A "healthy immigrant effect" or a "sick immigrant effect"? Immigrants' health in Europe versus Israel

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Abstract

An extensive body of research related to immigrants in a variety of countries has documented that when immigrants arrive in the host country they are healthier than the native populations. This phenomenon has been labeled the "healthy immigrant effect" (HIE).

Several explanations have been proposed to explain immigrants' health advantage upon arrival. The leading theory relates the superior health of new immigrants to positive self-selection (of immigrating individuals) and positive selection (of the receiving countries). The theory of positive self-selection of immigrants posits that only the healthiest and most motivated individuals choose to undergo the traumatic experience of migration to a new country and assimilation into a new labor market and society; people who are sicker and weaker stay behind. On top of self-selection, in many countries there is another level of selection imposed by the host country, which prefers the wealthier and more educated immigrants. As wealth and education are known to be positively correlated with health, the outcome is that new immigrants also have a health advantage. Health screening by the receiving countries' authorities imposes another type of selection.

A unique opportunity to test the role of this two-sided selection in establishing the "healthy immigrant effect", is provided by a comparison of immigration to Israel with immigration to Europe. Israel has virtually unrestricted open gates for Jewish immigrants, and migrants have ideological rather than economic considerations. On the other hand, migration to European countries is selective, at the country level; and self-selective, at the individual level. The European immigration policy and practice are not very different from those of many other receiving countries. Israel is however an out-liner. It has always encouraged and assisted the immigration and absorption process as part of a pro-immigration ideology and policy. Its *raison d'etre*was and remains the ingathering 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 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. 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. The majority of immigrants to Israel, up to date, are motivated by ideological motives rather than economic considerations. It follows that self-selection of immigrants is also very marginal.

The very generous immigration policy and the absence of any type of 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" that is believed to stem from selectivity and economic considerations for immigration. Moreover, it is safe to claim that the generosity of the immigration policy and system could even lead to the abuse of the system, when elder parents or sick family members are sent to Israel to get better treatment and free the family in the country of origin from the need to take care of the elderly and sick. In this sense, we could expect negative self-selection of immigrants to Israel. All in all, we can even expect 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 health of immigrants to Israel with immigrants to European countries can therefore shed light on the role of selectivity behind the health status of new immigrants and 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.*

The rich SHARE (Survey of Health and Retirement Europe) data set is used for the empirical analysis and for the testing of our core hypothesis. Distributions of raw SAHS levels for Israel versus European countries are first presented to get a first approximation of Israeli-European disparities. Descriptive statistics of health conditions (e.g., diseases, health symptoms, drug use, hospitalization, mobility limitations) of natives-versus-immigrants are also examined for differences between the Israeli and European samples. The data show a very clear pattern: whereas new immigrants in European countries are considerably healthier compared to natives, the opposite holds for immigrants who arrived in Israel. They are significantly less healthy compared to natives. There are also very significant disparities in health records: immigrants in Israel have inferior health conditions compared to natives, while the opposite holds for the European case. The next step is the estimation of SAHS equations that include immigration status, years-since-migration, and cohort variables, as well as a battery of health, behavioral, demographic, and socio-economic variables. Because individuals are clustered within countries, we use multilevel analysis for the European regressions, which is the most appropriate technique to analyze within-and between-country variation. A careful analysis provides similar results: The "healthy immigrant effect" that is evidenced in Europe, is transformed into a "sick immigrant effect" in Israel.

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

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A "healthy immigrant effect" or a "sick immigrant effect"?

Immigrants' health in Europe versus Israel

Introduction

An extensive body of research related to immigrants in a variety of countries (including Australia, Canada, France, Germany, Spain, Sweden, The United Kingdom, and the United states) has documented that when immigrants arrive in the host country they are healthier than the native populations and also compared to the population in their country of origin. This phenomenon has been labeled the "healthy immigrant effect".

Several explanations have been proposed to explain immigrants' health advantage upon arrival. The theory of positive self-selection of immigrants posits that only the healthiest and most motivated individuals choose to undergo the traumatic experience of migration to a new country and assimilation into a new labor market and society; people who are sicker and weaker stay behind. On top of self-selection, in many countries there is another level of selection imposed by the host country, which prefers the wealthier and more educated immigrants. As wealth and education are known to be positively correlated with health, the outcome is that new immigrants also have a health advantage.

