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**Immigration, Occupation, Education and Their Influence on the
Human Capital in Israel**

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Abstract: In recent years the world has been experiencing immigration in large scales. The globalization process and policies of open borders encouraged international migration. In this perspective Israel's experience seems to be valuable and insightful. This paper aims to explore the differences between the Human Capital of the Israeli-born and immigrants within the Jorgenson and Fraumeni (1989) model calculated for Israel's 1995 and 2008 Censuses. Our results show that immigrants in their first years after arriving to Israel do not work in an occupation that fits their education, a fact that influences their Human Capital which is lower than that of the Israeli-born. However, with the passage of years, some of the new immigrants were able to find an occupation that matched their education and to integrate in the local job market. Imputation of education level by occupation de facto, narrowed the gap between the Human Capital of immigrants and Human capital of Israeli natives, but it is still not closed.

Keywords: Imputed Education, Original Education, Immigration, Human Capital

JEL Classification: J24, J44

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A. Introduction

Measurement of human capital in a country is dependent on the characteristics of the country's population and labor force, the structure and condition of the economy and the available data sources. Since the mid-1980s, analysts from various countries have been researching and developing the measurement of human capital for the purposes of integrating this measurement into the System of National Accounts.

The work began with the seminal paper of Jorgenson and Fraumeni (1989) (hereafter - JF) which used a model of aggregated lifetime income of individuals for estimating the value of the human capital stock for a specific year. Analysts from several countries have attempted to adapt the approach to their own situation (Ahlroth and Forslund, 1997; Le et al., 2006; Grecker and Liu, 2008; Gu and Wong, 2008; Haizheng et al., 2009; Wei, 2009). Until now, research has focused on a calculation of the human capital for the entire population, and on an examination of the changes in the human capital over the years for population cohorts, for example as a function of the demographic or gender parameter.

In Israel the project of measuring the human capital is being done for the first time for the years 1995 and 2008. Based on the results of the measurement, the total stock of human capital for hired persons in Israel in 1995 was equal to 457.2 million dollars (in 2008 prices). In 2008 the human capital of hired persons in Israel increased to 847.5 million dollars, that is, an increase of 85% between 1995 and 2008, and an average annual rate of increase of 4.5%. This increase includes the growth in the population over that period.

The per capita human capital in Israel stood in 1995 at 99.4 thousand dollars per capita (in 2008 prices), compared to 121.1 thousand dollars per capita in 2008, an increase of 22% between 1995 and 2008, and an average rate of increase of 1.5% per year. Figure 1 shows the total stock of human capital for the entire population by age, in 1995 and 2008. Among the cohort of hired persons in the lower age bracket, a positive correlation was found between the age of the individual and their accumulated future human capital. Conversely, among the cohort of employed persons in the upper age bracket, a negative correlation was found between the age of the individual and their accumulated future human capital.

It further emerged that the human capital for each of the ages increased in the transition between 1995 and 2008. This could possibly be explained by the method of

calculation of the human capital and by the fact that the total stock of human capital depends on the number of individuals in each reference group. In other words, when there are a large number of individuals, the average income of the reference group is multiplied by this number, and the total income of this group increases. Figure 2A and 2B present the total stock of human capital by education levels for the years 1995 and 2008. Measurement of the per capita human capital eliminates the effect of the number of individuals on the human capital, which peaks at around the third decade of human life. The per capita human capital increases for all education levels and at every age – from individuals with no diploma through to individuals with advanced degrees. Furthermore, it is apparent that the per capita human capital increases as the education level rises (Figure 3).

A study of the results of estimates of the per capita human capital and of the proportion of human capital in the total GDP – as these were measured in Israel (in the two follow-up years in the study) and in several other countries (in 2006), points to a negative difference between the estimates of per capita human capital in Israel versus the other countries, as also for the proportion of per capita human capital in the total GDP (Appendix: A1, A2). It is worth emphasizing that an absence of standardization for calculating human capital is one of the primary problems when comparing the human capital estimates obtained in the different countries. Thus, for instance, the age range of the population measured in New Zealand is between 25 and 65, whereas in Israel it lies between 15 and 75. It should further be noted that the methodologies on which the human capital estimate is built differ in the various countries. These differences expressed in the way each country adapts the JF (1989) model to its specific limitations (such as the type of population measured, the method of estimating missing data, etc.).

In recent years the world has been experiencing immigration in large scales. The globalization process and open border policies have encouraged international migration. At the same time, the issue of the *value* of the human capital of migrants versus the *value* of the human capital of natives has still not been addressed in the academic literature.

From this perspective, Israel's experience seems to be valuable and insightful. Israel is a country of immigrants: 33.1% (as of 1.1.2008) of its current population were born abroad; beginning in 1989 and continuing through the decade of the 90s, a huge wave of immigration numbering over 1 million people, mostly from the Former

Soviet Union, arrived in Israel, bringing about 20% increase in Israel's population. About 600,000 immigrants entered Israel during the period 1990–95. The average level of schooling of these immigrants is high, 14.7 years of schooling for males and 14.3 for females (Weiss et al., 2003). The share of highly educated and skilled people among these immigrants was significantly higher than in that of the native population. As presented on Table 1., one can see that among native Israelis, the percentage of holders of advanced degrees is more than double, while the percentage of holders of bachelor's degrees is more than 60% higher, whereas in the lower education levels, there is a decrease of between 1.5% and 8.4% between 1995 and 2008. Among the new immigrants, there was an increase in the higher education levels between 1995 and 2008, mainly among those with high school education (7.5%) and holders of bachelor's degrees (8.5%).

This obviously had a significant impact on the value of human capital in the country. One specific characteristic of immigrants, and especially of educated immigrants, is the gap between their formal education level and its utilization in the Israeli labor market De Facto, during their first years after migration. This gap narrows in the process of gaining local labor market experience and gradual upgrading of skills and knowledge up to the level of equally educated local workers. Table 2 presents the breakdown of occupations between native Israelis and new immigrants, in 1995 and 2008: One notes a decrease of more than 17% in the percentage of those employed in unskilled occupations between 1995 and 2008 (immigrants and native Israelis), whereas an increase is apparent in the share of academic and liberal-art occupations, as well as in the share of managers, between 1995 and 2008. The share of those engaged in academic occupations rose between 1995 and 2008 by nearly 6% among native Israelis and 3% among new immigrants.

The issue of changes in the evaluation of immigrants' human capital and its impact on the aggregate estimates has not been addressed so far within the models of human capital accounting based on the JF (1989) framework.

For the purposes of applying the model, Israel's population was divided according to demographic characteristics, as done in other countries. In addition, a division specific to Israel was made according to immigrant and native status in the country – a parameter thus far not considered in the measurement of human capital in other countries.

The present study examines the differences between immigrant and native Israeli human capital. In addition, the study analyzes the impact of immigrants' choice of profession or occupation on their future income, as well as the dynamic effect of this choice on the human capital over time, compared to native Israelis.

This study aims to answer two main research questions: the one, whether there is a difference between the human capital of immigrants and that of native Israelis; the other, whether a narrowing of the gap between the human capital of immigrants and native Israelis is observable with an increase in the duration of the immigrants' residence in the country.

In order to answer these two questions of the study, it was decided to measure the human capital among the cohort of immigrants and to compare it with the results of the measurement of human capital for the cohort of native Israelis, at two points in time: the first, in 1995 – some four years after the massive wave of immigration from the former Soviet Union; and the other, in 2008 – some 13 years later, on the assumption that a period of 13 years is sufficient for full integration into the local labor market.

The present study utilizes for the first time two human capital measurement methods that expand on the original JF (1989) model. In the first method, the human capital is calculated on the "Original Education Method", according to education level (i.e. the highest diploma held by the individual), comparing the human capital of immigrants with that of native Israelis. In the second method, human capital is imputed to immigrants according to an education level calculated based on occupations of native Israelis. The results of the human capital estimate for immigrants were compared with those of the human capital estimate for native Israelis, by both methods, for each of the periods.

