537)	(0.546)	(0.546)	(1.118)	(1.245)	(1.243)
EE * YSM										(0.015)	(0.009)	(0.007)	(0.014)	(0.009)	(0.007)
										0.019	0.020	0.020	0.018	0.020	0.020
Islam										0.908	0.944	0.890	-0.068	1.172	1.105
										(0.721)	(0.760)	(0.760)	(1.352)	(1.379)	(1.378)
age_native	0.003**	0.002*	-0.043*	0.003**	0.002*	-0.043*	0.003**	0.002*	-0.037	0.003**	0.002*	-0.044*	0.003**	0.002*	-0.044*
	(0.001)	(0.001)	(0.026)	(0.001)	(0.001)	(0.026)	(0.001)	(0.001)	(0.030)	(0.001)	(0.001)	(0.026)	(0.001)	(0.001)	(0.026)
age_imm	0.032***	0.034***	-0.012	0.021	0.021	-0.024	0.029***	0.030***	-0.009	0.021	0.018	-0.028	0.021	0.018	-0.028
	(0.009)	(0.009)	(0.027)	(0.013)	(0.013)	(0.029)	(0.009)	(0.010)	(0.031)	(0.014)	(0.014)	(0.029)	(0.014)	(0.014)	(0.029)
constant		4.660***	6.397***		4.659***	6.066***	5.374***	4.679***	6.124***		4.655***	6.389***		4.655***	6.056***
		(0.171)	(0.325)		(0.171)	(0.333)	(0.209)	(0.162)	(0.302)		(0.171)	(0.325)		(0.171)	(0.333)
Survey year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	16,600	16,600	16,600	16,600	16,600	16,600	16,600	16,600	16,600	16,595	16,595	16,595	16,595	16,595	16,595
N of ind		2,945	2,945		2,945	2,945		2,945	2,945		2,944	2,944		2,944	2,944
R^2		0.119	0.125		0.119	0.125		0.119	0.125		0.119	0.125		0.119	0.125
rho		0.392	0.392		0.392	0.392		0.392	0.392		0.392	0.392		0.392	0.392

Standard errors are reported in parentheses. All specifications control for gender, marital status, education, income, employment status, nationality, children, urban area of residence. Rho indicates the proportion of variance in the dependent variable between subjects.

Note: * significant at 10%, ** significant at 5%, *** significant at 1%. YSM - years since migration, EE - Eastern European immigrants, Islam - Islamic immigrants, FE - fixed effects, imm - immigrant.

4.6 Conclusion

The aim of this study is to explore HIE in the sample of political immigrants, who arrived in Russia after the collapse of the Soviet Union. We compare them to economic immigrants, who arrived before 1989. We exploit RLMS to answer the question of interest. It is a large household survey with a panel component that allows us to create a longitudinal dataset that follows the same individuals over a period of time from 2010 to 2016. We extract information on health outcomes and socio-economic characteristics besides immigrants' age at arrival, country of origin and length of stay.

We use the collapse of the Soviet Union as a quasi-experiment as this shock made people to immigrate, this decision was not planned and not made voluntarily. Thanks to this we can assume that political immigrants and native Russians are homogenous groups except that one group immigrated and the other one did not. However, when we compare the two groups' descriptive statistics, we observe that the two groups are not completely homogenous. The differences are probably due to immigrants coming from different republics with different cultures. There are more men in the political immigrant group, they are more likely to be married, have kids and report nationality other than Russian. This is expected as they were born in different republics of the Soviet Union and had their nationality specified in their passports. Political immigrants are less likely to live in urban areas than natives and this is also likely to affect their assimilation process. We, therefore, control for these characteristics in our analysis. In addition to observed characteristics, we assume that immigrants are not different from natives in unobserved characteristics, such as language proficiency, health perception and largely cultural background. Language proficiency is likely to be the case due to Russian language being official language across the whole Soviet Union. Similar educational standards across the Soviet Union ensures that immigrants

perceive health the same way as native Russians.

In the regression analysis we estimate the effect of YSM on health outcomes. We do our best to account for all important factors that affect assimilation process: age of immigrants and natives, age at arrival and country of origin. We allow for YSM to have both linear and non-linear effect on health outcomes. We estimate CRE LPM to relax the assumption of random effects being independent from the regressors. Probit models are estimated as a robustness check. All models control for the socio-economic characteristics that were shown to be important in the descriptive analysis: age, gender, marital and employment status, income level, having children, nationality and area of residence. We plot predicted health outcomes over YSM to help the interpretation of the results.