Another related theory is that medical examinations by immigrant authorities in the host countries further screen out less healthy immigrants at the border. 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). Health screening is another type of selectivity that is imposed by some host countries. There is consensus in the literature that this two-sided positive selection is a major driving force behind the "healthy immigrant" phenomenon.

A third theory is that diets and behaviors are healthier in the home countries, including better nutrition and dietary habits, more physical activities, close family and religious ties , and other socially protective factors.

Finally, it may be that self-reports of health conditions are under-reported by foreign-born populations, either because they have not yet been diagnosed, or because of differences in perceptions about health status. Discussion of the various theories that try to explain the NIE, can be found (for instance) 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 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 shortcoming 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. In this study we propose to *test the effects of selection and self-selection by comparing the self-assessed health status of immigrants to Israel with immigrants to European countries.*

The existing literature made already efforts to challenge the selectivity hypothesis. For instance, Chiswick, Lee and Miller (2008) employed the type of visa used to gain admission to Australia, as a measure of the degree of selectivity of immigrants. The main distinction is 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. Using the three waves of the Longitudinal Survey of Immigrants to Australia, they find indeed that immigrant health is poorest for refugees and best for economic migrants. Akresh and Frank (2008) used the New Immigrant Survey (NIS) 2003 and found that positive health selection differed significantly across migrant groups and was related to differences in the socioeconomic profiles of immigrant streams. Cohen and Haberfeld (2007) focused on self-selection of immigrants in terms of education, which also leads to earnings' assimilation and is correlated with health. A comparisonof immigrants from the Former Soviet Union (FSU) to Israel and to the United States, during the time period of 1968-1989 (when the United States opened the doors to FSU immigrants, granting them refugee visas), suggests 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.

In the next section some stylized facts about immigration to Israel are presented, followed by a brief description of the 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 comparative study starts with comparable distributions of raw self-assessed health-status scores (ranging from 1 – poor, to 5 –

excellent) and of average health conditions. Regression analysis is then employed in order to control for socio-economic background variables (age; education; wealth; marital status; number of children); for personal medical records (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-capital GDP (log) in the European analysis. Dummies for cohorts are also added.

Immigration to Israel: Some stylized facts

Israel has always encouraged and assisted the immigration and absorption process as part of a pro-immigration ideology and policy. Its *raison d'etre*was and remains the ingathering 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 was extended and the right to immigrate extended to 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 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 common with international practice, this right is restricted (Neuman, 2005).

Indeed, Israel witnessed major waves of immigration. During the first three years of statehood (15/5/1948- end of 1951) mass immigration of 711,000 supplemented a population of 630,000, leading to an *annual*population growth-rate of about 24 percent. It is probably the only case in history where the receiving population was smaller than the immigration influx. Immigration did not stop after 1952 but the numbers dropped to several thousands a year.[1] During the last decade of the 20th century, Israel witnessed another impressive influx of immigrants from theFormer

[1]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).

Soviet Union (FSU). During 1990-1998, the Israeli population of 4.56 was enriched by 879,486 immigrants – a total population growth-rate of 19.3 percent. In 1991, 15,000 Jews were airlifted from Ethiopia in one single day, in "Operation Solomon" (Neuman, 2005).

The Israeli case is also unusual in that its origins are essentially ideological[2], triggered by the emergence of the Zionist Movement in Eastern and Central Europe in the last quarter of the 19th century.[3] 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 self-selectionof immigrants(in terms of health and socio-economic dimensions) is also very marginal.

The very generous immigration policy and the absence of any type of 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" that is believed to stem from selectivity and economic considerations for immigration. Moreover, it is safe to claim that the generosity of the immigration policy and system could even lead to the abuse of the system, when elder parents or sick family members are sent to Israel to get better treatment and free the family in the country of origin from the need to take care of the elderly and sick. In this sense, we could expect negative self-selection of immigrants to Israel. All in all, we could even expect, 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 health of immigrants to Israel with immigrants to European countries can therefore shed light on the role of selectivity behind the health status of new immigrants.