The rest of the study is organized as follows: In section B, a review of the literature that describes the characteristics of immigrants in the Israeli labor market. Section C describes the database and the study population, and Section D discusses the methods used by us to measure the human capital as well as the measurement results. The paper concludes with a summary.

B. Theoretical Background

Numerous studies demonstrate the existence of a difference between the characteristics of immigrants and native Israelis employed in the labor market. The vast majority of immigrants in the massive wave of immigration to Israel during 1989-1991 hailed from the republics of the Former Soviet Union. These immigrants were characterized by a relatively high level of education. The average number of schooling years among these immigrants at the time of their arrival in Israel stood at 14.7 years for men and 14.3 years for women, compared to a lower level of 13.5 years for men and 14.2 years for women among the local population.

A significant proportion of the immigrants were quickly absorbed into the Israeli labor market, often in jobs for which they were defined as overqualified (Weiss et al., 2003). This result strengthens the argument of Weiss (2000) that the process of adjustment of highly skilled immigrants to the labor market may be lengthy and even extend over many years. This represents a significant loss of skills in terms of the present value of human capital.

Following their arrival in Israel, there was no great variance among the immigrants in the wage they earned, most receiving more or less the same wage regardless of their level of education or field of occupation,^{1,2} in an amount significantly lower than native Israelis with similar characteristics. However, as time passed and their stay in Israel lengthened, and as they acquired local skills (such as work experience, language proficiency and occupational training), the immigrants migrated upwards on the occupational ladder and wage differences developed between them, mainly as a function of their field of occupation in Israel and less as a function of their education.³ The wages of immigrants who succeeded in integrating

¹ Weiss et al (2003), Eckstein and Weiss (2004) and Cohen-Goldner and Eckstein (2008) find no effect of imported education of immigrants from the Former Soviet Union on the local activity in the labor market.

² Kugler and Sauer (2002) examine the integration of immigrant doctors from the former Soviet Union in the Israeli labor market. This population group was required to undergo relicensing in order to engage in the same occupation as before they immigrated to Israel.

³ Cohen-Goldner and Eckstein (2004) and Cohen-Goldner (2005) examine the effects of the occupational training given to new immigrants in the hi-tech sector. They find a positive correlation between immigrants' participation in occupational training programs conducted by the government, and their tendency to specialize in the sector or find employment in white collar jobs in other sectors. However, this correlation was found to decrease with the passage of time, meaning that those who most recently underwent training were more likely to be employed in the hi-tech sector than those who received training earlier. Eckstein and Cohen-Goldner (2006) examine different types of policy in the field of occupational training and increasing employment opportunities for female immigrants in the

in academic professions and white collar professions in Israel rose more rapidly than the wages of immigrants employed in blue collar professions (Eckstein et al., 2006). This phenomenon is documented both among male immigrants (Eckstein and Weiss, 2004; Cohen-Goldner and Eckstein, 2008) and among female immigrants (Cohen-Goldner and Eckstein, 2010).

It should be noted that despite the growth in the wages of immigrants, as well as the variance in the education and occupation categories, there was no apparent negative impact on the employment and wages of native Israelis, just as there is no evidence of the convergence of immigrants' wages to those of native Israelis with similar characteristics (Friedberg, 2001; Eckstein and Weiss, 2001, 2002; Cohen-Goldner and Paserman, 2006). Weiss (2000) explains this last result as a combination of two trends, entry of additional capital and gradual entry into high skill occupations, which together kept the aggregate capital labor ratio constant.

C. Data and Research Population

The study is based on two main databases. The first contains the data of the population census for 1995 and 2008. The study used the data collected in the census from households by means of questionnaires. The questionnaire included, in addition to basic demographic questions, a range of questions on economic subjects. The sampling unit in the census is the household, and the data are reported for all the individuals in the household. The population census of 1995 included about 20% of households, and that of 2008 about 16% of households. The following demographic data were collected from this database: age, gender, year of migration (immigration) to Israel, and religious group (religion). Data were also collected on the reported education level, i.e. the highest diploma.

The second source of information is an administrative database of individual income constructed by the Israel Central Bureau of Statistics on the basis of employers' annual tax returns. The database includes, among other things, an itemization of month's worked, annual wage and first date of employment by the

skilled professions; according to them, such a policy could yield a personal and social return, but is costly and complicated to implement.

different employers.⁴ This data source provided the research variables for individual income from hired work for the year 2008. Individual income in 1995 was measured based on a database of the National Insurance Institute from that year containing data on hired employees only.

The study focuses on the population of hired employees of working age, i.e. individuals aged 15 to 75 years. This population totaled 703,418 individuals in 1995 and 720,343 individuals in 2008. It should be emphasized that the human capital measurements for these years were calculated for hired employees only.

The present study examined the population of immigrants that arrived after 1989, compared to the population of native Israelis. This population was divided into the following cohorts: gender (2 categories); education by the highest diploma (5 categories: no studies/studies with no diploma, completed elementary/junior high school, completed high school with matriculation, bachelor's degree, master's degree and up); age (61 categories within the 15-75 range). The cutoff was set at 1989 so as to reflect the difference in immigrant income following the massive wave of immigration to Israel from the Former Soviet Union which took place at that time, coupled with the short time the immigrants had been resident in the country as of the date of the 1995 population census (up to five years).

D. Description of Method and Results

The definition of the "emigration status" was determined based on the date of immigration: Individuals who immigrated after 1989 were defined as new immigrants, while individuals with no year of immigration were defined as native Israelis. The year of immigration for defining new immigrants was set at 1989 in view of the massive immigration from the former Soviet Union which occurred in 1989-1991, as described earlier.

The measurement of human capital is based on the assumption that the acquisition of education contributes to an increase in human capital. Therefore, for the purpose of the measurement, the population was classified into five education categories: no diploma, completed elementary/junior high school, completed high

⁴ It should be emphasized that the matched employer-employee database provided no information about hours worked and occupation; this information was also unavailable in other administrative sources of information.

school, bachelor's degree or equivalent, master's degree and up. It should be emphasized that in the case of an immigrant/emigrant, the number of years of schooling or the level of education does not necessarily reflect the level of income, because of the under-utilization of emigrant human capital and emigrants' gradual integration into the local labor market.

As discussed earlier, the human capital in Israel was calculated using the JF(1989) basic model for measurement of human capital. The study combines two analyses. In the first analysis (the "original education" approach) we first estimate the human capital level of the whole population without dividing the population into specific groups. These estimates are compared to the estimates for two separate groups defined by immigrant status: the veteran Israeli population and those who immigrated after 1989. The difference should be interpreted as the impact of introducing the dimension of immigrant status and years since migration into the standard HC model. Moreover, we can infer the long-term effects of immigrants' human capital, by the change in this value between 1995 and 2008.

It should be emphasized that according to the standard human capital model (JF, 1989), the total stock of human capital by cohorts is meaningless. The reason for this lies in the variance in the size of the cohorts. It follows that in order to examine the differences between the human capital of immigrants and that of native Israelis, it is necessary to examine the per capita human capital. A comparison of the per capita human capital of the immigrants with that of native Israelis neutralizes the effect of the number of individuals on the human capital.

Figure 3 shows the per capita human capital of immigrants versus that of native Israelis in 1995 (figure 3.A) and 2008 (figure 3.B). One can see that the per capita human capital for native Israelis is higher than for immigrants in all the age ranges, both in 1995 and in 2008. The gap between the per capita human capital of immigrants and that of native Israelis contracted between 1995 and 2008, on average, from 30% to 14%. An examination of the cohort of working ages, i.e. ages 25-64, shows that the average difference between the per capita human capital of immigrants versus native Israelis stood at 25% in 1995 and decreased to 11% only, in 2008 (Table 3). Based on this comparison, one can infer that the duration of residence in the country reduces the gap between immigrants and native Israelis in all the age ranges, and particularly in the 25-64 range of working ages.

