

IZA DP No. 9338

**A “Healthy Immigrant Effect”
or a “Sick Immigrant Effect”?
Selection and Policies Matter**

Amelie F. Constant
Teresa García-Muñoz
Shoshana Neuman
Tzahi Neuman

September 2015

A “Healthy Immigrant Effect” or a “Sick Immigrant Effect”? Selection and Policies Matter

Amelie F. Constant

George Washington University, Temple University and IZA

Teresa García-Muñoz

University of Granada

Shoshana Neuman

Bar-Ilan University, CEPR and IZA

Tzahi Neuman

Hadassah-Hebrew University Medical Center

Discussion Paper No. 9338
September 2015

IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0
Fax: +49-228-3894-180
E-mail: iza@iza.org

Any opinions expressed here are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but the institute itself takes no institutional policy positions. The IZA research network is committed to the IZA Guiding Principles of Research Integrity.

The Institute for the Study of Labor (IZA) in Bonn is a local and virtual international research center and a place of communication between science, politics and business. IZA is an independent nonprofit organization supported by Deutsche Post Foundation. The center is associated with the University of Bonn and offers a stimulating research environment through its international network, workshops and conferences, data service, project support, research visits and doctoral program. IZA engages in (i) original and internationally competitive research in all fields of labor economics, (ii) development of policy concepts, and (iii) dissemination of research results and concepts to the interested public.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

ABSTRACT

A “Healthy Immigrant Effect” or a “Sick Immigrant Effect”? Selection and Policies Matter*

An extensive body of research related to immigrants in a variety of countries has documented a “healthy immigrant effect” (HIE). When immigrants arrive in the host country they are healthier than comparable native populations, but their health status may deteriorate with additional years in the country. HIE is explained through the positive self-selection of the health of immigrants and the positive selection, screening and discrimination applied by the host countries. In this paper we study the health assimilation of immigrants within the context of selection and migration policies. Using SHARE data we are able to compare Israel and Europe that have fundamentally different migration policies. Israel has virtually unrestricted open gates for Jewish people around the world, who in turn have ideological rather than economic considerations to move. European countries have selective policies with regards to the health, education and wealth of migrants, who self-select themselves. Our hypothesis is that the *HIE, evidenced in many countries will not be found in Israel. Instead, immigrants to Israel may arrive with lower health than that of natives and improve their health with residence in the country, due to the universal health coverage and generous socio-economic support of the government.* Our results provide evidence that a) immigrants to Israel have compromised health and suffer from many health ailments upon arrival, making them less healthy than comparable natives. Their health does not improve for up to twenty years of living in Israel, after which they become similar to natives; b) immigrants to Europe have better health than natives upon arrival and up to eleven years since arrival in the host country, after which they are not significantly different than natives. Our results are important for policy.

JEL Classification: C22, J11, J12, J14, O12, O15, O52

Keywords: self-reported health status, immigration, Europe, Israel, older population, multilevel regression, SHARE

Corresponding author:

Shoshana Neuman
Department of Economics
Bar-Ilan University
52900 Ramat-Gan
Israel
E-mail: shoshana.neuman@biu.ac.il

* We are grateful for comments and critical questions by the Annual Migration Meeting participants in Dakar, Senegal, April 2015. We have also benefited from discussions with Klaus F. Zimmermann. Part of this work was carried out at IZA when S. Neuman and A. Constant were visiting together.

A “healthy immigrant effect” or a “sick immigrant effect”?

Selection and policies matter

Introduction

An extensive body of research related to immigrants’ health in a variety of countries (including Australia, Canada, France, Germany, Spain, Sweden, the United Kingdom, and the United States) has documented that when migrants first arrive in the host country they are healthier than comparable native populations; they may also be healthier than the population in their country of origin, as they are not a random sample of the left-behind. This phenomenon has been labeled as the “healthy immigrant effect” (HIE). In most countries the HIE dissipates after the first ten years since arrival.

Several explanations have been proposed to explicate the immigrants’ health advantage upon arrival. The theory of positive self-selection of immigrants posits that only the healthiest and most motivated individuals choose to move and undergo the traumatic experience of migration to a new country; less healthy and weaker individuals stay behind. ‘Survival of the fittest’ predicts that only the most healthy will be able to survive the tribulations and stress of the move and proceed with the struggle of acculturation in the new society and assimilation into a new labor market. On top of self-selection, in many countries, there is another level of selection imposed by the host country’s migration policies. Accordingly, host countries screen prospective immigrants for health and prefer the wealthier and more educated immigrants. As wealth and education are usually positively correlated with health, the outcome is that new immigrant arrivals have a health advantage over natives.

Another related explanation is that medical examinations by immigrant authorities in the host countries are conducted at the border to further screen out less healthy immigrants in order to reduce public health menaces (especially relating to communicable diseases) and lessen the burden to the healthcare services. Screening started in 1887 in the United States (Evans, 1987) and is still the norm in Canada, Australia and other countries (Chiswick, Lee and Miller, 2008). There is consensus in the literature that this two-sided positive selection is a major driving force behind the “healthy immigrant” phenomenon.

A third idea conjectures that diets and behaviors are healthier in many home countries, including better nutrition and dietary habits, more physical activities, close family and religious ties, and other socially protective factors that shield migrants and preserve good health. Finally, it may be that self-reported health conditions are under-reported by foreign-born populations upon arrival, either because they have not yet been diagnosed, or because of differences in perceptions about health. Discussion of the various theories that try to explain the HIE, can be found in: Jasso et al., 2004; McDonald and Kennedy, 2005; Antecol and Bedard, 2006; Biddle, Kennedy and McDonald, 2007; Chiswick, Lee and Miller, 2008; Neuman, 2014; and Constant et al., 2014.

It is also reported that the immigrants' health advantage declines with time spent in the host country and converges toward (or even falls below) the health status of native residents. Researchers are puzzled by the subsequent health deterioration and have offered several explanations, including "negative acculturation"; a natural process of regression towards the mean as immigrants assimilate and converge toward the health status of the local population (Jasso et al., 2004); low utilization of healthcare services; discrimination (stemming from xenophobia, racism and "otherness") (Grove and Zwi, 2006); poor working conditions and sorting of immigrants into more dangerous and strenuous occupations (Orrenius and Zavodny, 2009; Guintella and Mazzonna, 2004). For a review of factors driving the health deterioration and empirical testing, see Neuman, 2014; and Constant et al., 2014.

Data shortcomings limit the ability to disentangle the roles of the various factors driving the health advantage of immigrants upon arrival, as well as the health deterioration process after settling in the host country. The existing literature, however, has made some efforts to challenge the selectivity hypothesis. Employing the type of entry visa to Australia as a measure of the degree of selectivity of immigrants, Chiswick et al. (2008) distinguished between economic (self-selected) migrants and (non-selected) refugees. Entry health regulations may also be looser for refugees than for economic migrants, since helping those in distress is the main objective of the refugee policy, leading to very different host country selection levels. The authors find that immigrant health is indeed the poorest for refugees and best for economic migrants. Others show that positive health selection differed significantly across migrant groups and was related to differences in the socioeconomic profiles of immigrant streams (Akresh and Frank, 2008).

Focusing on the self-selection of immigrants in terms of education, which also leads to earnings' assimilation as well as it is correlated with health, Cohen and Haberfeld (2007) compared immigrants from the former Soviet Union (FSU) to Israel and to the United States, during the time period of 1968-1989. During this period of the Cold War, the United States opened its doors to FSU immigrants, granting them refugee visas. The authors suggest that FSU immigrants to the United States have significantly higher educational attainments and experience faster rates of earnings assimilation in the host country than their counterparts who immigrated to Israel. The authors present evidence that positive self-selection is the main reason for these differences.