We estimate the same set of models for economic immigrants. This comparison is not designed as quasi-experiment as this is a highly selected group of individuals, who can arrive due to a whole variety of reasons including health reasons. We explore the assimilation process of economic immigrants to compare our results with the results of existing studies on healthy immigrant effect. Then we compare it with the results from political sample to see if HIE holds for that sample.

We find support of the HIE in economic immigrants as their health worsens over time spent in Russia and their health is constantly worse than natives' health. Political immigrants have different assimilation process as despite spending shorter time in Russia compared to natives, their health status is worse than health of economic immigrants and native individuals.

We also find that young age at the time of arrival and country of origin have a protective effect on health acculturation process (adoption of health behaviours) because they are associated with changes towards healthier lifestyle. Being an immigrant from Islamic country is mostly associated with healthier lifestyle. In contrast, Eastern European origin is associated with higher probabilities of smoking and obesity. Older age at the time of

arrival is associated with higher obesity and regular drinking prevalence, but does not have an effect on smoking.

The study has, at present, several limitations. First of all, we do not have an ideal dataset for this study that follows immigrants from the time of arrival in the destination country over time. Therefore, we cannot evaluate the impact of assimilation that happened before we start observing the outcomes of interest. We have a random, although small sample of immigrants in the dataset. We do not have information on individuals' language proficiency and have to assume there is no difference between immigrants and natives. However, we consider it as a plausible assumption.

We assess health status and health behaviours using multiple variables. We analyse these variables separately and summarise the results of the analysis. However, this approach may be subject to bias due to multiple inference (Fitzimos et al., 2016). To resolve this bias, it is recommended to create a summary measure. Anderson et al. (2008) suggest how such measure can be generated. We are not concerned about this bias in our study as all measures provide consistent results. However, in future work we plan to generate summary measures for health status and lifestyle.

Economic immigrants, who arrived before the collapse of the Soviet Union, are not the best compassion group as we do not have a large sample of them and they have spent a lot of time in Russia and their cultural and health assimilation has been done to a great extent. It may seem as a better idea to compare political immigrants with more recent immigrants, who did not spend as much time in the destination country. But this is rather difficult to do as a lot of events happened after 2001, including global financial crisis of 2008, annexation of Crimea and subsequent sanctions imposed on Russia by the United States and the European Union that are still valid. Therefore, this group of immigrants would be very selected by the reason of immigration, when some immigrants

may be coming from Ukraine in recent years to escape the unfortunate consequences of the conflict with Russia due to the annexation of Crimea. As an extension of this study, we are planning to look at more recent immigrant group and try to account for different processes taking place in this time period.

We contribute to the literature by studying the sample of political immigrants that have not been widely studied before. The collapse of the Soviet Union provided us with the unique design to establish causal effect of immigration on immigrants' health. We find support of HIE in the economic immigrant sub-sample and a partial support of the effect in the political immigrant sub-sample. It is important for policy-makers to consider political immigrants separately from economic immigrants. Specifically, it is crucial to take into account that political immigrants, who arrived later in life, need the greatest support as they experience the greatest decline in health outcomes. Educational and public health campaigns need to be targeted towards this specific group of immigrants. It is also important to take into account the country of origin as some have a protective effect, and some – a completely opposite effect.