The data base

The Survey of Health Aging and Retirement Europe (SHARE)[5] will be used for a comparative study of Israel versus European countries vis-a-vis the health-status of

[2] 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. While all these factors have played some role in immigration to Israel, the *major* drive was ideological.

[3]Immigration to Land of Israel (Palestine) started in 1882 (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).

[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).

[5]For a comprehensive description of the SHARE data set see: Garcia Muñoz, Neuman and Neuman, (2014) and Constant et al., (2014).

natives-versus-immigrants (by years-since-migration, YSM). 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). Israel too was included in the 2nd wave.

Four waves of SHARE, conducted in 2004/5, 2006/7, 2008/9 and 2011, are now available. The 3rd wave (SHARELIFE) focuses on life histories of individuals. Israel participated in the 2nd wave only. The data for Israel will be contrasted with parallel data for European countries (excluding Israel) who participated in the 2nd wave. Findings for European countries based on the most recent 4th wave, and also for a pooled sample of 2nd and 4th waves, will also be presented and compared with the findings for the Israeli case.

The main variable of interest is the self-assessed health status. 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?" The subjective metric of self-assessed health-status (SAHS) is now commonly used as a measure of health, based on the finding that individuals are the best evaluators of their health (Sen, 2002) and on the numerous studies that have demonstrated that that self-assessed health is a good proxy for the health status and is also highly correlated with mortality and morbidity (see Garcia-Muñoz, Neuman and Neuman, 2014; and also Jylha, 2009 – for a comprehensive review).

The incredibly rich SHARE data set covers individuals over 50. This age group becomes more significant in Europe, given that the share of the elder population in Europe increases constantly: within one decade (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 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.

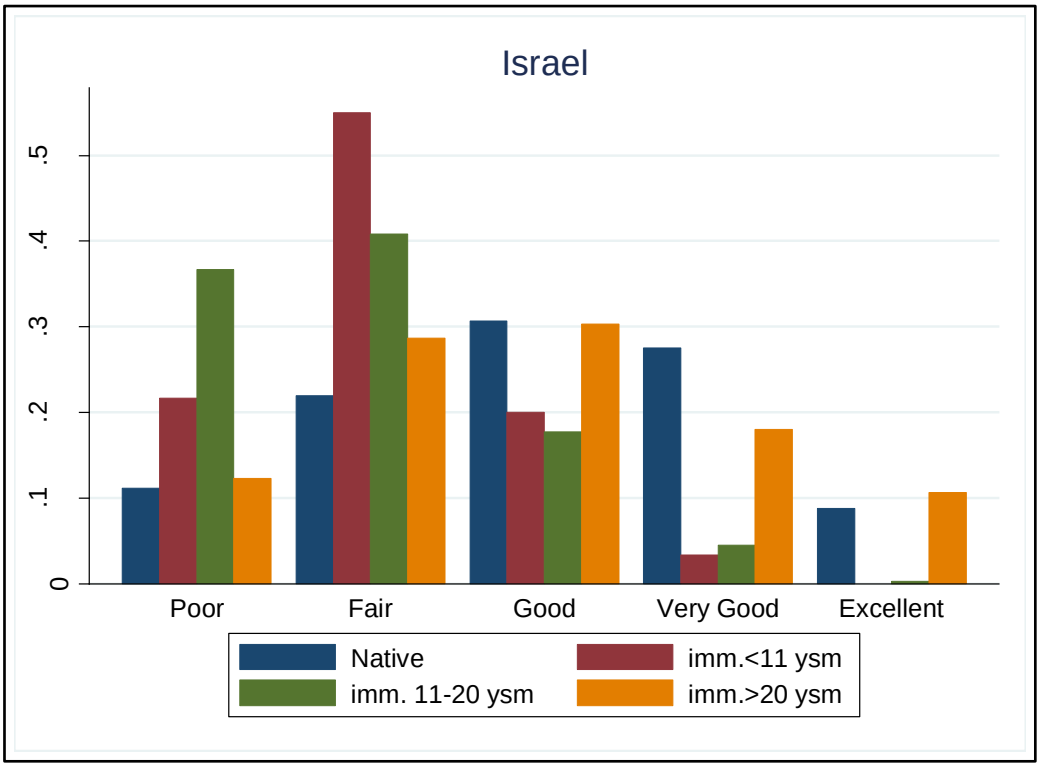
A cross country comparison of distributions of raw SAHS levels and of descriptive statistics of health conditions, will first be presented to get a first approximation of Israeli-European disparities. The next step is the estimation of SAHS equations that include immigration status, years-since-migration, and cohort variables, as well as a battery of health, behavioral, demographic, and socio-economic variables. 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.*