Israel is a unique country to study in the sense that it does not impose any health screening on people of Jewish origin who want to migrate to the country. Israel also has a compulsory and universal healthcare system that provides all its residents with medical services. In fact, all Jewish migrants receive medical care and health insurance upon arrival. Moreover, Israel has actively supported the transportation of migrants and airlifted many of them.

In this study we propose to test the HIE in the context of selection and migration policies. Taking advantage of the SHARE data we examine the self-reported health

(SRH) status of immigrants and natives and compare their outcomes between Israel and sixteen European countries.

In the next section some stylized facts about immigration to Israel are presented, followed by a brief description of the SHARE data base used for the comparative study. A comparison of the health status of immigrants to Israel, versus immigrants in European countries is then presented. The variable we study is the self-reported health scores (ranging from 1 (poor) to 5 (excellent)). Multivariate regression analysis is then employed in order to control for socio-economic background variables such as age, education, wealth, marital status, number of children; for personal medical records such as diseases diagnosed with, medical symptoms, drug use, medical consultation, hospitalization, quality of eyesight, health risk factors, mobility limitations, cognitive skills; and for country-level aggregate per-capita GDP (in log) in the European analysis. After we present and discuss our results, we conclude the study.

Immigration to Israel: Some stylized facts

Israel has always encouraged and assisted the immigration and return migration of Jewish people; it has also devoted time and money to the absorption process¹ of these immigrants as part of a pro-immigration ideology and policy. Israel's *raison d'être* has been and remains the in-gathering and retention of Jewish immigrants and the forging of these diverse elements into a unified nation. It is a country established for and administrated by immigrants from diverse countries and origins. Israel has a unique immigration policy that opens the gates of the country to everybody who is Jewish or has a Jewish ancestry. The state is legally committed to the absorption of any applicant of Jewish origin. The idea behind the "Law of Return", which was passed in 1950, is that Israel should become home to all Jews around the globe, who wish to return to their homeland. The Law states that:

"Each and every Jew has the right to immigrate to Israel.. He will be given an Immigration Certificate by the Minister of the Interior.. unless he is: acting against the Jewish people; might endanger the health of the public or the security of the country; or has a criminal record which might endanger the safety of the public".

In 1970 the "Law of Return" was extended and the right to immigrate covered also the children, grandchildren, spouse, and spouses of children and grandchildren of a person who is Jewish. A generous absorption policy and good public health and education systems help all immigrants to settle and adjust to the Israeli labor market and society. Many immigrants may also have family who arrived in previous waves of immigration in the country, who are able to help them settle and assimilate. Non-Jews, too, may immigrate, but in accord with international practice, this right is restricted (Neuman, 2005).

¹ Absorption is the word denoting a profound and lasting integration of all Jewish people in Israel.

Indeed, Israel witnessed major waves of immigration. During the first three years of its statehood (from May 15, 1948 to the end of 1951) mass immigration of 711,000 people supplemented a population of 630,000; this led to an *annual* population growth-rate of about 24 percent. It is probably the only case in history in which the receiving population was smaller than the immigration influx. Immigration did not stop after 1952, but the numbers dropped to several thousands a year.²

During the last decade of the 20th century, Israel witnessed another impressive influx of immigrants from the former Soviet Union (FSU). Between 1990 and 1998, with the fall of the Iron Curtain, the Israeli population of 4.56 million was enriched by 879,486 immigrants; a total population growth-rate of 19.3 percent. In addition, in 1991 under the “Operation Solomon”,³ about 15,000 Jews were airlifted from Ethiopia in one single day and settled in Israel (Neuman, 2005).

The Israeli case is also unusual in that its origins are essentially ideological, triggered by the emergence of the Zionist Movement in Eastern and Central Europe in the last quarter of the 19th century. Immigration to the Land of Israel (Palestine) started in 1882, long before statehood and the establishment of the State of Israel in 1948. Between 1882 and 1947, in successive waves of immigration, some 543,000 Jews immigrated to Palestine, joining the 24,000 who lived there (Neuman, 2005). While other major international migration movements were largely economic in nature – the push of poverty or the pull of expected better standards of living – or have been in response to persecution, and while all these factors have played some role in immigration to Israel, the major drive was ideological. The early immigrants were motivated by a commitment to resettle and rebuild the land of Israel, neglected by centuries of Jewish dispersal around the world.⁴ It follows that the self-selection of immigrants in terms of health and socio-economic dimensions is rather negligible.

Israel’s very generous immigration policy and the absence of any type of health screening and limitations on one side, coupled with ideological rather than economic incentives for immigration on the other side, challenge the hypothesis of the “healthy immigrant effect”, which is believed to stem from selectivity and economic considerations for immigration. After the fall of the iron curtain, many Russian Jews with weak and ailing health may have moved to Israel in hopes of improving their

² Population growth-rates due to immigration varied during the period of the 1950s to the 1990s: from 5 percent in the 1950s and 1960s, they declined to 2 percent in the 1970s and 1980s, and then increased a little bit to 2.5 percent in the 1990s (Neuman, 2005).

³ Operation Solomon was a covert operation to airlift Ethiopian Jews to Israel due to the dangerous situation in Ethiopia.

⁴ While Jewish immigration and the establishment of the State of Israel created the opportunity to achieve the Zionist Movement's goals, it also intensified the historical Jewish-Arab conflict. As the Jewish community grew, conflict with the Arab population accelerated. When independence was declared, the new state was already engaged in the first of a series of wars with neighboring Arab countries. The War of Independence established the borders of the new state and led to the departure of a significant portion of the Arab population. As for the end of 2013, the Israeli population of 8,134.5 thousand is composed of a majority of 6,104.5 thousand Jews (75 percent of the total population), 1,420.3 thousand Moslem Arabs (17.5 percent), 160.9 thousand Christians (2.0 percent), 133.4 Druze (1.6 percent), and 315.4 thousand (3.9 percent) declare to have no religion (Israel, Central Bureau of Statistics, 2014).

health. Moreover, it is safe to claim that the generosity of the Israeli immigration policy and system could even lead to the abuse of the system. For example, elder parents or sick family members are sent to Israel to receive better health treatment and free the family from taking care of the elderly and sick. Israel has also experienced mass migration from tuberculosis-endemic and high HIV-prevalent countries from Africa.

Besides studies in social sciences, studies in medical journals and epidemiology confirm that immigrants from the former Soviet Union had reported higher rates of diseases and sub-optimal health (Baron-Epel and Kaplan, 2001), significantly higher BMI, lower reported “good” health status, higher incidence of heart attack and other chronic diseases (Manoff et al., 2011).⁵

In this sense, we could expect negative self-selection of immigrants to Israel with respect to health. All in all, we could even anticipate, a “sick immigrant effect”, i.e., lower health levels of immigrants upon arrival compared to natives, as opposed to what is experienced in most immigrant-absorbing countries. A comparison of the health of migrants going to Israel with the health of migrants going to European countries can therefore shed light on the role of selectivity behind the health status of new immigrants.