Appendix A

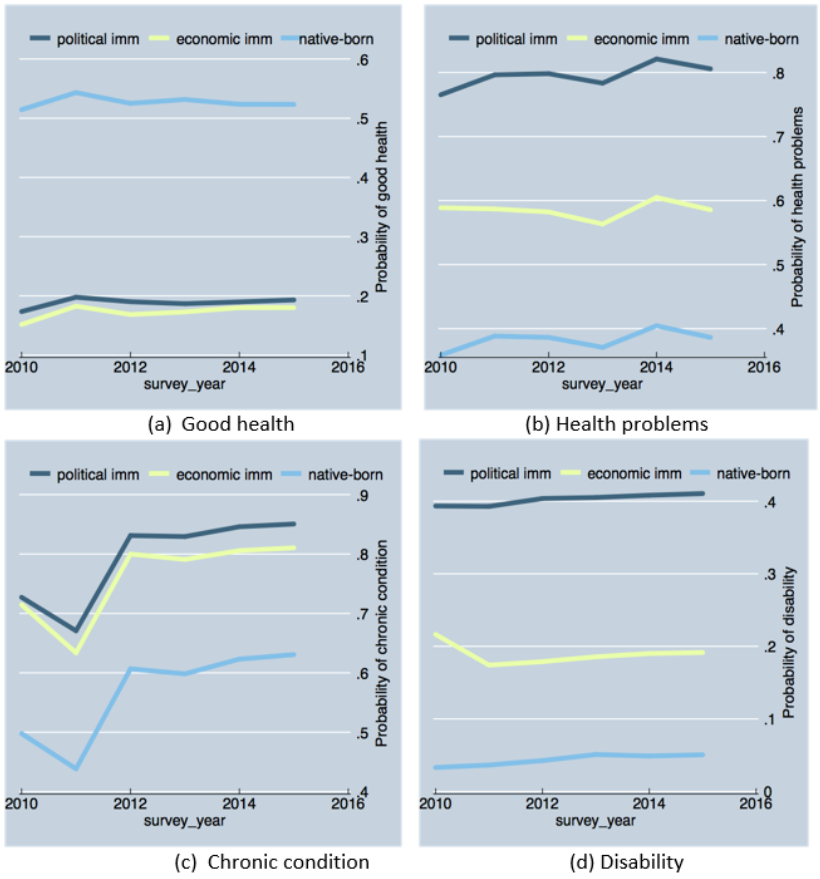


Figure A1: Predicted probabilities of measures of self-assessed health by nativity