Distributions of SAHS levels – Israel versus European countries

Figure 1 presents the distribution of SAHS levels within the Israeli sample. As is clearly demonstrated by the graph, the "healthy immigrant effect" is not evidenced. On the contrary, *a "sick immigrant effect" is noticed: upon arrival, immigrants report much poorer health compared to natives*: 77 percent of immigrants report 'poor' or 'fair' health (compared to 33 percent of natives); 20 percent are in 'good' health (31 percent of natives); only 3 percent are in 'very good' health (28 percent of natives), and not a single new immigrant perceives her/his health status as excellent (9 percent of natives). Immigrants' health is inferior to natives' also after more than a decade since migration: many more 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 after more than two decades in the receiving country (10 percent even report now 'excellent' health)

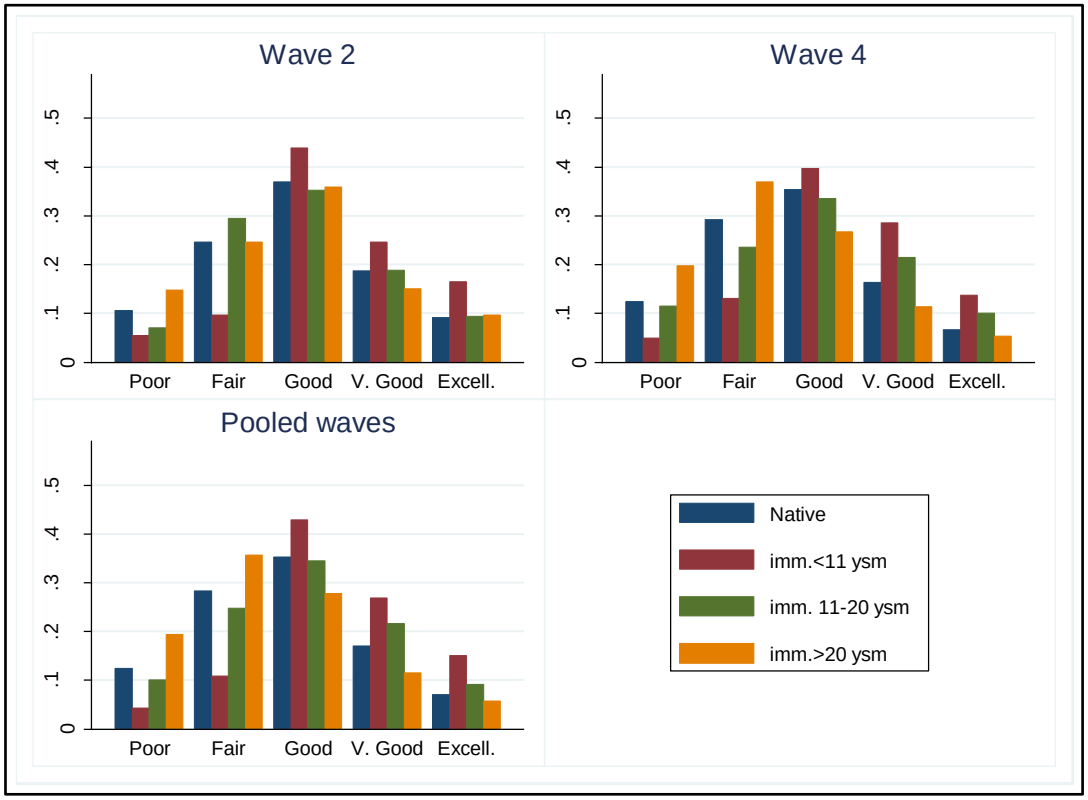
Figure 1: Distributions of SAHS levels within the Israeli sample, natives and immigrants (by years-since-migration), SHARE , 2nd wave, 2006/7



Notes: Based on a sample of 1,460 observations included in the SHARE 2nd wave (the only wave that included Israel); The sample is composed of 945 natives and 515 immigrants, sub-divided by YSM (up to 10 years since migration – 11.6 percent of immigrants; 11-20 years – 64.7 percent; 21+ years - 23.7 percent)

The distribution within the Israeli sample will now be contrasted with parallel distributions for the sample of European countries. Three alternative samples will be used: The sample of the 2nd wave (in which Israel participated) with the exclusion of Israel; the most recent 2011 4th wave; and a pooled sample of 2nd and 4thwaves (2006/7, 2011; with the exclusion of repeated observations, and Israel).