An examination of the percentage of individuals according to their level of education (Table 4) shows that the percentage of immigrants with a master's degree and up in 1995 is higher by more than 20% than among native Israelis. The percentage of holders of bachelor's degrees is only 1% higher than among native Israelis. However, the percentage of those with high school education and those who completed elementary/junior high school among the immigrants is lower by 11% and 12%, respectively, than among native Israelis.

Also in 2008, the percentage of holders of advanced degrees was found to be higher than among native Israelis. Nevertheless, there is a contraction by more than one half in the gap, to a difference of 10% between immigrants and native Israelis. This contraction stems from an increase of 5% in the percentage of holders of advanced academic degrees among native Israelis, as well as from a 7% decrease in the percentage of holders of advanced degrees among the immigrants. A narrowing of the gap between immigrants and native Israelis was also observed among those with lower education levels. Nevertheless, the percentage of immigrants is lower in these education levels than that of native Israelis (a difference of 3% and 7%, respectively). The percentage of holders of bachelor's degrees rose between these years both among native Israelis, at a rate of 7%, and among the immigrants, at a rate of 6%, reaching an identical percentage in both groups (see Table 4). One can infer from this, as has already been posited in various studies, that the immigrants' level of education is higher, on average, than that of native Israelis.

In light of this, the question arises whether the immigrants' level of education in fact reflects their human capital, primarily in the first years of their residence in Israel and when integrating in the local job market.

In attempt to answer this question, let us imagine that the education of the immigrants is standardized in order to correctly reflect their actual human capital in the Israeli labor market. For this purpose, the present article presents for the first time ever a calculation based on a method which is hereinafter referred to as the "Impute education" method.

The Imputation of education to immigrants was determined based on the average education level of native Israelis and based on the occupations in which the immigrants actually engaged in 1995 and 2008. In this method as well, the population was classified, in the first stage – in addition to the classification according to the "usual" demographic groups – into two main cohorts, based on their "emigration

status": the cohort of immigrants who arrived in Israel after 1989, and a second cohort of native Israelis. In the second stage, the average actual education of native Israelis was calculated on the basis of their occupations. This average education was impute to the new immigrants, based on the occupations in which they were actually engaged in Israel. As a result, a variance was created in the distribution of the reference groups according to the impute education. Thus for example, if the latest diploma of the immigrant is a bachelor's degree, but he in actual fact engages in an occupation in which, among native Israelis, individuals with an average education of high school graduates engage, an education level of high school graduate was impute to the immigrant. In this stage, the human capital of the immigrants was calculated according to their impute education. In the next stage, the human capital of the immigrants was recalculated according to their impute education. For native Israelis, the measurement of the human capital was calculated as in the "original education" method.

Also according to the impute education method one can see that the per capita human capital of native Israelis is higher than that of the immigrants, in all the age ranges, both in 1995 and in 2008 (Figure 3).

The difference between the per capita human capital of the immigrants and the per capita human capital of native Israelis contracted, on average, between 1995 and 2008, from 23% to 9%. An examination of the working age population which has a presence in the job market, i.e. the 25-64 age bracket, shows an average difference between the per capita human capital of immigrants and the per capita human capital of native Israelis at a rate of 19% in 1995, contracting to 7% only, in 2008 (Table 3). One can infer from this that with the passage of years, some of the new immigrants were able to find an occupation that matched their education and to integrate in the local job market, in all the age ranges and particularly in the 25-64 age bracket in which there is a presence in the job market. As a result, the gap between their per capita human capital and that of Israeli natives was narrowed, but still not closed. Based on the imputation according to education level, as presented in Table 4, it was found that in 1995, the percentage of new immigrants with advanced academic degrees declined to 23% compared to their original education, reaching 3% only, 1% less than for native Israelis. Among holders of bachelor's degrees, the percentage of immigrants decreased by 5% compared to their original education, reaching 7%, 4% lower than for native Israelis.

Concurrently, there was an increase in the percentage of immigrants with elementary/ junior high school education compared to their original education. Among those with elementary school education, the percentage of immigrants according to imputed education reached 17% versus 7% only, compared to their original education, but still remained 2% lower than for native Israelis. Among those with high school education, the percentage of immigrants according to imputed education reached 74% versus 50% only, compared to their original education, 13% **higher** than for native Israelis (Table 4).

Also in 2008 it was found that the percentage of new immigrants with advanced academic degrees decreased by 16% compared to their original education, reaching 9% only, 10% **lower** than for native Israelis but nevertheless equal to their percentage in 1995 (3%). Among holders of bachelor's degrees, the percentage of immigrants decreased by 2% compared to their percentage based on their original education, reaching 16%, 2% lower than for native Israelis and 9% higher than in 1995.

Concurrently, an increase was noted in the percentage of immigrants with high school education compared to their original education. Among those with high school education, the percentage of immigrants according to imputed education reached 81% versus 55% only, compared to their original education, 23% **higher** than for native Israelis (Table 4) and 7% higher in comparison with 1995. This increase can be explained by the decrease in the number of immigrants with elementary school education and below to a level approaching 0% according to imputed education: 5% among those with elementary/junior high school education (and 17% compared to 1995) and 3% among immigrants with no diploma compared to their original education (no change compared to 1995), as well as by the decrease in their percentage among those with higher education (see Table 4).

In light of the above, it can be inferred that, in actual fact, the new immigrants engaged in occupations that did not fit their level of education during up to 5 years from the day of their arrival in Israel. It can further be said that the majority of holders of advanced degrees did not find work in an occupation suited to their education during those years.

At the same time, there was a convergence of the immigrants towards native Israelis in the Israeli job market with an increase in the duration of residency in the country. An increase in the number of years in the country also enables immigrants to

find occupations that are suited to their level of education, mainly among those with a higher education.

An examination of the changes in the per capita human capital according to each of the education levels is presented in Figure 5(A-C). One can see that the per capita human capital of Israeli natives is greater than the per capita human capital of immigrants in all the age ranges and in the education levels from high school and up, both in 1995 and in 2008⁵.

A comparison between the per capita human capital of native Israelis versus immigrants shows that in 1995, the imputation of education has almost no effect on the per capita human capital among those who completed high school (Figure 5A.), and is equal to a rate of 31%. In 2008, the imputation of education reduces the gap from 14% to 12% among those with high school education, between the per capita human capital of native Israelis and that of the immigrants (2% in all). A comparison between the years 1995 and 2008 shows a reduction of 17% in the gap according to original education, and of 18% according to impute education (Table 5).

In the higher education levels (bachelor's degree and master's degree and up), the imputation of education narrows the gap between the per capita human capital of the immigrants and the per capita human capital of native Israelis, in all the age ranges, with a convergence apparent in the later ages (Figure 5B and Figure 5C). Nevertheless, a gap still remains between the human capital of the immigrants and that of native Israelis – both according to the imputed education and according to the original education.

The imputation of education reduces the gap between the per capita human capital of immigrants with a bachelor's degree and that of native Israelis with the same level of education by 19% and 14%, respectively in 1995 and 2008 (from 37% to 18% in 1995 and from 21% to 7% in 2008).

Among holders of advanced degrees, the difference stands at 16% in 1995 and 6% in 2008 (from 33% to 17% in 1995 and from 16% to 10% in 2008) (see Table 5). A comparison between the years 1995 and 2008 shows a contraction of 15% in the gap according to original education, and of 11% according to impute education, between holders of bachelor's degrees. Among holders of advanced degrees this gap

⁵ A dearth of individuals with no diploma in both years, and a dearth of individuals with elementary/junior high school education in 2008, does not allow a reliable presentation that would reflect the human capital of the individuals in these categories.

stands at 16% according to original education and 8% according to imputed education.