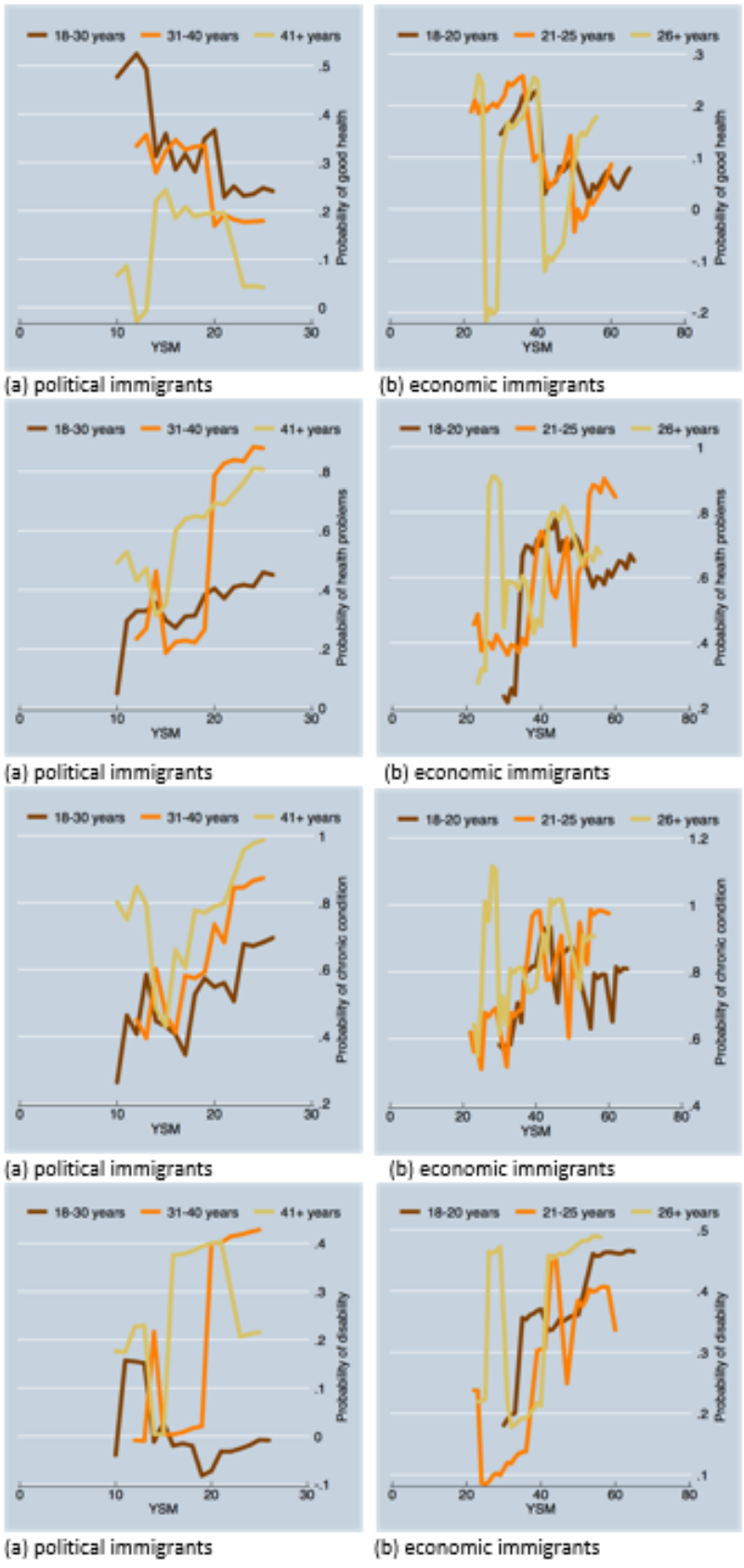


Figure A2: Predicted probabilities of measures of self-assessed health for immigrants by age at arrival

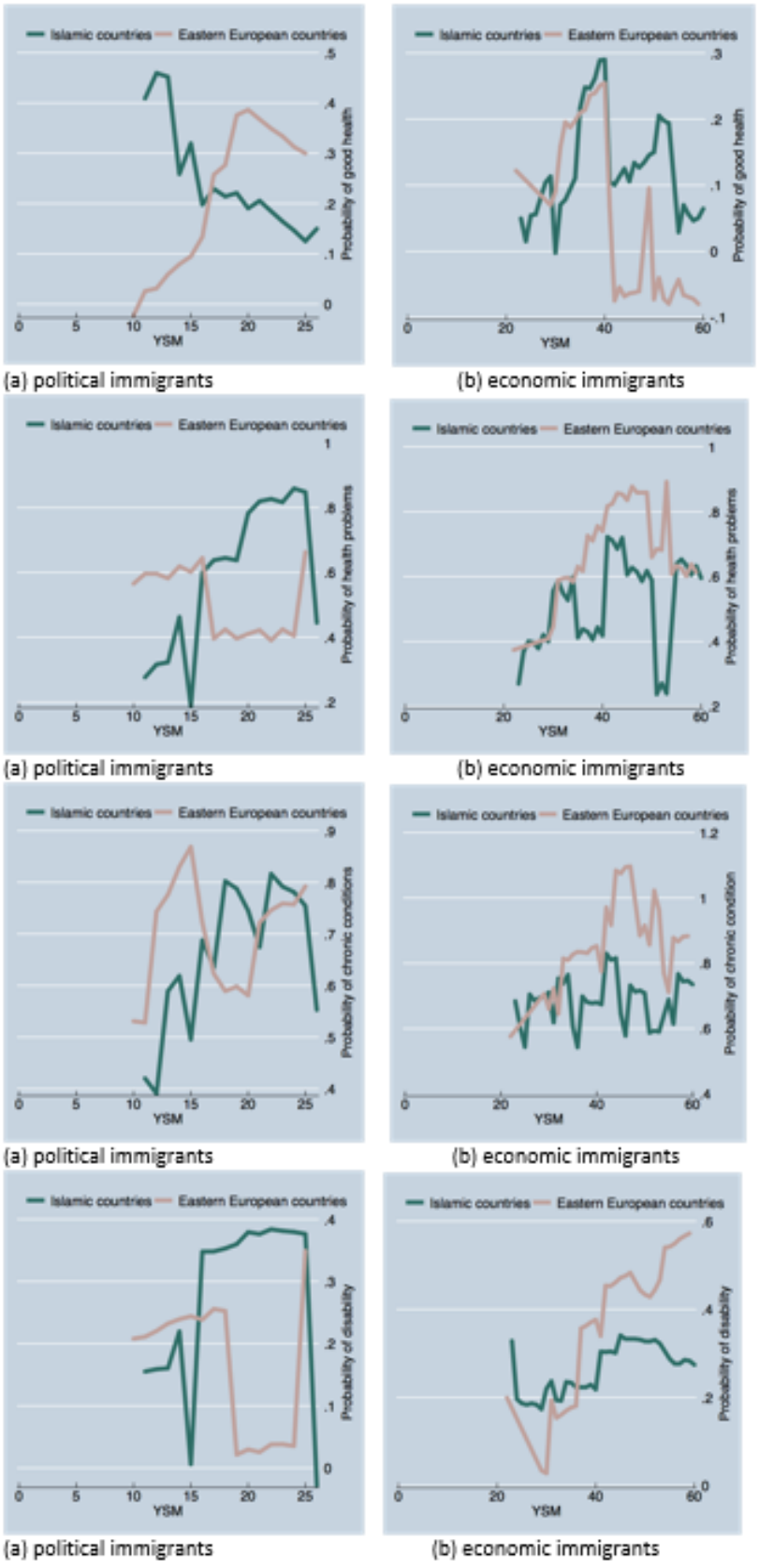


Figure A3: Predicted probabilities of measures of self-assessed health for immigrants by country of origin