Figure 2: Distributions of SAHS levels within the European sample, natives and immigrants (by years-since-migration), SHARE , 2nd, 4th, and pooled waves



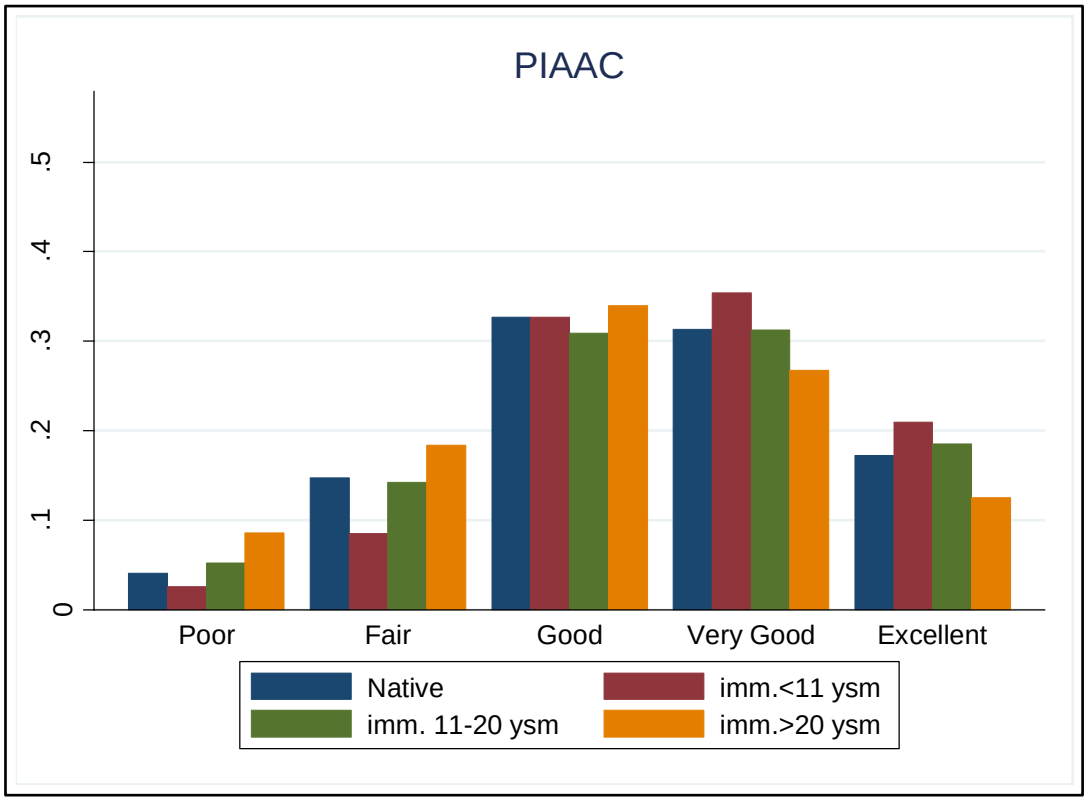
Notes: WAVE 2: The sample is composed of 30,786 natives and 965 immigrants, sub-divided by YSM (up to 10 years since migration – 7.6 percent of immigrants; 11-20 years – 8.8 percent; 21+ years –83.6 percent). WAVE 4: The sample is composed of 50,689 natives and 3,955 immigrants, sub-divided by YSM (up to 10 years since migration – 4.1 percent of immigrants; 11-20 years – 5.0 percent; 21+ years –90.9 percent). POOLED 2nd and 4thWAVES: The sample is composed of 64,856 natives and 4,469 immigrants, sub-divided by YSM (up to 10 years since migration – 4.7 percent of immigrants; 11-20 years – 5.6 percent; 21+ years –89.7 percent). The pooled sample is smaller than the sum of the two samples, due to exclusion of repeated observations.