It emerges from the results of the study that as the education level increases, the gap between the per capita human capital of the immigrants and that of native Israelis contracts. The imputation of education narrows the gaps between immigrants and native Israelis as the level of education increases, but a gap nevertheless remains between the per capita human capital of immigrants versus native Israelis.

Parallel with the increase in duration of residence in Israel, the gaps between the immigrants and native Israelis as well as between original education and imputed education are reduced at the higher education levels. One can infer from this that with the passage of years, some of the new immigrants were able to find an occupation that matched their education and to integrate in the local job market, and that there is a process of convergence between the per capita human capital of the immigrants and that of native Israelis with an increase of the duration of residence in Israel.

E. Summary and Conclusions

In recent years the world has been experiencing immigration in large scales. The globalization process and the open-border policies have encouraged international migration. From this perspective, Israel's experience seems to be valuable and insightful.

The study shows that the total stock of human capital for salaried workers in Israel in 1995 was equal to 457.2 million dollars (in prices of 2008). In 2008 the human capital of salaried workers in Israel increased to 847.5 million dollars, that is, an increase of 85% between 1995 and 2008, and an average annual rate of increase of 4.5%. This increase includes the growth in the population over that period. The per capita human capital stood in 1995 at 99.4 thousand dollars per capita (in prices of 2008), compared to 121.1 thousand dollars per capita in 2008, an increase of 22% between 1995 and 2008, and an average rate of increase of 1.5% per year.

A negative difference was found between the estimate of per capita human capital in Israel versus the other countries, as also for the proportion of per capita in the total GDP and GNP. This difference could be explained by the absence of uniform standards for the calculation of human capital between the different countries (for

example, variance in the age range of the measured population and in the methodologies on which the human capital estimate of the different countries is built). The present article focuses on the variance between the education levels of the immigrants versus native Israelis and the manner in which this variance affect their human capital compared to that of Israeli natives. The study's results indicate that emigrants arriving in Israel do in fact possess difference human capital than that of the local population. The study's findings point to the fact that the composition of education levels of the immigrant population differs from that of native Israelis. The percentage of holders of advanced academic degrees among the immigrants is more than 20% higher than among native Israelis within the first 5 years of their stay in Israel. However, the percentage of those with high school education and those who completed elementary/ junior high school among the immigrants is lower by 11% and 12%, respectively, than among native Israelis.

It emerges from the study that the variance in the education levels has an effect on the human capital of the cohort of immigrants versus the cohort of native Israelis. The gap between the per capita human capital of the immigrants and that of native Israelis stands at 30%. As the duration of the immigrants' residence in the country increases, the gaps in the per capita human capital, when comparing between immigrants and native Israelis, narrow. The gap between the per capita human capital of immigrants and that of native Israelis contracted between 1995 and 2008, on average, by 16%. The study examines the relationship between the immigrants' human capital according to the occupations in which they engaged in the local labor market. The study's results shows that in the first years after their immigration to Israel, the immigrants do not engage in occupations that are suited to their level of education. The imputation of education according to the immigrants' occupations in the local mob market does in fact reduce the gaps between the per capita human capital of the immigrants versus that of native Israelis at the higher education levels.

The imputation of education reduces the gap between the per capita human capital of immigrants with a bachelor's degree and that of native Israelis from 37% to 18% in 1995 and from 21% to 7% in 2008. Among holders of advanced degrees, the gap is reduced from 33% to 17% in 1995 and from 16% to 10% in 2008).

At the same time, the imputation of education increased the gap or did not affect at all the gap between the per capita human capital of the immigrants and that of native Israelis in the first post-immigration years; this gap is reduced with an

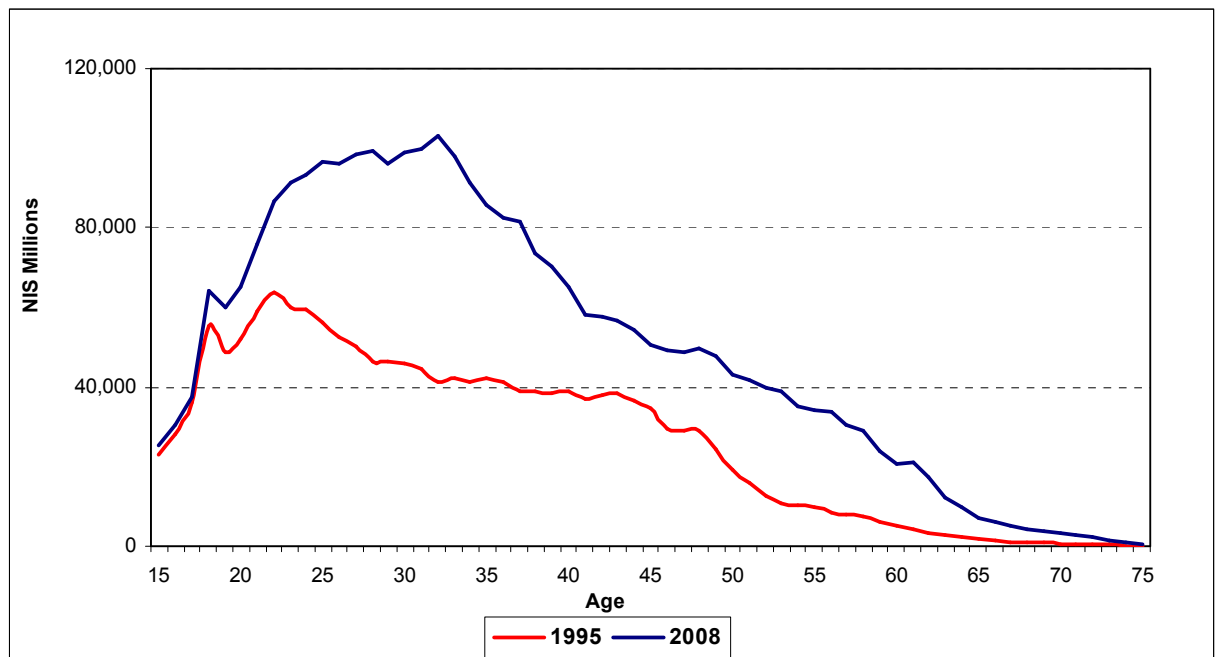
increase in the duration of residence in Israel, mainly in the high education levels: a decrease of 15% in the gap according to original education and of 11% according to imputed education among the holders of a bachelor's degree. Among the holders of advanced degrees, this gap stands at 16% according to original education and at 8% according to imputed education.