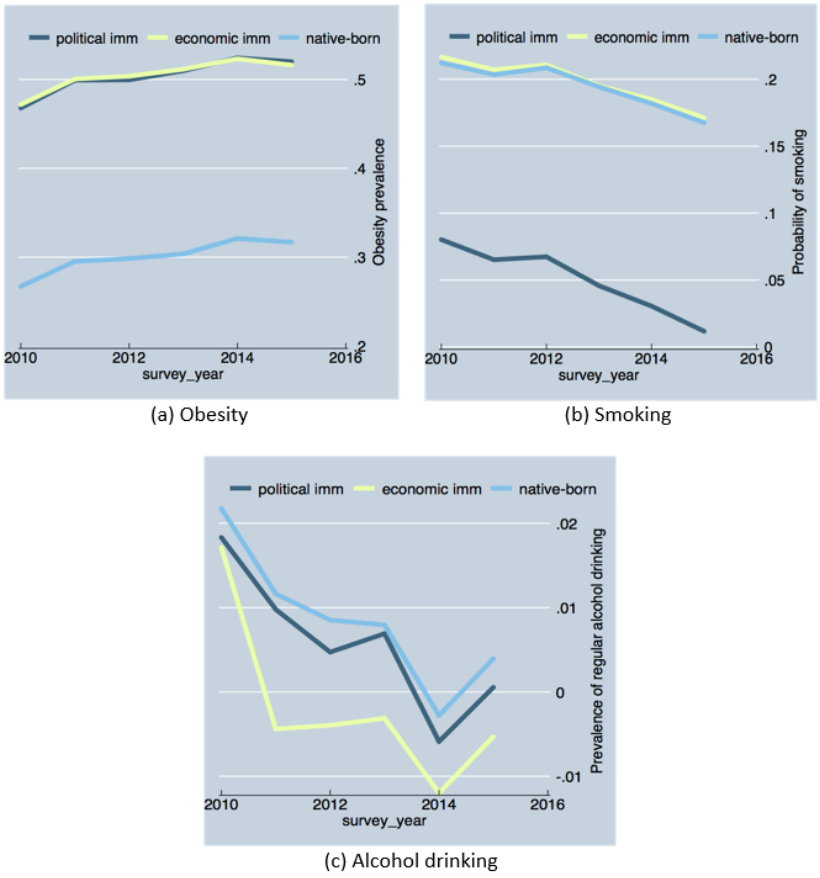


Figure A4: Predicted probabilities of engagement in health behaviours by nativity