As it is obvious from Figure 2, *the health status of newly arrived immigrants in European countries is much better compared to 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 newly arrived immigrant report 'poor' or 'fair' health, compared to 40 percent of natives. More newly arrived immigrants than natives report 'good' health (shares of43

and35 percent,respectively), 'very good' health (shares of27 and17 percent, respectively) and 'excellent' health (respective shares of15 and7 percent). Health deteriorates over time since 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, SAHS distributions are derived also from the Programme for the International Assessment of Adult Competencies (PIAAC) data set, that was conducted in 2011/12, relates to 22 OECD countries (Israeli data not available), and includes individuals aged 16-65. The results are similar for this extended and more general age spectrum (and a slightly different country mix). Immigrants who arrived less than a decade ago are healthier than the 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 2011/12 1st wave of PIAAC 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: Distributions of SAHS levels within the OECD sample, natives and immigrants (by years-since-migration), PIAAC, 2011/12



Notes: The sample is composed of 126,466 natives and 7,820 immigrants, sub-divided by YSM (up to 10 years since migration – 45.0 percent of immigrants; 11-20 years – 25.8 percent; 21+ years –29.2 percent).

Another indication of native-immigrant health disparities can be obtained from an examination of personal medical information (for a description of all research variables, see Appendix Table A1). Table 1 presents descriptive statistics for natives and immigrants (all three groups combined) within the Israeli sample. A focus on comparative objective health conditionspresents very clear and sharp evidence of the inferior objective (reported) health-status 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, ISRAEL, 2005/6

Characteristics	Whole sample Means (st.dev.)	Natives Means (st.dev.)	Immigrants Means (st.dev.)
SAHS (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 yearssincemigration	-	-	62.17
21 and over years since migration	-	-	26.48
Arrival years between			
1900-1940	-	-	0.97
1941-1950	-	-	7.05
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

Characteristics	Whole sample Means (st.dev.)	Natives Means (st.dev.)	Immigrants Means (st.dev.)
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
Personal Medical variables			
Healthconditions; diagnosedwith..(%)			
Heartproblems	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
Chroniclungdisease	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 rememberedanimals	19.03 (7.35)	21.30 (7.15)	14.76 (5.62)

Note: Based on 2nd SHARE wave: 2005/6

Parallel summary information on the European sample shows a very different picture. Here the native-immigrant differences seem to indicate an immigrant health advantage, although the results are somewhat mixed: in most aspects (e.g., drug use, medical symptoms, hospitalization, major diseases, eyesight) immigrants are in better shape than natives, while in some other few aspects they have inferior health measures (e.g., medical consultation, cognitive skills).

Table 2: Summary statistics, natives and immigrants, EUROPE, pooled sample (2nd and 4th waves, 2005/5 and 2011)

Characteristics	Whole sample Means (st.dev.)	Natives Means (st.dev.)	Immigrants Means (st.dev.)
SAHS (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

Characteristics	Whole sample Means (st.dev.)	Natives Means (st.dev.)	Immigrants Means (st.dev.)
11 –to- 20 yearssincemigration	-	-	11.51
21 and over years since migration	-	-	77.90
Arrival years between			
1900-1940	-	-	4.11
1941-1950	-	-	13.15
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)	29.25	29.21	30.55
Personal Medical variables			
Healthconditions; diagnosedwith..(%)			
Heartproblems	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
Chroniclungdisease	6.54	6.60	4.40
Arthritis	24.49	24.56	22.43
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)

Characteristics	Whole sample Means (st.dev.)	Natives Means (st.dev.)	Immigrants Means (st.dev.)
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 rememberedanimals	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

Note: Based on pooled sample of the two SHARE 2nd and 4thwaves: 2005/6 and 2011

The summary statistics relate to the combined group of immigrants (not divided by YSM) and do not control for socioeconomic and demographic disparities (e.g., pronounced age differences between the Israeli and European samples) that could affect the medical conditions. Regression analysis is now employed in order to arrive at the net effects of the immigration status, by YSM.