The data base

To conduct our comparative study between Israel and other European countries with respect to the SRH status of immigrants and natives, we use the Survey of Health Aging and Retirement Europe (SHARE).⁶ SHARE provides comparable cross-national individual data for many countries in Europe. It is nationally representative of non-institutionalized individuals in every country, who are 50 years old and over and their partners. This age group becomes more and more significant in Europe, given that the share of the elder population in Europe increases constantly. SHARE has rich information on the economic and social conditions of individuals as well as their health and well-being and contains immigrants (persons living in a country where they were not born) and natives.

Within one decade alone (2002-2012) the number of individuals aged 50 and over increased by about 30 percent, from 164,000 to 190,000 (Eurostat, 2013). The share of immigrants in Europe rises as well. The United Nations (2013) report that in 2013 Europe hosted 72 million migrants, constituting 31 percent of the world migrants’ stock, with almost one third of them (30.6 percent) above the age of 50. In many European

⁵ Interestingly, these studies do not show excess utilization in health services (Baron-Epel and Kaplan, 2001; Neuman, 2014) nor in emergency room visits or hospitalization (Davidovitch et al., 2013). The risk of tuberculosis for Israeli natives has also remained very low while by addressing the cultural needs of these immigrants has effectively controlled the disease among them (Chemtob et al., 2003).

⁶ For a comprehensive description of the SHARE dataset see: Garcia Muñoz, Neuman and Neuman, (2014) and Constant et al., (2014).

countries, more than 10 percent of the populations are foreign-born (immigrants) (Constant et al., 2014). Moreover, as health starts deteriorating around the age of 50, studying the health of older natives and immigrants is essential and of great socio-political importance.

SHARE is a balanced representation of the various regions in Europe, ranging from the Scandinavian countries (Denmark and Sweden), to Central Europe (Austria, France, Germany, Switzerland, Belgium, the Czech Republic and the Netherlands) and Eastern Europe (Poland, Hungary, the Slovak Republic and Estonia), to the South (Spain, Italy and Portugal). Nineteen countries participated in SHARE, but not all countries were part of each wave. Israel was included only in the 2nd wave of SHARE. In addition, the timing of data collection differs among countries.

Four waves of SHARE, conducted in 2004-2005, 2006-2007, 2008-2009 and 2011-2012, are now available. The 3rd wave (SHARELIFE) focuses on the life histories of individuals. SHARE is an ideal dataset for the study of the health of individuals. It has a plethora of information on health, socio-economic status and social and family networks, and contains more than 86,000 individuals. Besides a battery of questions on the medical conditions and hospitalizations of individuals, SHARE has information on the self-reported health (SRH) status of the individual. Respondents report their health-status answering the question “On a scale from 1 to 5, where 1 describes the worst imaginable condition and 5 the best imaginable condition, how do you rate your health in general?” This question was designed to make comparisons of populations’ health among countries comparable.⁷

Our sample and variables and measures

Our sample consists of Israel and 16 European countries (Austria, Germany, Sweden, The Netherlands, Spain, Italy, France, Denmark, Switzerland, Belgium, The Czech Republic, Poland, Hungary, Portugal, Slovenia, and Estonia), and complete records on both immigrants and natives and both men and women. After we account for missing values, the Israeli sample contains 1,111 individuals and the European sample contains 59,079 individuals (both immigrants and natives). In the Israeli sample, native men are about 46 percent; immigrant men are 49 percent. In the European sample, men are about 46 percent in both the native and immigrant sample.

Our dependent variable is the subjective metric of SRH. SRH is now commonly used as a measure of health, based on the finding that individuals are the best evaluators of their health (Sen, 2002). Numerous studies have demonstrated that SRH is a good proxy for

⁷ The first wave only asked participants about their SAHS using first the WHO version that rates SAHS from “very good” to “very bad” and then the US version that rates SAHS from “excellent” to “poor”. Juerges et al. (2008) find that 69 percent of respondents provided literally concordant answers and only about one-third provided relatively concordant answers. Moreover, the “two versions were strongly correlated, had similar associations with demographics and health indicators, and showed a similar pattern of international variation” (p. 773). In this paper we are using the US version, which was the only one used in subsequent waves.

health status measurement, and is also highly correlated with mortality and morbidity (see Garcia-Muñoz, Neuman and Neuman, 2014; and also Jylha, 2009 – for a comprehensive review). A more recent medical study underscores the importance of assessing SRH and treating it like other markers because - for apparently healthy individuals of both genders - there is an association between inflammation-sensitive biomarker levels and SRH categories (Leshem-Rubinow et al., 2015).⁸

We group our independent variables under the following labeling. Demographics (age, gender, marital status, children), human capital (education), household income, personal medical information (use of prescription drugs and health facilities), diagnosed health conditions (heart problem, diabetes, cancer, etc.), smoking, obesity, mobility and cognitive skills, and macroeconomic information (logarithm of GDP per capita for the host countries). For the immigrant sample we include years-since-migration (YSM) as a categorical variable. Table A1 in the appendix provides a detailed description of all research variables employed.

Data utilization and strategy

We utilize the second wave of SHARE in 2006-2007, because it included Israel. For a comparable comparison with Israel, we will contrast the data for Israel with equivalent data for European countries (excluding Israel) that also participated in the 2nd wave. Findings for European countries based on the most recent 4th wave (2011-2012), and also for a pooled sample of the 2nd and 4th waves, will also be presented and juxtaposed to findings for the Israeli case.

We proceed with a cross-country comparison of distributions of raw SRH levels and of descriptive statistics of health conditions to gain a first approximation of Israeli-European disparities. The next step is the estimation of SRH equations that include a battery of health, behavioral, demographic, and socio-economic characteristics as well as immigration status and years-since-migration.

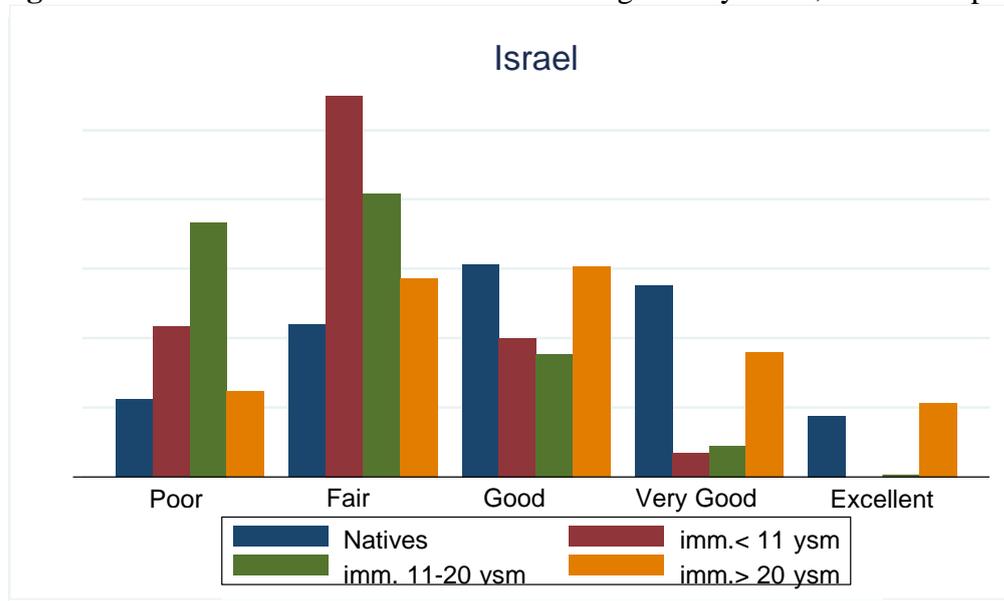
Distributions of SRH levels – Israel versus European countries

Figure 1 presents the distribution of SRH levels for immigrants and natives within the Israeli sample. As this histogram clearly demonstrates, a “healthy immigrant effect” is not evident. On the contrary, we notice a “*sick immigrant effect*”, meaning that upon arrival or within the first 10 years since arrival in Israel, immigrants report a much poorer health status compared to natives. Among those reporting ‘poor’ or ‘fair’ health, 77 percent are immigrants while only 33 percent of natives are in these categories. Only 20 percent of immigrants report ‘good’ health, versus 31 percent of natives. Under ‘very

⁸ Schneider et al. (2012), using German data showed that socioeconomic and health-related variables have different impacts on self-assessed health and cautioned to handle heterogeneity with care.

good' health we find only 3 percent of immigrants while we find 28 percent of natives. Interestingly, not a single one newly arrived immigrant perceives her/his health status as excellent; natives in this category are 9 percent.