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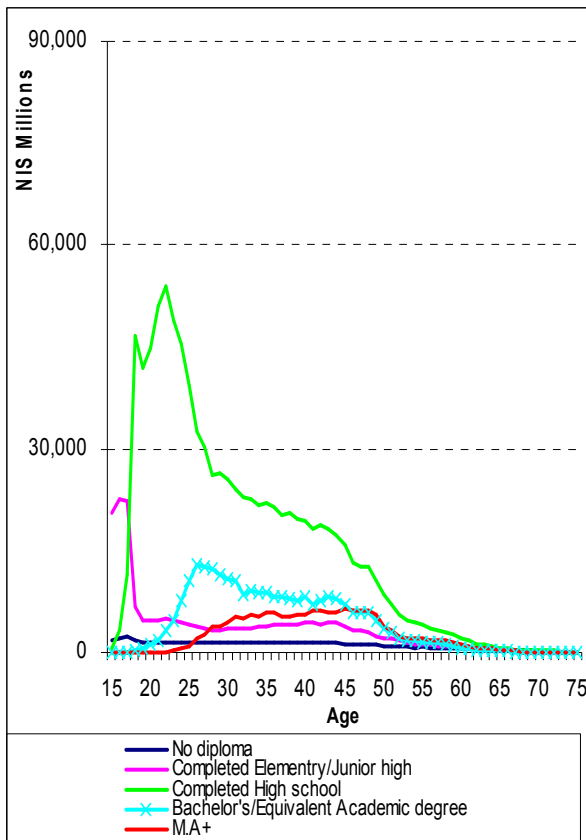
Figure 1: Human Capital by age, 1995 and 2008 (2008 prices)



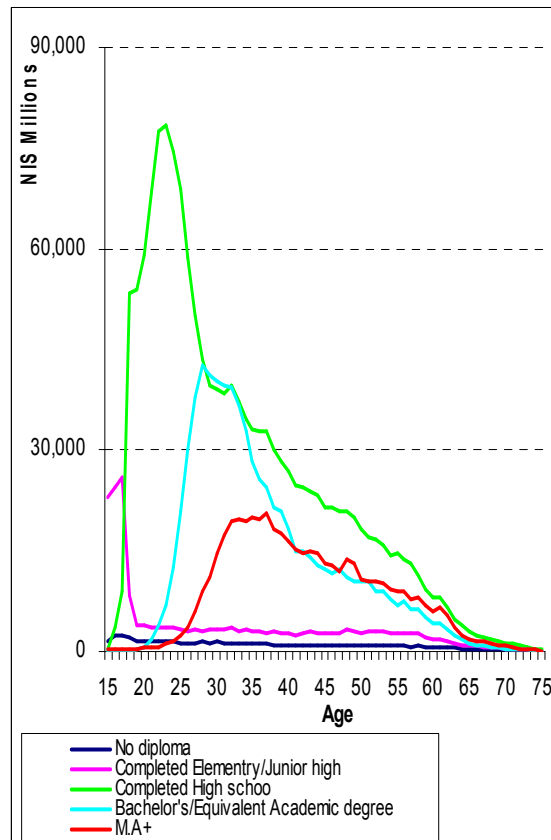
Source: Israeli Central Bureau of Statistics, processed by authors

Figure 2. Total stock of Human Capital, by education level (2008 prices)

A - Total Stock of Human Capital, 1995



B - Total Stock of Human Capital, 2008

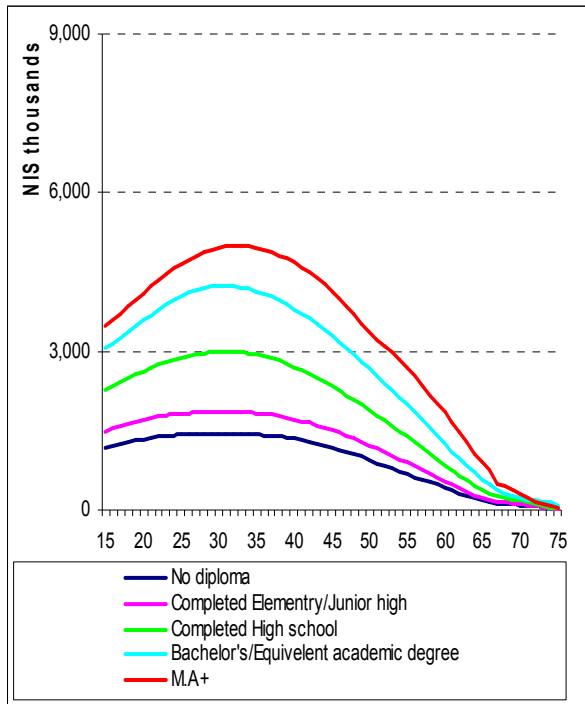


Source: Population census (1995, 2008), authors' data processing

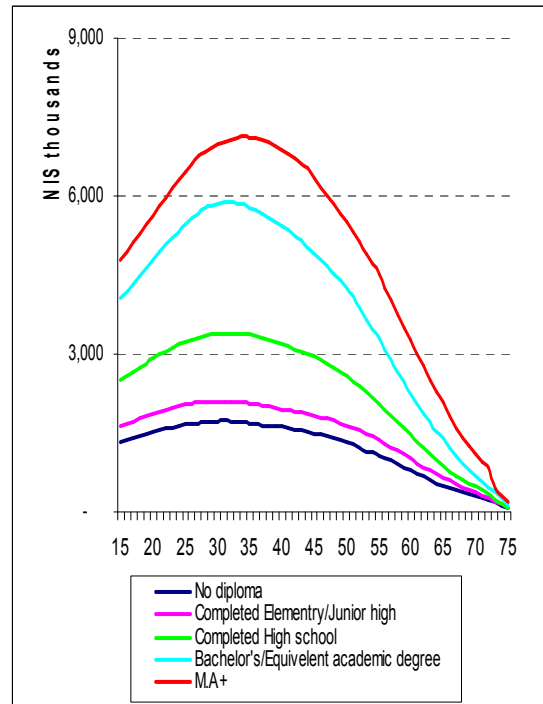
Note: The data for 1995 were calculated according to prices of 2008.

Figure 3. Per Capita Human Capital, by education level (2008 prices)

A - Per Capita Human Capital, 1995

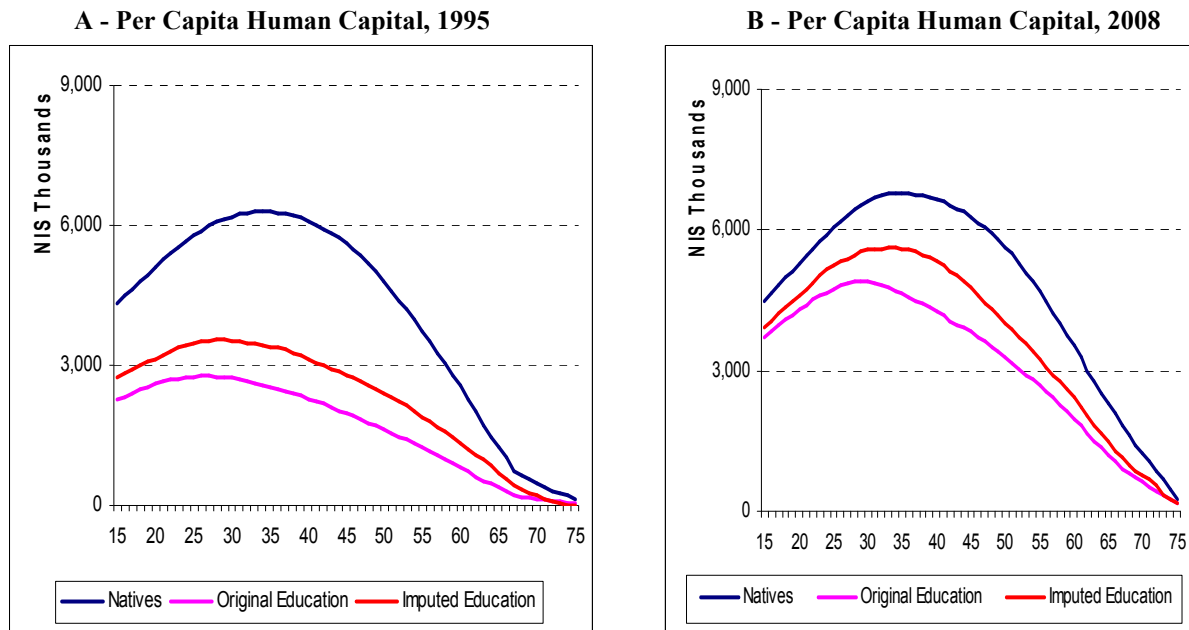


B - Per Capita Human Capital, 2008



Source: Israeli Central Bureau of Statistics, processed by authors; OECD (2010)

Figure 4. Human Capital Per capita, by age (2008 prices)