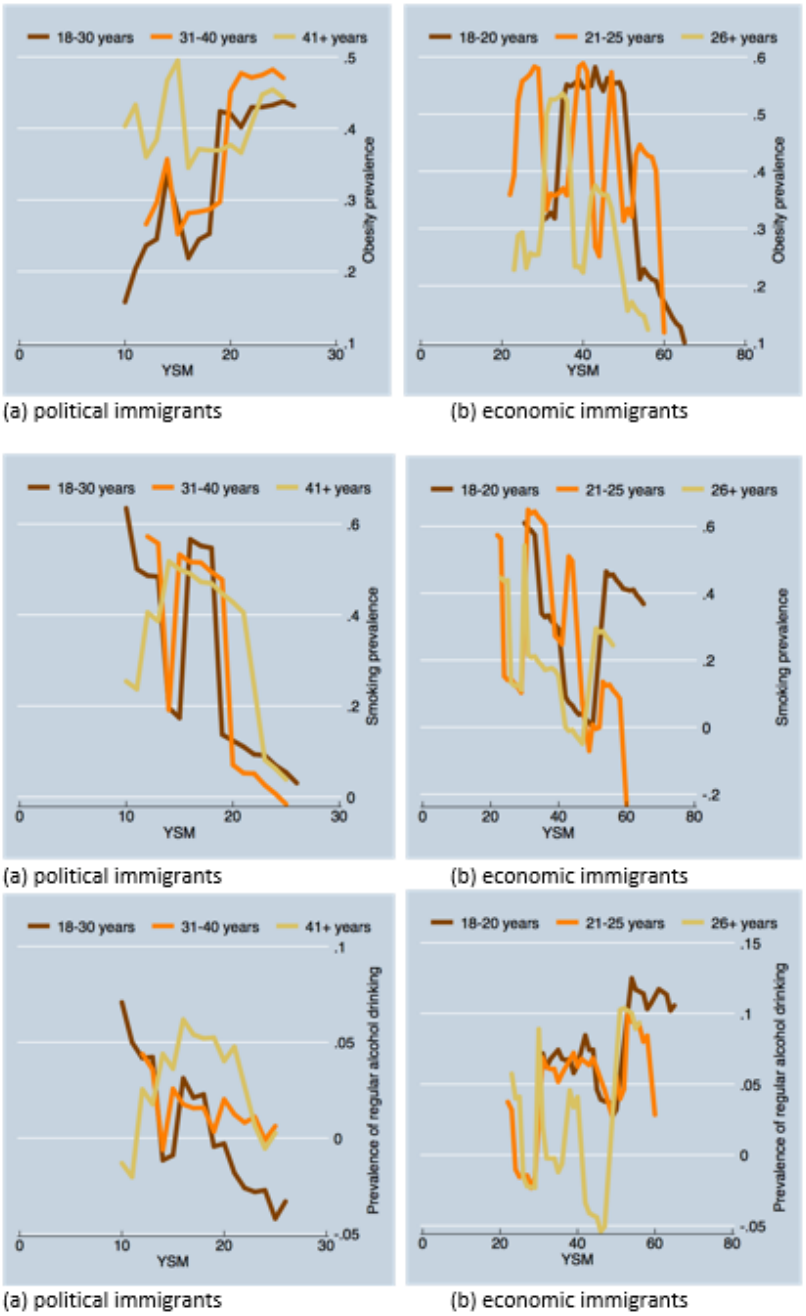


Figure A5: Predicted probabilities of engagement in health behaviours for immigrants by age at arrival