Figure 1 SRH distributions of natives and immigrants by YSM; Israeli sample

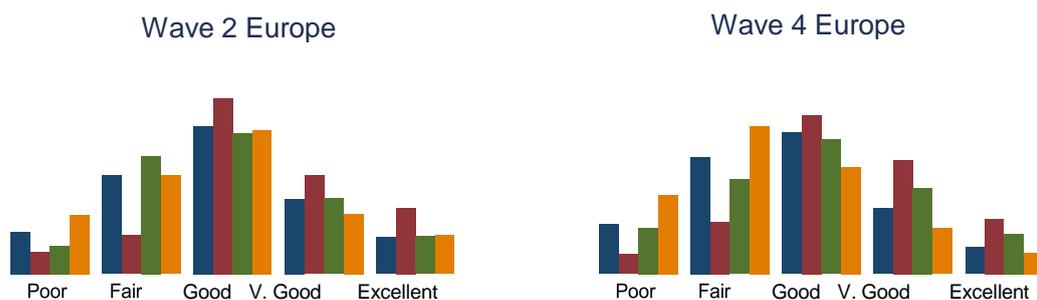


Notes Authors' calculations based on a sample of 1,460 observations included in the 2nd wave of SHARE, the only wave that included Israel. There are 945 natives and 515 immigrants (11.6 percent have < 11 YSM; 64.7 percent have 11-20 YSM; 23.7 percent have > 21 YSM).

Immigrants' health remains inferior to natives' health also after more than a decade since migration. We see many more immigrants with low levels of health; only 4.5 percent report 'very good' health (compared to 28 percent of natives) and only one single immigrant (out of 333) reports 'excellent' health. There seems to be improvement in the health status of immigrants after more than two decades of living in Israel; 10 percent even report 'excellent' health.

Next, we contrast the SRH distribution within the Israeli sample with parallel SRH distributions for the sample of European countries. We utilize three alternative samples: the sample of the 2nd wave (in which Israel participated) with the exclusion of Israel; the most recent wave (4th); and a pooled sample of the 2nd and 4th waves (2006-2007, 2011-2012) excluding repeated observations and Israel.

Figure 2 SRH distributions of natives and immigrants by YSM; European sample

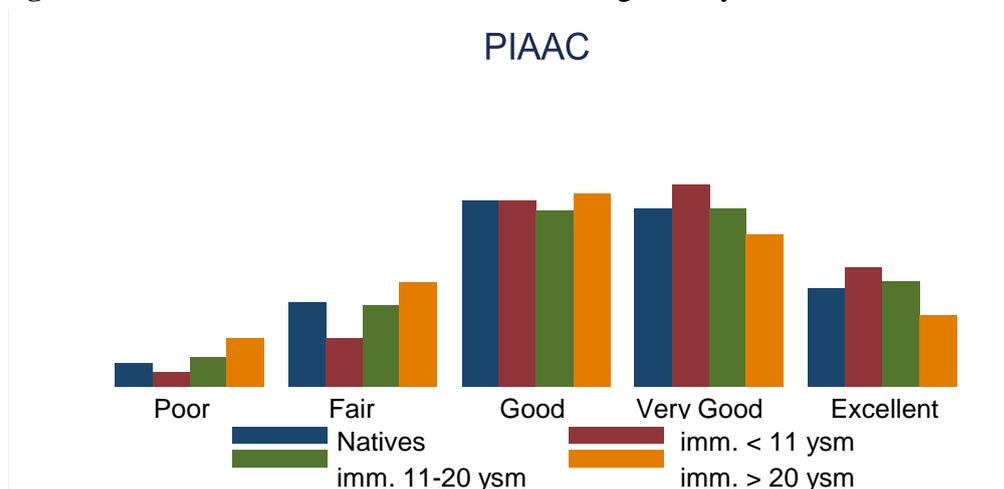


Notes Authors' calculations based on: a) the 2nd wave sample with 30,786 natives and 965 immigrants (7.6 percent with < 11 YSM; 8.8 percent with 11-20 YSM; 83.6 percent with 21+ YSM), b) the 4th wave sample with 50,689 natives and 3,955 immigrants (4.1 percent with < 11 YSM; 5.0 percent with 11-20 YSM; 90.9 percent with 21+ YSM), c) pooled 2nd and 4th waves with 64,856 natives and 4,469 immigrants (4.7 percent with < 11 YSM; 5.6 percent with 11-20 YSM; 89.7 percent with 21+ YSM). The pooled sample is smaller than the sum of the two samples, due to the exclusion of repeated observations.

As it is obvious from Figure 2, *the health status of newly arrived immigrants in European countries is much better than that of natives*. A smaller percentage of immigrants report 'poor' or 'fair' health, while a larger percentage report 'good', 'very good' and 'excellent' health. For instance, in the pooled sample, only 15 percent of the newly arrived immigrants report 'poor' or 'fair' health, compared to 40 percent of natives. Many more newly arrived immigrants than natives report 'good' health (shares of 43 and 35 percent, respectively), 'very good' health (shares of 27 and 17 percent, respectively) and 'excellent' health (respective shares of 15 and 7 percent). However, the health status of immigrants deteriorates over time after migration. These findings are in line with numerous other studies on immigrants' health by years-since-migration (see Constant et al., 2014, for a literature review and a comprehensive study of immigrants' health in European countries).

To extend and complement the SHARE results, which are restricted to individuals ages 50 and older, we derived SRH distributions from the Programme for the International Assessment of Adult Competencies (PIAAC) dataset, which was conducted in 2011/12. PIAAC relates to 22 OECD countries and includes individuals aged 16-65. Israeli data are not available in PIAAC. The results are similar for this extended and more general age spectrum (and a slightly different country mix). Immigrants who have less than a decade of YSM are healthier than comparable native residents. As the time living in the host country lengthens, the reported health status of immigrants deteriorates; after more than two decades, their health status is inferior to that of the local population. Unfortunately, the public web of the 1st wave of PIAAC in 2011-2012 does not include data for Israel. The Israeli case will be considered when Israeli data will be included in one of the next waves.

Figure 3 SRH distributions of natives and immigrants by YSM; PIAAC/OECD



Notes Authors' calculation on a sample of 126,466 natives and 7,820 immigrants (45.0 percent with < 11 YSM; 25.8 percent with 11-20 YSM; 29.2 percent with 21+ YSM).