SAHS regressions: Israel versus European countries

The next step is the estimation of SAHS equations, in order to control for demographic, socioeconomic and medical disparities and thus arrive at the net effects of the years-since-migration (YSM) variable.Our dependent variable is the respondent's subjective assessment of her/his health-status (SAHS), ranging from 1

(very poor) to 5 (excellent). The explanatory variables include years-since-migrationand cohort of migration variables (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 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. Ordinary Least Squared regressions are used for the Israeli sample.Random-effects multilevel regression analysisis employedfor the European sample, because individuals are clustered within countries.

Table 3: Determinants of SAHS, Israel versus Europe

Variables	Israel	Israel	Europe	Europe
(i) Immigrant status				
Up to 10 years since migration	-0.310***	-0.332**	0.184***	0.171***
	(-2.584)	(-2.011)	(3.043)	(2.732)
11 to 20 yearssincemigration	-0.326***	-0.420**	-0.044	-0.219
	(-3.701)	(-2.004)	(-0.779)	(-0.876)
21 or more years since migration	-0.038	-0.933***	0.024*	-0.169
	(-0.365)	(-3.914)	(1.708)	(-0.453)
Arrivalyearsbetween 1900-1940	-	1.074**	-	0.406
		(2.031)		(1.062)
1941-1950	-	0.982***	-	0.233
		(3.365)		(0.619)
1951-1960	-	0.752***	-	0.228
		(2.748)		(0.606)
1961-1970	-	0.616*	-	0.181
		(1.944)		(0.482)
1971-1980	-	1.663***	-	0.152
		(4.250)		(0.405)
1981-1990	-	0.217	-	0.131
		(1.052)		(0.353)
1991-2000	-	0.069	-	0.175
		(0.370)		(0.719)
2001-2010	Ref.	Ref.	Ref.	Ref.
(ii) Country variables				
Log of country per capita GDP	-	-	0.348***	0.349***
			(6.591)	(6.611)
(iii) Demographics				
Age (years)	Ref.	Ref.	Ref.	Ref.

Variables	Israel	Israel	Europe	Europe
50-60				
61-70	-0.005	0.007	-0.022***	-0.023***
	(-0.075)	(0.108)	(-2.668)	(-2.865)
71-80	-0.080	-0.070	-0.054***	-0.058***
	(-1.034)	(-0.901)	(-5.564)	(-5.912)
Over80	0.091	0.066	-0.044***	-0.049***
	(0.792)	(0.582)	(-3.226)	(-3.569)
Male	-0.093	-0.082	-0.078***	-0.078***
	(-1.636)	(-1.445)	(-11.106)	(-11.076)
Marital status				
Single/Divorced/Separated	Ref.	Ref.	Ref.	Ref.
Married	-0.029	-0.040	-0.036***	-0.036***
	(-0.308)	(-0.424)	(-3.707)	(-3.670)
Widowed	0.004	-0.003	0.029**	0.029**
	(0.031)	(-0.027)	(2.316)	(2.316)
Number of children	0.066***	0.069***	0.007***	0.007***
	(4.872)	(5.112)	(2.684)	(2.748)
(iv) Socio-economic variables				
Householdincomecentile	0.004	0.003	0.021***	0.021***
	(0.374)	(0.330)	(16.790)	(16.709)
Education (morethan 12 years)	0.135***	0.128***	0.109***	0.109***
	(2.308)	(2.181)	(14.040)	(14.091)
(v) Personal medical variables				
Drug use	-0.055***	-0.057***	-0.075***	-0.075***
	(-2.692)	(-2.786)	(-24.407)	(-24.381)
Health conditions – diagnosed with:				
Heart problems	-0.042	-0.054	-0.094***	-0.094***
	(-0.542)	(-0.704)	(-8.936)	(-8.928)
Hypertension	-0.100*	-0.104*	-0.055***	-0.055***
	(-1.713)	(-1.800)	(-7.240)	(-7.248)
Cerebral vascular disease	-0.180*	-0.173	-0.124***	-0.125***
	(-1.721)	(-1.635)	(-7.323)	(-7.386)
Diabetes	-0.243***	-0.241***	-0.113***	-0.113***
	(-3.883)	(-3.856)	(-10.602)	(-10.615)
Chronic lungdisease	-0.005	-0.006	-0.100***	-0.100***
	(-0.041)	(-0.049)	(-7.322)	(-7.329)
Arthritis	-0.115	-0.110	-0.166***	-0.166***
	(-1.637)	(-1.546)	(-19.616)	(-19.595)
Osteoporosis	-0.003	-0.021	-0.110***	-0.110***
	(-0.044)	(-0.275)	(-4.951)	(-4.931)
Cancer	-0.194*	-0.204*	-0.318***	-0.319***
	(-1.856)	(-1.967)	(-22.048)	(-22.070)
Number of medical symptoms	-0.057***	-0.053***	-0.099***	-0.099***
	(-3.237)	(-3.017)	(-38.465)	(-38.506)
Medical consultation (number)	-0.007***	-0.007***	-0.011***	-0.011***
	(-3.500)	(-3.467)	(-29.757)	(-29.733)
Hospitalization (dummy)	-0.237***	-0.248***	-0.167***	-0.167***
	(-3.080)	(-3.230)	(-17.577)	(-17.570)