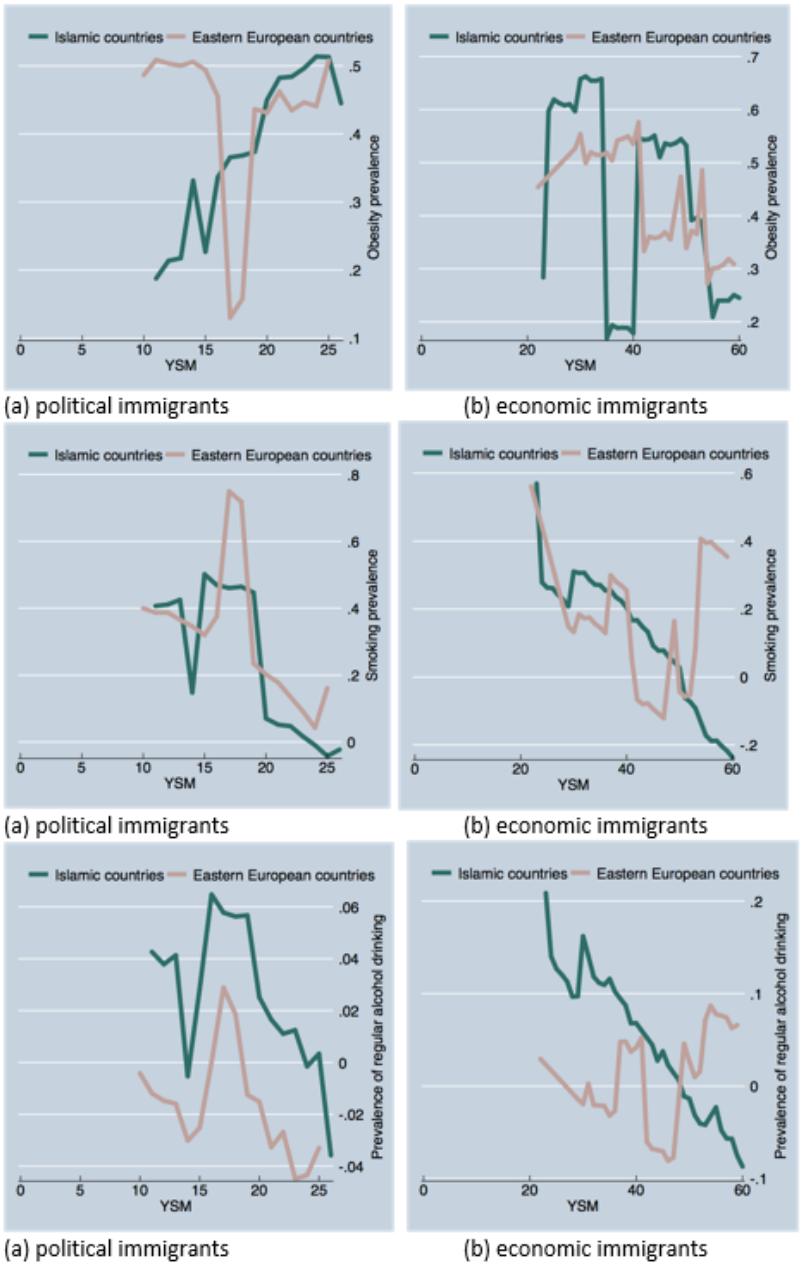


Figure A6: Predicted probabilities of engagement in health behaviours for immigrants by country of origin

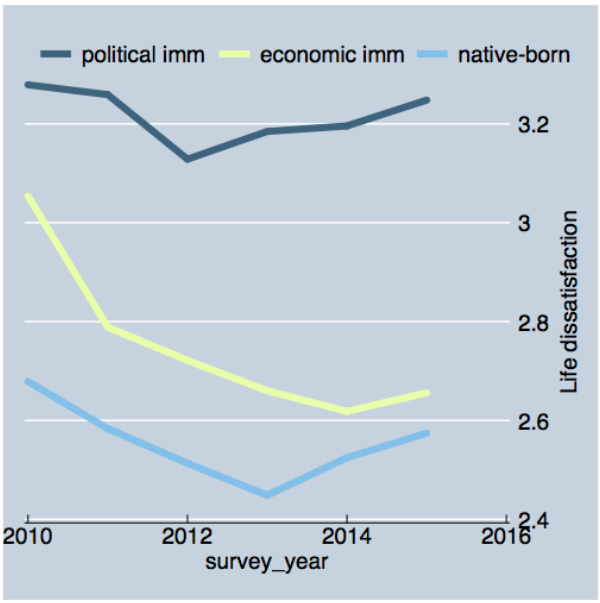
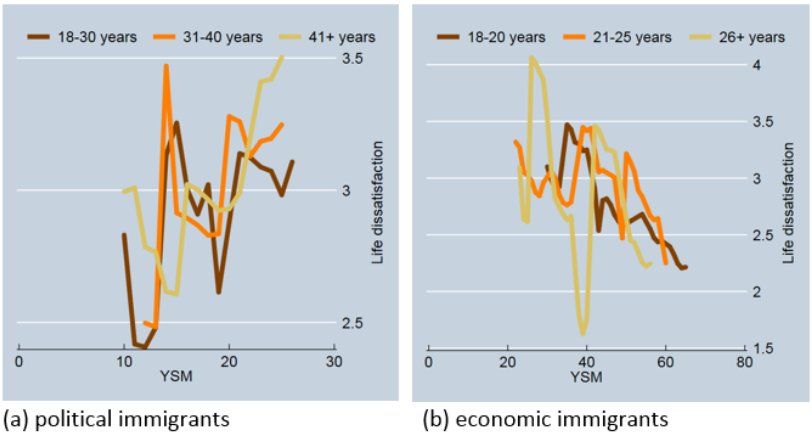
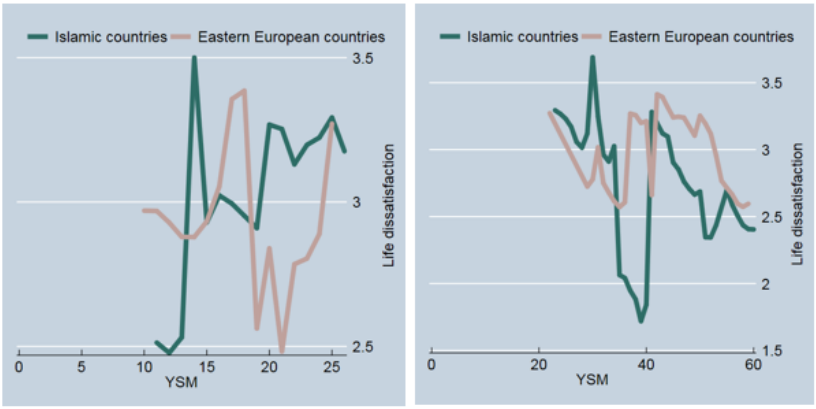