Summary Statistics of relevant characteristics – Israel versus European countries

Another indication of native-immigrant health disparities can be obtained from an examination of personal medical information. Table 1 presents descriptive statistics for natives and immigrants and for both combined together within the Israeli sample. Starting with the mean of SRH, we see that immigrants on average are almost one category below natives (2.2 versus 3.07). A focus on comparative objective health conditions presents very clear and sharp evidence of the inferior SRH of immigrants vis-à-vis every health factor: they have higher prospects to be diagnosed with major diseases; consume more drugs; have more medical symptoms and more mobility limitations; need more physician consultation and hospitalization; have lower cognitive skills; and suffer more from eyesight problems.

Table 1 Summary statistics, natives and immigrants in Israel

Characteristics	Whole sample Means (st.dev)	Natives Means (st.dev)	Immigrants Means (st.dev)
SRH (range of 1-5)	2.78 (1.14)	3.07 (1.09)	2.22 (1.01)
Years since migration (YSM) (%)			
Up to 10 years since migration	-	-	11.35
11-to-20 years since migration	-	-	62.17
21 and over years since migration	-	-	26.48
Arrival years between			
1900-1950	-	-	8.02
1951-1960	-	-	8.59
1961-1970	-	-	5.48
1971-1980	-	-	3.10
1981-1990	-	-	17.95
1991-2000	-	-	50.23
2000-2010	-	-	6.62
Socio-economics and demographics			
Male (%)	47.24	46.34	48.94
Age in years (%)			
50-60	34.39	44.57	15.13
61-70	36.69	33.44	42.84
71-80	21.28	18.65	26.27
81+	7.64	3.34	15.76
Marital status (%)			
Married	82.95	81.82	85.07
Widowed	8.52	8.77	8.05
Single/divorced/separated	8.53	9.41	6.682
Number of children	3.10 (2.11)	3.60 (2.29)	2.14 (1.24)
Household income centile (1-10)	5.87 (2.95)	6.22 (2.98)	5.21 (2.78)
Education (more than 12 years)	54.04	47.85	65.72

Characteristics	Whole sample Means (st.dev)	Natives Means (st.dev)	Immigrants Means (st.dev)
Personal Medical variables			
Health conditions; diagnosed with..(%)			
Heart problems	14.32	9.94	22.61
Hypertension	41.36	35.41	52.62
Cerebral vascular disease	4.15	2.08	8.06
Diabetes	24.10	22.65	26.83
Chronic lung disease	4.55	2.14	9.09
Arthritis	14.39	11.02	20.76
Osteoporosis	11.75	10.29	14.51
Cancer	5.49	3.58	9.10
Number of medical symptoms	1.73 (2.08)	1.27 (1.59)	2.59 (2.56)
Drug use (number of drugs)	2.10 (1.94)	1.69 (1.59)	2.86 (2.28)
Medical consultation (annual-number)	9.75 (13.68)	8.30 (12.03)	12.48 (16.00)
Hospitalization (%)	13.89	12.43	16.66
Quality of eyesight (range of 1-5)	3.32 (0.96)	3.57 (0.85)	2.83 (0.97)
Alcohol consumption (>= 5 days/week)	2.82	2.23	3.93
Smokes at present time (%)	19.18	22.11	13.62
Obesity (BMI > 30)	23.79	19.22	32.44
IADL (range of 0-5)	0.25 (0.69)	0.16 (0.52)	0.43 (0.91)
Mobility (range of 0-4)	0.54 (0.97)	0.39 (0.79)	0.84 (1.19)
Number of remembered animals	19.03 (7.35)	21.30 (7.15)	14.76 (5.62)
Number of observations	1,100		

Source SHARE data, 2nd wave (2005-2006)

Other notable differences pertain to obesity, alcohol consumption and smoking. While about 32 percent of immigrants are obese, only 19 percent of natives are. Immigrants also score higher in alcohol consumption. However, a much smaller percentage of immigrants (14 percent) smokes than natives (22 percent). The health profile of immigrants to Israel is in congruence with previous studies that show that former USSR immigrants have significantly higher BMI, lower reported “good” health status, higher incidence of heart attack and other chronic diseases (Manoff et al., 2011).

Regarding demographics, immigrants have a larger percentage of men, and of being married. They also have an older age structure (the majority is in the 61-70 age group). On the other hand, they have fewer children and a lower household income. Interestingly, about 66 percent of immigrants report having more than 12 years of education, versus about only 48 percent of natives. Lastly, the majority of immigrants have been in Israel for more than 11 years; 50 percent arrived in the 1990s.

Parallel summary statistics on these characteristics for the European sample are reported in Table 2. Here, we have a very different picture. The SRH levels of immigrants are slightly higher than those of natives. Overall, the native-immigrant differences seem to indicate an immigrant health advantage, although the results are somewhat mixed. Regarding being diagnosed with major diseases, number of medical symptoms, prescription drug use, hospitalization, eyesight, and mobility immigrants are in better

shape than natives. In addition, a smaller percentage of immigrants is obese (17 percent versus 20 of natives) and consumes alcohol (18 versus 25). However, in some other few aspects immigrants report an inferior health status as is shown by the annual number of medical consultation and their cognitive skills. A larger percentage of immigrants smokes (24 percent) than natives (19 percent). Differences in economic integration, host language proficiency, and social barriers are likely factors why immigrants respond to the health system differently than natives.

Table 2 Summary statistics, natives and immigrants in Europe

Characteristics	Whole sample Means (st.dev)	Natives Means (st.dev)	Immigrants Means (st.dev)
SRH (range of 1-5)	2.72 (1.05)	2.72 (1.05)	2.79 (1.08)
Years since migration (YSM) (%)			
Up to 10 years since migration	-	-	10.59
11 –to- 20 years since migration	-	-	11.51
21 and over years since migration	-	-	77.90
Arrival years between			
1900-1950	-	-	17.26
1951-1960	-	-	13.57
1961-1970	-	-	21.40
1971-1980	-	-	17.02
1981-1990	-	-	10.29
1991-2000	-	-	11.99
2000-2010	-	-	8.47
Country Macros			
Log. per capita GDP (host country)	10.46 (0.42)	10.46 (0.42)	10.46 (0.42)
Socio-economics and demographics			
Male (%)	46.03	46.03	45.96
Age in years (%)			
50-60	36.52	35.28	53.76
61-70	29.50	29.72	22.12
71-80	21.88	22.08	15.33
81+	12.10	12.20	8.79
Marital status (%)			
Married	66.54	66.53	66.62
Widowed	17.49	17.64	12.66
Single/divorced/separated	15.97	15.83	20.72
Number of children	2.10 (1.42)	2.10 (1.42)	2.24 (1.55)
Household income centile (1-10)	5.36 (2.94)	5.37 (2.94)	5.09 (2.98)
Education (more than 12 years) (in %)	29.25	29.21	30.55
Personal Medical variables			
Health conditions; diagnosed with..(%)			
Heart problems	12.27	12.31	10.90
Hypertension	37.50	37.71	30.43
Cerebral vascular disease	3.36	3.39	2.26
Diabetes	12.87	12.83	13.97
Chronic lung disease	6.54	6.60	4.40
Arthritis	24.49	24.56	22.43