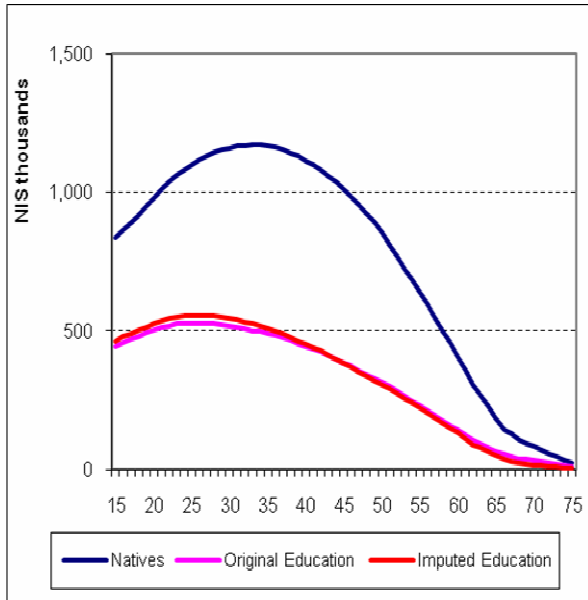


Source: Population census (1995, 2008), authors' data processing
Note: The data for 1995 were calculated according to prices of 2008.

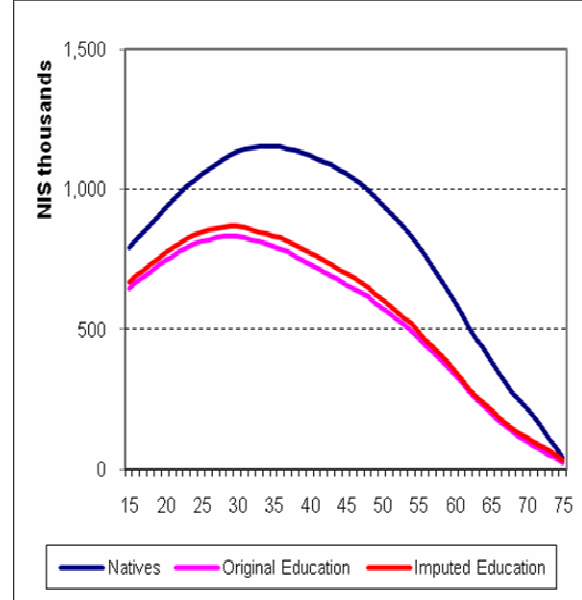
Figure 5. Per Capita Human Capital, by education level (2008 prices)

5.A Per Capita Human Capital – High School

5.A (1) - Per Capita Human Capital, 1995

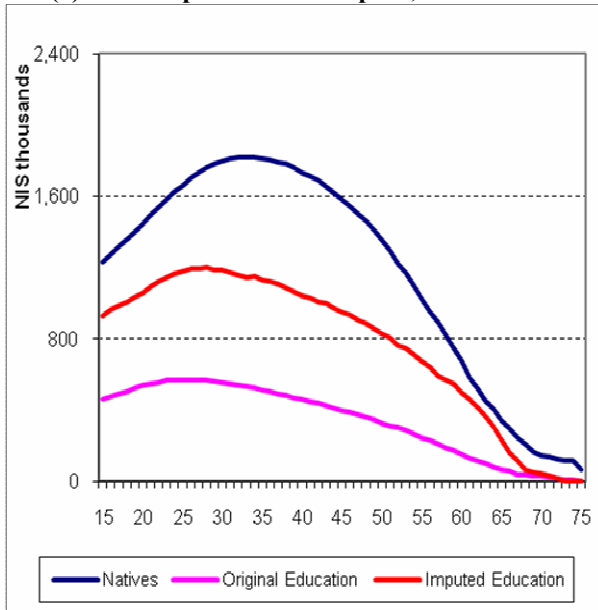


5.A (2) - Per Capita Human Capital, 2008

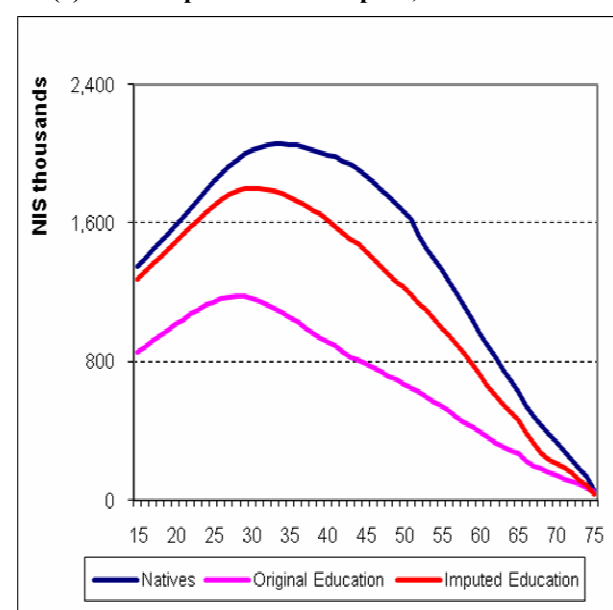


5.B Per Capita Human Capital – Bachelor's Degree

5.B (1) - Per Capita Human Capital, 1995



5.B(2) - Per Capita Human Capital, 2008



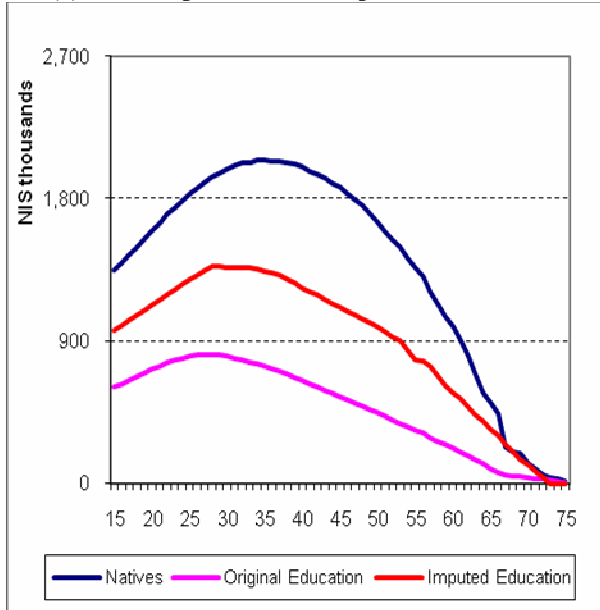
Source: Population census (1995, 2008), authors' data processing

Note: The data for 1995 were calculated according to prices of 2008.

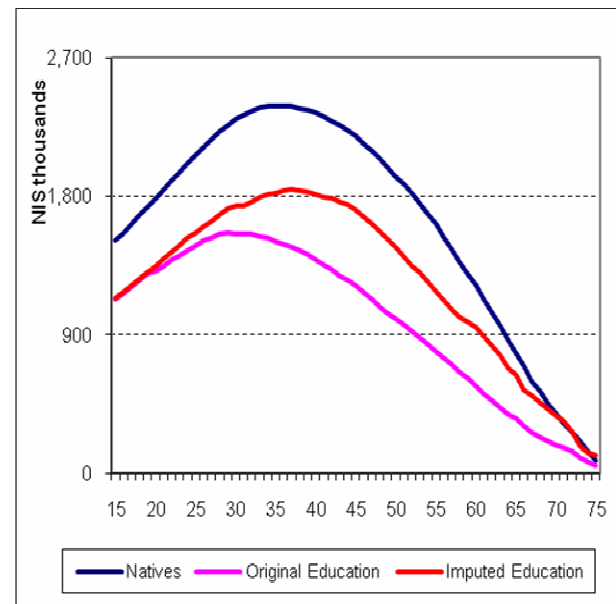
Figure 5. Per Capita Human Capital, by education level (2008 prices) (Cont.)