Variables	Israel	Israel	Europe	Europe
Quality of eyesight (range of 1-5)	0.258***	0.259***	0.159***	0.159***
	(7.815)	(7.902)	(43.007)	(43.097)
Alcohol consumption	0.058	0.041	0.042***	0.042***
	(0.332)	(0.245)	(5.029)	(5.008)
Smokes at present time	-0.144*	-0.158**	-0.120***	-0.120***
	(-1.948)	(-2.146)	(-14.049)	(-14.038)
Obesity (BMI>30)	-0.213***	-0.210***	-0.069***	-0.069***
	(-3.663)	(-3.616)	(-8.321)	(-8.328)
IADL	-0.055	-0.064	0.003	0.003
	(-1.313)	(-1.523)	(0.555)	(0.560)
Mobility	-0.118***	-0.115***	-0.178***	-0.178***
	(-3.274)	(-3.149)	(-37.152)	(-37.160)
Cognitiveskills:	0.003	0.003	0.010***	0.010***
rememberedanimals	(0.618)	(0.716)	(21.044)	(20.903)
Year of interview dummies	-	-	Yes	Yes
SampleSize	1,100	1,100	59,079	59,079
AIC	2673	2668	138202	138201
BIC	2833	2863	138553	138614

Note: Sample sizes are somewhat smaller than those used for the SAHS distributions, due to missing values of part of the explanatory variables

As is evident from Table 3, the regression results confirm a "sick immigrant effect" in Israel, versus a "healthy immigrant effect" in Europe. Newly arrived immigrants are significantly sicker than natives in Israel, while they are significantly healthier in European countries. Inclusion of cohorts of arrival (to disentangle the effects of age and cohort) reveals that the cohort of arrival has no significant effect in Europe, while it has positive effects for immigrants who arrived in Israel more than two decades ago (between 1900 and 1980). These positive effects (in particular for the cohort of 1971-1980) also explain the highly negative effect of 21+ YSMvariable (-0.933). The overall negative effect is netted out by the specific cohort positive effect.

Inclusion of interactions between YSM and cohorts, and parallel regressions for the samples of immigrants only, led to similar clear conclusions: A "healthy immigrant effect" in Europe, versus a "sick immigrant effect" in Israel.

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Appendix

Table A1: Variable description

Demographic variables	
Age	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.
Gender	Dummy variable that is set to 1 for male respondents.
Marital status	Two dummy variables: married and widowed, with the reference group including: divorced, separated and single.
Number of children	Number of the respondent's children.
Socio-economic variables	
Household income centile	Respondents' household income centiles.
Education	Dummy variable that equals 1 if the respondent has at least 13 years of schooling.
Medically based health	
Drug use	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).
Health conditions	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.
Health symptoms	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).
Medical consultation	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".
Hospitalization	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."
Quality of eyesight	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	

Alcohol consumption	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.
Obesity	Dummy variable that is equal to 1 if the Body Mass Index (BMI, based on weight and height) is greater than 30.
Smokes at present time	Dummy variable that is set to 1 for respondents who smoke at the time of the survey.
Functional capacity	
IADL	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
Mobility	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	
Identifying animals	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. Youhaveone minute to do this."