Characteristics	Whole sample Means (st.dev)	Natives Means (st.dev)	Immigrants Means (st.dev)
Osteoporosis	2.58	2.59	2.04
Cancer	4.97	4.97	4.99
Number of medical symptoms	1.71 (1.78)	1.71 (1.78)	1.60 (1.69)
Drug use (number of drugs)	1.55 (1.65)	1.56 (1.66)	1.37 (1.60)
Medical consultation (annual-number)	7.41 (9.91)	7.42 (9.86)	7.60 (12.04)
Hospitalization (%)	15.79	15.89	12.27
Quality of eyesight (range of 1-5)	3.22 (1.00)	3.23 (1.00)	3.29 (0.97)
Alcohol consumption (≥ 5 days/week)	25.05	25.26	18.17
Smokes at present time (%)	19.28	19.15	23.70
Obesity (BMI $>$ 30)	19.60	19.68	17.10
IADL (range of 0-5)	0.19 (0.70)	0.19 (0.70)	0.17 (0.66)
Mobility (range of 0-4)	0.58 (0.97)	0.58 (0.98)	0.51 (0.89)
Number of remembered animals	18.25 (7.80)	18.27 (7.82)	17.13 (6.78)
Country shares in the sample (%)			
Austria	2.16	2.09	4.23
Germany	22.62	22.79	16.75
Sweden	2.33	2.37	0.73
The Netherlands	4.09	4.11	3.41
Spain	11.10	11.12	10.70
Italy	17.64	18.02	5.05
France	15.57	15.03	33.36
Denmark	1.45	1.48	0.40
Switzerland	1.95	1.77	7.65
Belgium	2.83	2.75	5.37
The Czech Republic	3.33	3.33	3.60
Poland	9.83	10.06	2.05
Hungary	2.18	2.20	1.56
Portugal	2.19	2.22	1.27
Slovenia	0.45	0.41	1.68
Estonia	0.27	0.22	2.17
Number of observations	59,079		

Source SHARE data, 2nd wave (2005-2006). The data include 16 European countries

On average, raw demographics in Table 2 show that immigrants and natives in Europe are very similar vis-à-vis their socio-economic status. There are some differences in the age categories, in which the majority of immigrants is in the 50 to 60 age group and in years of education, with a higher percentage of immigrants having more than 12 years.⁹

We proceed with multivariate regression analysis to arrive at the net effects of the immigration status (YSM) on SRH. We control for all health conditions, behavior, and socio-economic status.

⁹ Based on the 2004 wave of SHARE and eleven European countries, and studying the differential health system usage by immigrants and natives, Solé-Auró et al. (2012) find evidence of higher healthcare usage by immigrants, as a whole.

SRH estimations: Israel versus European countries

The European sample contains 16 countries. Because individuals are clustered within countries, we use random-effect multilevel analysis for the European regressions, which is the most appropriate technique to analyze within-and between-country variation and also allows the inclusion of macro-country variables. A careful analysis is conducted to provide answers to our core question: *are native-immigrant health disparities different in Israel than in European countries*. In particular, we test *our core hypothesis that the “healthy immigrant effect”, which is evidenced in many countries and presented in numerous studies, will not be found in Israel*.

Our dependent variable is the respondent’s subjective assessment of her/his health-status (SRH), ranging from 1 (very poor) to 5 (excellent). The explanatory variables include years-since-migration dummies (for migrant respondents), as well as a battery of health, behavioral, demographic, and socio-economic variables. We use a non-linear form of YSM because additional years of residence in the host country may have a differential effect on health. YSM is thus a categorical variable with three levels: (i) less than 10 YSM; (ii) 11-20 YSM; (iii) more than 20 YSM. Natives are the reference group.

In the regression of the European sample we also include the country-level per-capita GDP (log), in order to control for the host country development level (see Appendix Table A1 for variable definitions). The samples are: SHARE 2nd wave for Israel and SHARE pooled sample of 2nd and 4th waves for Europe. For the Israeli sample we use Ordinary Least Squared (OLS). For the European sample we use random-effects multilevel regression analysis, because individuals are clustered within countries.

Regression results in Table 3 confirm a “sick immigrant effect” for Israel and a “healthy immigrant effect” in Europe. Newly arrived immigrants are significantly less healthy than Israeli natives, while they are significantly healthier than natives in European countries. For Israel, the lower health status of immigrants upon arrival appears to persist and remains significant for up to 20 YSM, after which time their health status is no different than that of the natives.

The persistence of their lower health in Israel in spite of having immediate access to health insurance and governmental support for schooling, housing, language, etc. could be related to the stress of acculturation,¹⁰ acclimatization and fitting in as well as their lower socioeconomic status. Moreover, immigrants, especially older ones, tend to preserve their cooking and eating habits from the home country. Immigrants from the former USSR countries, for example, are known to consume heavy food, rich in cholesterol and saturated fat. Lack of their traditional foods in the host country, may prompt them to consume more convenience food high in fat and sugar. Immigrants from Africa may also suffer from nutritional inadequacies if they follow the poor diets of their

¹⁰ The debilitating effects of the stress of acculturation among immigrants in Israel from the former USSR (compared to natives and other Jews in Russia who did not migrate) are evident in the Ritsner and Ponizovsky (1999) study. These immigrants suffered by psychological distress and had psychosomatic manifestations.

origin.

In contrast, immigrants in Europe who arrive with better health than natives lose this advantage within the first decade of YSM. Their health status is no different than that of natives for 11 to 20 YSM and becomes positive and significant again after more than 20 YSM, albeit it is a small number close to zero. This result is in line with other studies Popovic-Lipovac and Strasser (2015) explain the deterioration of the immigrant SRH through a busier lifestyle in the host country, coupled with lack of social relations and safety nets.

Table 3 Determinants of SRH, Israel versus Europe

Variables	Israel	Europe
(i) Immigrant status		
Up to 10 years since migration	-0.310*** (-2.584)	0.184*** (3.043)
11 to 20 years since migration	-0.326*** (-3.701)	-0.044 (-0.779)
21 or more years since migration	-0.038 (-0.365)	0.024* (1.708)
Natives	Ref	Ref
(ii) Country variables		
Log of country GDP per capita	-	0.348*** (6.591)
(iii) Demographics		
Age (years)		
50-60	Ref.	Ref.
61-70	-0.005 (-0.075)	-0.022*** (-2.668)
71-80	-0.080 (-1.034)	-0.054*** (-5.564)
Over 80	0.091 (0.792)	-0.044*** (-3.226)
Male	-0.093 (-1.636)	-0.078*** (-11.106)
Marital status		
Single/Divorced/Separated	Ref.	Ref.
Married	-0.029 (-0.308)	-.036*** (-3.707)
Widowed	0.004 (0.031)	0.029** (2.316)
Number of children	0.066*** (4.872)	0.007*** (2.684)
iv) Socio-economic variables		
Household income centile	0.004 (0.374)	0.021*** (16.790)
Education (more than 12 years)	0.135*** (2.308)	0.109*** (14.040)
(v) Personal medical variables		
Drug use	-0.055*** (-2.692)	-0.075*** (-24.407)

Variables	Israel	Europe
Health conditions-diagnosed with		
Heartproblems	-0.042 (-0.542)	-0.094*** (-8.936)
Hypertension	-0.100* (-1.713)	-0.055*** (-7.240)
Cerebral vascular disease	-0.180* (-1.721)	-0.124*** (-7.323)
Diabetes	-0.243*** (-3.883)	-0.113*** (-10.602)
Chronic lung disease	-0.005 (-0.041)	-0.100*** (-7.322)
Arthritis	-0.115 (-1.637)	-0.166*** (-19.616)
Osteoporosis	-0.003 (-0.044)	-0.110*** (-4.951)
Cancer	-0.194* (-1.856)	-0.318*** (-22.048)
Number of medical symptoms	-0.057*** (-3.237)	-0.099*** (-38.465)
Medical consultation (number)	-0.007*** (-3.500)	-0.011*** (-29.757)
Hospitalization (dummy)	-0.237*** (-3.080)	-0.167*** (-17.577)
Quality of eyesight (range of 1-5)	0.258*** (7.815)	0.159*** (43.007)
Alcohol consumption	0.058 (0.332)	0.042*** (5.029)
Smokes at present time	-0.144* (-1.948)	-0.120*** (-14.049)
Obesity (BMI>30)	-0.213*** (-3.663)	-0.069*** (-8.321)
IADL	-0.055 (-1.313)	0.003 (0.555)
Mobility	-0.118*** (-3.274)	-0.178*** (-37.152)
Cognitive skills: remembered animals	0.003 (0.618)	0.010*** (21.044)
Year of interview dummies	-	Yes
Sample Size	1,100	59,079
AIC	2673	138202
BIC	2833	138553