5.C Per Capita Human Capital – Master's Degree and up

5.B (1) - Per Capita Human Capital, 1995



5.B(2) - Per Capita Human Capital,



Source: Population census (1995, 2008), authors' data processing

Note: The data for 1995 were calculated according to prices of 2008.

Table 1. Education level, by year and definition of individual (percentage)

Education level	1995'		2008	
	No diploma	4.71	0.01	3.32
Elementary/junior high	19.32	16.8	11.76	0.22
High school	61.24	73.67	58.34	81.21
Bachelor's degree	10.89	6.96	17.66	15.63
Master's degree and up	3.84	2.56	8.92	2.94

Source: Population census (1995, 2008), authors' data processing

Table 2. Breakdown of occupations of native Israelis and new immigrants, by year (percentage)

	1995		2008	
	Native Israelis	New immigrants	Native Israelis	New Immigrants
Academic occupations	9.83	9.38	15.81	12.45
Liberal arts and technical occupations	12.34	9.08	18.53	14.23
Managers	4.3	0.49	6.17	1.85
Clerical workers	19.5	6.95	18.01	11.58
Agents, sales personnel and service personnel	15.65	13.18	21.92	22.45
Skilled workers in agriculture	1.54	1.03	1.52	0.6
Skilled workers in industry, construction and other professional workers	13.29	27.26	9.62	19.54
Unskilled workers	22.45	31.8	4.77	13.56

Source: Population census (1995, 2008), authors' data processing

Table 3. Share of Per capita Human Capital, all ages and working ages

	Native Israelis	Immigrants - Original Education	Immigrants - Imputed Education	Total
All ages (15-74)				
Total per capita lifetime income, 1995	51%	21%	28%	100%
Total per capita lifetime income, 2008	41%	27%	32%	100%
Main working ages (25-64)				
Total per capita lifetime income, 1995	40%	15%	21%	100%
Total per capita lifetime income, 2008	31%	20%	24%	100%

Source: Population census (1995, 2008), authors' data processing

Note: The data for 1995 were calculated according to prices of 2008.

Table 4. Individuals, by education level (percentage)

Education level	1995		
	Native Israelis	New immigrants - Original education	New immigrants - Impute education
No diploma	5%	5%	~ 0%
Elementary/junior high	19%	7%	17%
High school	61%	50%	74%
Bachelor's degree	11%	12%	7%
Master's degree and up	4%	26%	3%
	2008		
No diploma	3%	3%	~ 0%
Elementary/junior high	12%	5%	~ 0%
High school	58%	55%	81%
Bachelor's degree	18%	18%	16%
Master's degree and up	9%	19%	3%

Source: Population census (1995, 2008), authors' data processing

Table 5. Per Capita Human Capital, by education level (percentage)

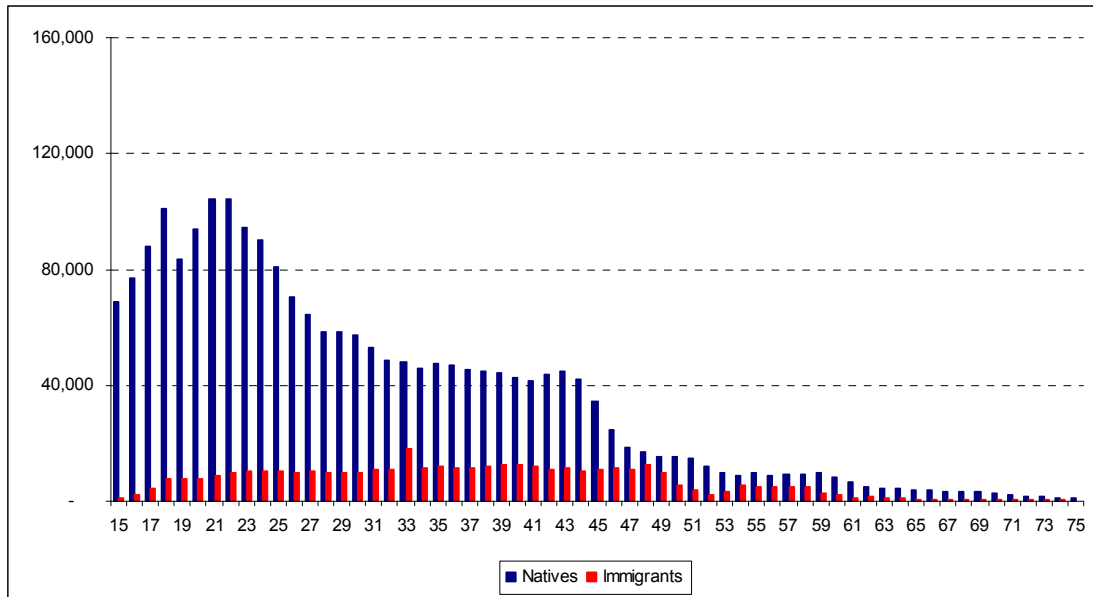
Education level	1995		
	Native Israelis	New immigrants - Original education	New immigrants - Impute education
No diploma	58%	41%	~ 0%
Elementary/ junior high	46%	27%	27%
High school	54%	23%	23%
Bachelor's degree	52%	15%	34%
Master's degree and up	50%	17%	33%
	2008		
No diploma	46%	52%	3%
Elementary/ junior high	30%	28%	42%
High school	42%	28%	30%
Bachelor's degree	43%	28%	36%
Master's degree and up	42%	22%	32%

Source: Population census (1995, 2008), authors' data processing

Note: The data for 1995 were calculated according to prices of 2008.

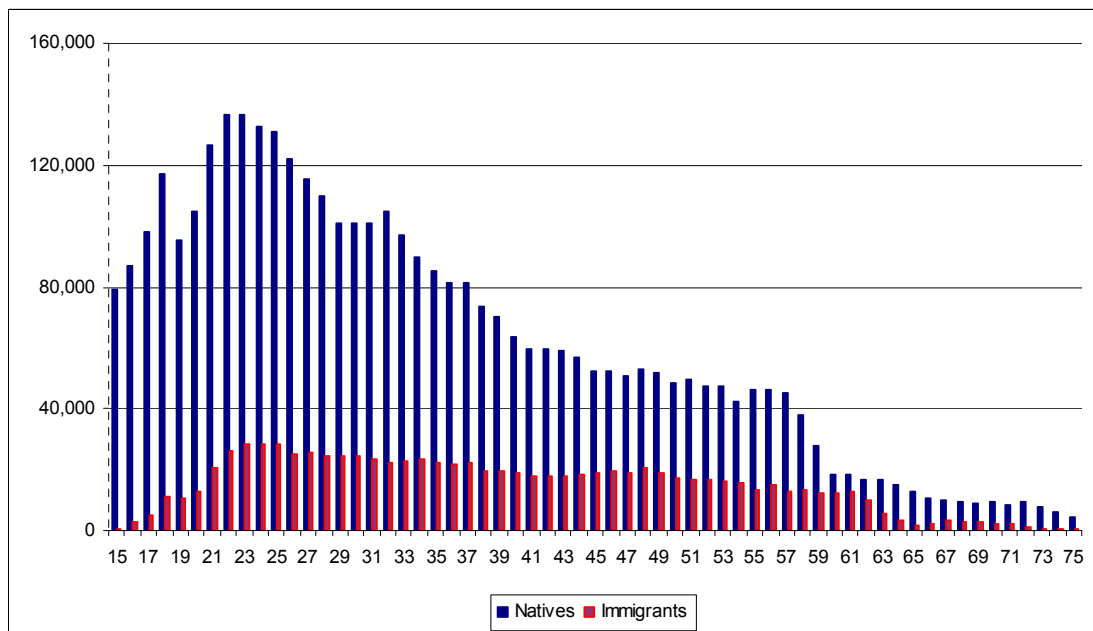
Appendix:

Figure A1: Number of individuals, 1995



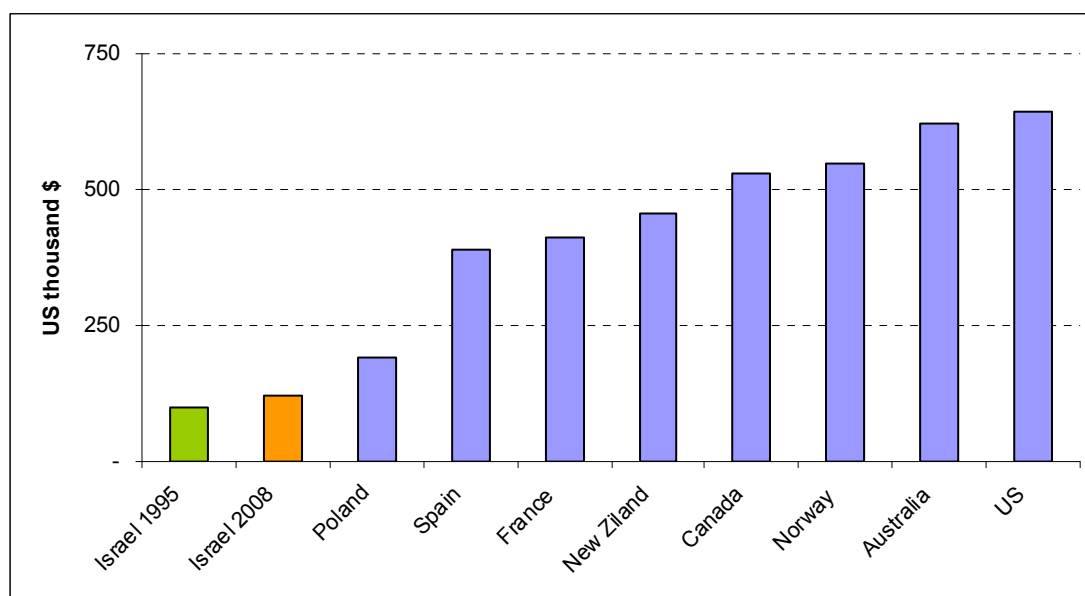
Source: Israeli Central Bureau of Statistics, processed by authors

Figure A2: Number of individuals, 2008



Source: Israeli Central Bureau of Statistics, processed by authors

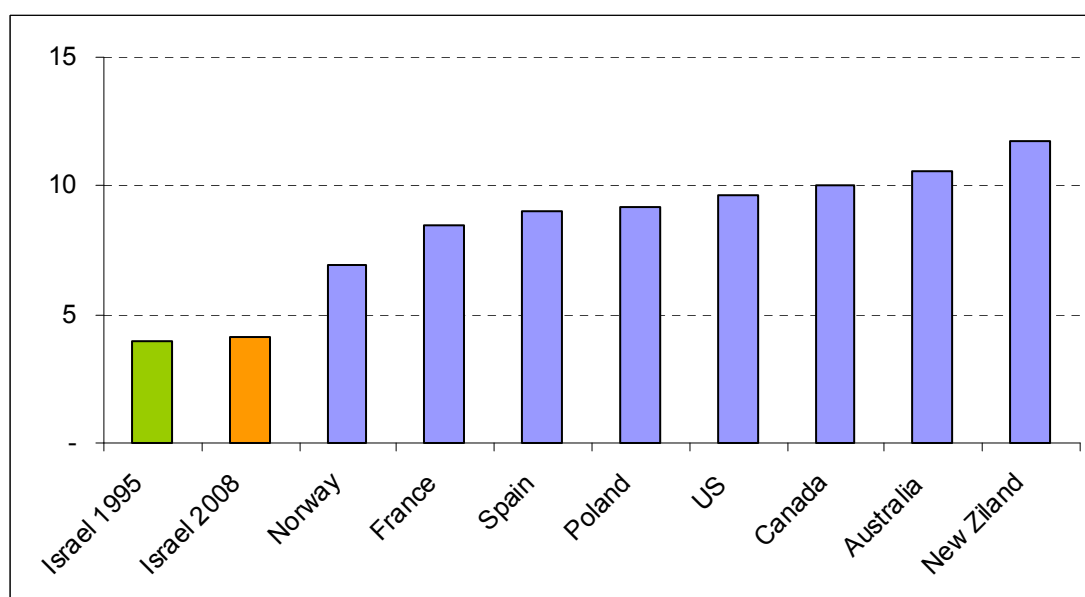
Figure A3. Per Capita Human Capital, 2006



Source: Israeli Central Bureau of Statistics, processed by authors; OECD (2010)

Note: Data of the countries (excluding Israel) relates to the year 2006. Data relating to Israel are in 2008 prices.

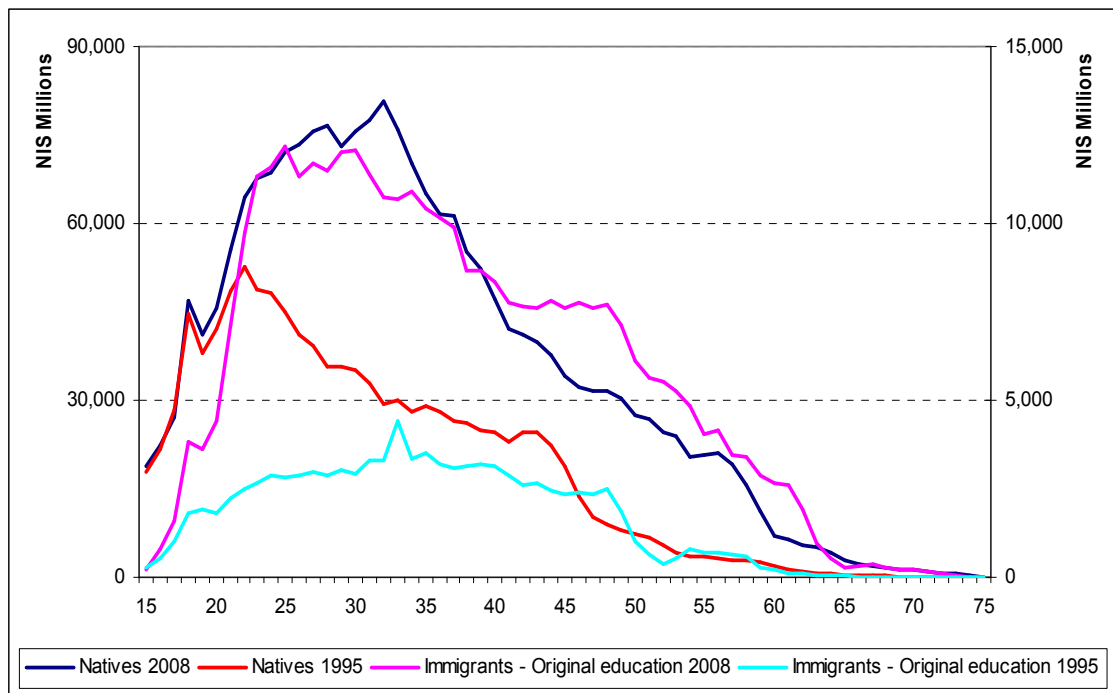
Figure A4. Ratios of Total Stock of Human Capital to GDP, 2006



Source: Israeli Central Bureau of Statistics, processed by authors; OECD (2010)

Note: Data of the countries (excluding Israel) relates to the year 2006. Data relating to Israel are in 2008 prices.

Figure A5. Lifetime labor income, by age (2008 prices)



Source: Israeli Central Bureau of Statistics, processed by authors

Note: Data of the countries (excluding Israel) relates to the year 2006. Data relating to Israel are in 2008 prices.