Figure A7: Predicted life dissatisfaction by nativity



(a) political immigrants (b) economic immigrants

Figure A8: Predicted life dissatisfaction for immigrants by age at arrival



(a) political immigrants (b) economic immigrants

Figure A9: Predicted life dissatisfaction for immigrants by country of origin

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CHAPTER 5

CONCLUSION

This thesis presents a collection of three chapters studying immigrants' health and health behaviours. Immigrant population is a very interesting, but also extremely difficult, group of individuals to explore. Individuals decide to immigrate only if the benefit of immigration is higher than its cost. The cost includes but is not limited to travelling, time spent unemployed while searching for a job, great uncertainty around the prospects in the destination country, adaptation to the new culture, loss of social connections and large level of stress that inevitably affects individual's health. Immigrants may impose a burden on the destination country's health care system, especially if "healthy immigrant effect" holds: immigrants arrive to the destination country healthier than average native population, but their health then deteriorates over time. Later in life, immigrants are likely to have worse health than their native counterparts and, therefore, will use more health care services.

We examine different determinants of immigrants' health: their risk and time preferences in association with health behaviours (Chapter 2), their assimilation in the new country and, specifically, the effect of acculturation on health behaviours (Chapter 3) and the effect of reason

for immigration on how health assimilation process evolves (Chapter 4). We hypothesize that immigrants are highly risk loving individuals and this makes them risky in their health too. Hence, the deterioration of immigrants' health later in life can be caused by them adopting unhealthy lifestyles.

The most common comparison group in immigration studies is native-born individuals. Most studies aim to find how different immigrants are from the native population. Knowing the difference would allow us to accommodate their health needs in the best way. However, this is not a straightforward comparison: we do not compare two homogeneous groups of individuals. Individuals do not decide to immigrate at random, they are selected based on their age, gender, ability, motivation, risk attitude and many other factors. Using existing data, it is often not possible to control for all these characteristics.

The study in Chapter 2 provides useful insight into immigrants' preferences: they are more willing to take risks, including specifically risk in health, but they discount time less than native individuals. To the best of our knowledge this is the first study that compares immigrants and natives in the UK in terms of both risk and time preferences.

Chapter 3 studies the sample of immigrants in the UK and, for the first time in literature, uses longitudinal data to explore the effect of acculturation on immigrants' health behaviours. We control for individual characteristics that we believe affect lifestyle choices. We use two proxies for acculturation: length of stay in the UK and national identity. The main contribution of the study is to allow for different acculturation trajectories based on individuals' social support, family background, life satisfaction, mental health status and cultural distance. The last measure of cultural distance quantifies how different people from other countries are from the UK culture. To the best of our knowledge, this is the first acculturation study that constructs and uses this measure.

Chapter 4 is unique thanks to using the collapse of the Soviet Union as

quasi-experiment. It provides us with two rather homogeneous groups of individuals: foreign-born individuals from former Soviet Union republics and Russian-born individuals. Therefore, the comparison of their health and health behaviours is expected to yield causal estimates of the effect of immigration on health. We also compare the assimilation process of immigrants, who arrived due to political reasons, and economic immigrants, who arrived to improve their socio-economic status.

Overall, this thesis makes important contributions to the related literature on the effects of immigration on immigrants' health behaviours, with some of the contributions being very innovative and unique. This is the first study that examines the issue using a panel data approach for the UK. The results indicate that immigrants are more risk loving and this situation can significantly affect their health behaviour. So, we show the mediating role of risk and time preferences in the health behaviours of immigrants. We also examine the role of acculturation in the immigrants' health like whether different trajectories of acculturation would matter for the healthy immigrant effect and health convergence to the levels of native individuals. In this part, we use a unique measure for cultural distance and show that immigrants who are from cultures more distant than British culture experience slower convergence. So, these results provide another mediating factor for the health behaviours of immigrants. Then, the identification of these two factors, namely risk attitudes and cultural distance, as important determinants of immigrants' health behaviours are important contributions to the literature. Finally, we use panel data from Russian Federation along with the collapse of Soviet Union as a quasi-experiment, and show that politically motivated immigrants can have quite different health behaviour convergence than the economically motivated immigrants. Overall, the results of this thesis provide both very important academic contributions and crucial policy recommendations with great significance.