Note Sample sizes are somewhat smaller than those used for the SRH distributions, due to missing values of part of the explanatory variables; the model is estimated with multilevel analysis
Significance levels *** P\0.01; ** P\0.05; * P\0.1. Standard errors in parentheses

As expected, a higher GDP per capita in the host country is associated with a higher SRH (in Europe). In the European sample we find a strong aging effect as well, even after we control for all possible health characteristics. Men have lower SRH than women and married individuals have lower SRH than the single/divorced/separated; widows have higher SRH than the reference group. All these characteristics however, are not significantly different than zero in the Israeli sample. In both samples, the higher number of children is associated with higher SRH and so is more years of education.

Another notable difference between the samples has to do with the household income, which has a positive and significant effect on SRH in the European sample, but has no effect for Israel. Turning to the medical variables, we see that those who use prescription drugs have a significantly lower SRH. Similarly, those with a higher number of medical symptoms and medical consultation as well as more hospitalizations have a lower SRH.

When it goes to the diagnosed medical conditions of individuals, there are differences between the two samples. Only diabetes, hypertension and cancer significantly lower SRH in the Israeli sample. In the European sample, all health conditions cause lower SRH. While eyesight quality increases SRH in both samples, smoking, obesity, and reduced mobility decrease SRH. Alcohol consumption has a detrimental effect on SRH for the European sample only, but no effect in the Israeli sample. Finally, good cognitive skills increase SRH in the European sample, but they have no effect in the Israeli sample.

Highlights and conclusion

This paper studies the self-reported health status of immigrants and natives comparing sixteen European countries to Israel by employing the SHARE data base that provides comparable data. Most of the previous literature finds a “healthy immigrant effect” (HIE), meaning that immigrants have a higher health status than natives when they first arrive in the host country and during their first years since migration (YSM), but their health deteriorates with additional years of residence in the host country and approaches that of natives. This phenomenon is attributed to the positive health self-selection of migrants, the additional hurdles they have to overcome during their migration journey, in which only the healthiest can survive and to the health screening or positive selection that the host countries apply.

However, Israel is a country build on ideology and encourages the migration of Jews from all around the world to the homeland without imposing any health restrictions. Israel perceives this as a return home and not as migration. Moreover, Israel has assisted Jews in undertaking the migration trip and provides immediate help and health insurance to all upon arrival. We hypothesize that the healthy immigrant effect may not hold in the Israeli case. To test this hypothesis we are employing the 2nd wave of the SHARE data in 2006, which is the only wave that includes Israel. From Europe, we include sixteen countries and compare the SRH health of immigrants and natives. All individuals in all countries in SHARE were given the same questionnaire, which provides a smooth comparison.

Both raw statistics and regression results confirm that there are indeed differences in the health status of immigrants when compared to natives between Israel and the European countries. On average, immigrants to Israel are in the health status “fair” while natives are in the health status “good” (a category above). Compared to natives, immigrants to Israel have also been diagnosed with major diseases, have more medical symptoms and

more mobility limitations, use more prescription drugs, have a higher number of hospitalizations, have lower cognitive skills, and suffer more from eyesight problems. A higher percentage of them is in the obese category. Multivariate analysis confirms that immigrants to Israel fit into a “sick immigrant effect”, meaning that they arrive with a lower health status than natives and this status persists for several decades even after we control for all socioeconomic, demographic and medical characteristics. Our results are validated by previous studies in the medical and epidemiological literature.

Comparable analysis using the European sample reveals a different picture. Overall, immigrants to Europe are in a better health shape than natives. First, raw statistics show that they are in the same category of SRH (“good”) as natives, albeit slightly higher. This is supported by their profile vis-à-vis their diagnosed diseases, medical symptoms, drug use and hospitalization. What stands out is that fewer immigrants than natives are obese, and fewer consume alcohol. However, more of them smoke. While they have a younger age structure, they have similar household incomes. Second, controlling for all other characteristics, immigrants in Europe exhibit a “healthy immigrant effect”. Up to their first ten YSM, they report a significantly healthier status than natives. This health advantage disappears with additional years of living in the host country and they become indistinguishable from natives.

Our results contribute to the literature on health assimilation between immigrants and natives and selection, by providing a unique comparative study between countries with totally different migration policies. Our results increase our understanding of the health disparities between immigrants and natives and among different countries. We also enrich our study with the use of multilevel techniques and distinctive health, demographic and socio-economic variables. We provide evidence that self-selection alone does not explain the healthy immigrant effect. The migration journey, whether it is assisted and cushioned by the host country or not, plays also a role. Above all, we show that the migration policies of the host countries have a lot to do with the health quality the migrants receive. Israel being a unique example in this respect, has been receiving immigrants who have poorer health than natives and this inferiority is long-lasting.

References

1. Antecol, H. and Bedard, K.: Unhealthy Assimilation: Why Do Immigrants Converge to American Health Status Levels? *Demography* 43(2):337-360 (2006)
2. Akresh, I.R. and Frank, R.: Health Selection among New Immigrants. *American Journal of Public Health* 98(11): 2058-2064 (2008)
3. Baron-Epel, O., and Kaplan, G.: Self-reported health status of immigrants from the former Soviet Union in Israel. *The Israel Medical Association Journal*, 3: 940-946 (2001)
4. Biddle, N., Kennedy, S. and McDonald, J.T.: Health Assimilation Patterns amongst Australian Immigrants, *Economic Record* 83: 16-30 (2007)
5. Chemtob, D., Leventhal, A., and Weiler-Ravell, D.: Screening and management of

- tuberculosis in immigrants: The challenge beyond professional competence *International Journal of Tuberculosis and Lung Disease* 7(10): 959–966 (2003)
6. Chiswick, B.R., Lee, Y.L. and Miller P.W.: Immigrant Selection Systems and Immigrant Health, *Contemporary Economic Policy* 26(4): 555-578 (2008)
 7. Cohen, Y. and Habersfeld, Y.: Self-selection and Earnings Assimilation: Immigrants from the Former Soviet Union in Israel and in the United States, *Demography* 44(3): 649-668 (2007)
 8. Constant, A., Garcia-Muñoz, T, Neuman, S. and Neuman T.: Micro- and Macro Determinants of health: Older Immigrants in Europe, *IZA, Bonn: Discussion Paper No. 8754* (2014)
 9. Davidovitch. N., Filc, D., Novack, L., and Balicer, R.D.: Immigrating to a universal health care system: Utilization of hospital services by immigrants in Israel, *Health & Place* 20: 13-18 (2013)
 10. Eurostat: *Population on January 1st 2013, by Five-Year Age Groups and Sex*. Can be accessed at: <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home> (2013)
 11. Evans, J.: Migration and Health, *International Migration Review* 21(3): v-xi (1987)
 12. Garcia-Muñoz, T, Neuman, S. and Neuman, T.: Health Risk Factors among the Older European Populations: Personal and Aggregate Country Effects, *IZA, Bonn: Discussion Paper No. 8529* (2014)
 13. Grove, N. and Zwi, A.: Our Health and Theirs: Forced Migration, Othering, and Public Health, *Social Science and Medicine* 62: 1931-1942 (2006)
 14. Guintella O. and Mazzonna, F.: Do Immigrants Bring Good Health? *IZA, Bonn: Discussion Paper No. 8073* (2014)
 15. Israel, Central Bureau of Statistics Annual Statistical Abstract (2014)
 16. Jasso, G., Massey, D.S., Rosenzweig, M.R. and Smith, J.: Immigrant Health: Selectivity and Acculturation. In: Anderson N.B., Bulatao, R.A. and Cohen, B. (eds.), *Critical Perspectives on Racial and Ethnic Differences in Health in Late Life* (pp. 227-266). Washington, DC: National Academies Press (2004)
 17. Juerges, Hendrik, Avendan, Mauricio and Mackenbach, Johan P.: (2008), “Are different measures of self-rated health comparable? An assessment in five European countries”. *European Journal of Epidemiology* 23:773–781
 18. Jylha, M.: What is Self-rated Health and Why Does it Predict Mortality? Toward a Unified Conceptual Model, *Social Science and Medicine* 69: 307-316 (2009)
 19. Leshem-Rubinow, E., Shenhar-Tsarfaty, S., Milwidsky, A., Toker, S., Shapira, I., Berliner, S., Benyamini, Y., Melamed, S., and Rogowski, O.: Self-Rated Health is Associated with Elevated C-Reactive Protein Even among Apparently Healthy Individuals, *Israeli Medical Association Journal*, 17:213-218 (2015)
 20. Manoff, A., Vardi, H., Enten. R.S., and Shahar, D.R.: Differences in dietary consumption patterns and obesity rates between immigrants from the former USSR and a country’s

- native population, *International Journal of Food and Safety* 4: 119-130 (2011)
21. McDonald, J.T. and Kennedy, S.: Is Migration to Canada Associated with Unhealthy Weight Gain? Overweight and Obesity among Canada's Immigrants, *Social Science and Medicine* 1: 2469-2481 (2005)
 22. Neuman, S.: Aliya to Israel: Immigration under Conditions of Adversity. In (Zimmermann, K.F., (ed.) *European Migration: What Do We Know?* Oxford University Press, pp. 459-506 (2005)
 23. Neuman, S.: Are immigrants Healthier than Native Residents?, *IZA World of Labor*: 208 (2014)
 24. Orrenius, P.M. and Zavodny, M.: Do Immigrants Work in Riskier Jobs? *Demography* 46(3): 535-551 (2009)
 25. Popovic-Lipovac, A. and Strasser, B.: A Review on Changes in Food Habits Among Immigrant Women and Implications for Health, *Journal of Immigrant Minority Health* 17: 582-590 (2015)
 26. Programme for the International Assessment of Adult Competencies (PIAAC), information available at <http://www.oecd.org/site/piaac/> accessed April 2015
 27. Ritsner M., and Ponizovsky A.: Psychological distress through immigration: the two-phase temporal pattern? *International Journal of Social Psychiatry*, 45:125-139 (1999)
 28. Ronellenfitch, U. and Razum, O.: Deteriorating health satisfaction among immigrants from Eastern Europe to Germany. *International Journal for Equity in Health*, 3 (4) (2004)
 29. Schneider, U., Pfarr, C., Schneider, B.S., and Volker Ulrich, V.: I feel good! Gender differences and reporting heterogeneity in self-assessed health. *European Journal of Health Economics*, 13:251-265 (2012)
 30. Sen, A.: Health: Perception versus Observation, *British Medical Journal* 324(13): 860-861 (2002)
 31. Solé-Auró, A., Guillén, M. and Crimmins, E.M.: Health care usage among immigrants and native-born elderly populations in eleven European countries: results from SHARE, *European Journal of Health Economics*, 13:741-754 (2012)
 32. Survey of Health, Ageing and Retirement in Europe (SHARE), information available at <http://www.share-project.org/>
 33. United Nations, Department of Economic and Social Affairs, Population Division *International Migration - The 2013 Revision* (2013)

Appendix

Table A1 Description of variables

Demographic variables	
<i>Age</i>	Four dummy variables, relating to the age groups of: 61-to-70; 71-to-80; 81-to-90; 91 and over; with the reference group being age of 50-to-60.
<i>Gender</i>	Dummy variable that is set to 1 for male respondents.
<i>Marital status</i>	Two dummy variables: married and widowed, with the reference group including: divorced, separated and single.
<i>Number of children</i>	Number of the respondent's children.
Socio-economic variables	
<i>Household income centile</i>	Respondents' household income centiles.
<i>Education</i>	Dummy variable that equals 1 if the respondent has at least 13 years of schooling.
Medically based health	
<i>Drug use</i>	Continuous variable that is the number of different drugs that the respondent takes at least once a week (e.g., drugs for high-cholesterol, high blood-pressure, joint pain, back pain, sleep problems, anxiety or depression, stomach burns).
<i>Health conditions</i>	Set of dummy variables that relate to diseases that the individual was diagnosed with. They include: heart diseases; hypertension; vascular diseases; diabetes; lung diseases; arthritis; osteoporosis; and cancer.
<i>Health symptoms</i>	Continuous variable that is the sum of different symptoms that the individual suffered from during the last 6 months (e.g., sleeping problems, falling down, persistent cough, fatigue, swollen leg, dizziness).
<i>Medical consultation</i>	Continuous variable that is the response to the question: "During the last 12 months, about how many times in total have you seen or talked to a medical doctor about your health. Please exclude dentist visits and hospital stays, but include emergency rooms and outpatient clinic visits".
<i>Hospitalization</i>	Dummy variable that equals 1 if the respondent answered positively the question: "During the last 12 months, have you been in hospital overnight? Please consider stays in medical, surgical, psychiatric or any other specialized wards."
<i>Quality of eyesight</i>	Continuous variable ranging from 1 (poor) to 5 (excellent). It is the average of 2 variables related to eyesight that are the responses to the question: "Your distance/reading eyesight is: poor (1)...excellent (5)".

Behavioral risk factors	
<i>Alcohol consumption</i>	Dummy variable is defined: it equals 1 if the respondent, during the last 3 months, uses to drink any alcoholic beverages, like beer, wine, spirits or cocktails at least 5 days a week.
<i>Obesity</i>	Dummy variable that is equal to 1 if the Body Mass Index (BMI, based on weight and height) is greater than 30.
<i>Smokes at present time</i>	Dummy variable that is set to 1 for respondents who smoke at the time of the survey.
Functional capacity	
<i>IADL</i>	Number of limitations with several instrumental activities: preparing a hot meal, shopping for groceries, making telephone calls, taking medications, and managing money (such as paying bills). The IADL index ranges from 0 – 5
<i>Mobility</i>	Describe the functional capacity of the individual, indicated by: walking 100 meters, walking across a room, climbing several flights of stairs, and climbing one flight of stairs. Mobility is an index in the range of 0 – 4
Cognitive abilities	
<i>Identifying animals</i>	Continuous variable that is the number of animals that the individual listed in 60 seconds, in response to the question: “I would like you to name as many different animals as you can think of. You have one minute to do this.”