

ISRAEL'S BRAIN DRAIN

ERIC D. GOULD AND OMER MOAV¹

This paper examines the rate of emigration from Israel—known as "*yerida*"—in the years 1995 to 2004. Specifically, we examine how the rate of *yerida* varies according to education levels, employment status, income, marital status, and the number of years living in Israel. The analysis uses data from the 1995 Israeli census, combined with an indicator for *yerida* status as of 2004. The data show that the probability of emigrating from Israel is 2.5 times higher for educated individuals (individuals with a bachelor's degree or higher) than those with less education. A similar pattern exists for new immigrants to Israel, although the magnitudes are much larger and the relationship between education and the probability of leaving Israel is much more pronounced.

1. INTRODUCTION

This paper examines the patterns of emigration from Israel, known in Hebrew as "*yerida*". Specifically, we examine how the rate of *yerida* varies according to education levels, employment status, income, marital status, and the number of years living in Israel. The analysis uses data from the 1995 Israeli census, combined with an indicator for *yerida* status as of 2004. The data show that the probability of emigrating from Israel is 2.5 times higher for educated individuals (holders of a bachelor's degree or higher) than those with less education.

The Ministry of Immigrant Absorption published an estimate in November 2003 that 750,000 Israelis are living abroad (mostly in the United States and Canada), which represents about 12.5% of the total Jewish population in Israel. Moreover, according to these estimates, the number of Israelis leaving the country in 2005 exceeded twenty-five thousand. By comparison, in the three preceding years, 2002–04, about nineteen thousand Israelis left the country per year.

Our paper shows that the problem of *yerida* is far more severe than what has been suggested by prior research, which focused on the extent of *yerida*, the destinations for people leaving Israel, and the general reasons for *yerida*. Our analysis shows that the

¹ Eric Gould: The Department of Economics, Hebrew University of Jerusalem and the Economic-Social Institute at Shalem Center. Omer Moav: The Department of Economics, the Hebrew University of Jerusalem; the Economic-Social Institute at Shalem Center; and London University. The authors wish to thank Tamar Roth and Solomon Adelsky for their help in research, and the Central Bureau of Statistics for the data file. The authors also wish to thank two anonymous referees for their comments which contributed significantly to improving the paper.

"*yordim*"—the commonly used term for people who emigrate from Israel—do not constitute a representative cross-section of the population. Rather, the *yordim* constitute a group of people which is significantly younger and more educated than the general population. This pattern is particularly acute among immigrants to Israel from the former Soviet Union. Many of the young, educated people that came from the former Soviet Union have moved on to Western countries, and today there is even a significant amount of emigration back to Russia.

The international emigration of educated workers—"the brain drain"—has generated a lot of interest in recent years in the academic literature and in the popular media. The growing demand for skilled workers has brought about increased openness in the immigration policy of many developed countries, especially when it comes to workers who are in "high demand", such as well-educated individuals. Indeed, several papers find a considerable rise in the scope of emigration on the part of well-educated people during the 1990's. The rapid growth of the high-tech sector, combined with a general decrease in birth-rates, has evoked concern in countries like Canada, Britain and Germany, which therefore adapted their immigration policy so as to encourage the immigration of highly skilled workers.² Germany, for instance, which traditionally offered very few opportunities for permanent immigration, increased its acceptance of well-educated immigrants in high-demand occupations, such as computer programmers.

The emigration of Israeli academics is therefore part of a worldwide phenomenon which is expected to increase in the future. The "information revolution" makes job-hunting and relocating in foreign countries easier than ever before, and keeping in touch with family and friends "back home" is cheaper than it used to be. As a result, the emigration of educated workers to Europe has risen significantly in the past 15 years.³ The total number of émigrés in OECD countries, to which the vast majority of developed countries belong, has increased by 64% in the decade between 1990 and 2000. The growth was especially large for immigrants from less developed countries, particularly from Latin American countries, the Caribbean (93%), and from Africa (113%).⁴

The purpose of this paper is to characterize the types of people who were most likely to leave Israel in the last decade: Israeli *yordim*. In the context of our paper, we use the term "brain drain" to describe the situation where there is a positive correlation between the tendency to leave Israel and the level of education. In other words, a "brain drain" is exemplified by the fact that the *yordim* are not a representative cross-section of the population—they come disproportionately from the upper echelons of the education distribution. In order to obtain a fuller picture of the net gain or loss of brain power in Israel, we also need to consider the flow of immigration into Israel. The wave of immigration that Israel experienced since the 1960s and especially during the 1990s included a large number of people with higher education, especially immigrants who came from a scientific or academic background. However, in view of the significant decline in the volume of immigration in recent years, it would seem that this source of educated

² Docquier, Lohest and Marfouk (2005).

³ Becker et al. (2003).

⁴ Docquier, Lohest and Marfouk (2005).

people is on the decline.⁵ Also, the existence of a "brain drain" does not mean that the total number of educated people in Israel, or even their proportion in the population, has been dropping over time. Israel's higher education system produces about 27,000 new graduates with academic degrees, most of whom remain in Israel.

The fact that people with higher education constitute a higher percentage of Israeli émigrés is not unusual. According to the theoretical and empirical literature, this pattern is the norm rather than the exception.⁶ According to the literature, if the return to education and capital after taxes is lower in the country of origin than in a potential country of destination, then those who choose to emigrate should come from the upper ends of the education and income distribution. However, these results are typically found for less-developed countries. In contrast to the large brain drain experienced by less-developed countries to developed countries, Israel is a case of a developed country that loses a significant percentage of its educated citizens to other developed countries.

It is worth mentioning that there is a claim in the economic literature that a brain drain could have a positive impact on the accumulation of education in a country's economy. In developing countries, the opportunity to emigrate provides incentives to individuals to invest in their own education, so that they may be able to emigrate after completing their education. As a result, it is possible that the brain drain ultimately has a positive impact on the total number of educated persons in the economy.⁷ However, Schiff (2005) argues that it is highly improbable that this positive effect outweighs the direct negative effect of educated people leaving the country. In addition, it is unlikely that in the context of the Israeli economy, characterized as it is by a high return to education and widespread access to subsidized education, the prospect of emigrating from the country would have a decisive impact on acquiring education.⁸

2. FINDINGS

In this section, we present our main findings using data from the 1995 Israeli Census. Every respondent in the 1995 Census was living in Israel as of 1995, but our data include an additional variable which was included in the 1995 Census which indicates whether the respondent is defined as a *yored*, or émigré, as of 2004 by the Central Bureau of Statistics.

However, before we present our analysis using the Israel Census, we first present our findings from the U.S. Census of 2000. The U.S. Census data cover about 5% of the population in the United States, and contain information about the country of birth and education level of each respondent. Using this data, we can compute the brain drain from many countries to the US, and see how Israel compares to other countries. To do this, we

⁵ According to the Central Bureau of Statistics, the number of immigrants to Israel in 2005 was about 21,000, fewer than the number of emigrants, and a third of that number were children and pensioners.

⁶ See: Borjas (1987), Chiswick (1999) Chiquiar and Hanson (2005).

⁷ See: Borjas (1987), Chiswick (1999) Chiquiar and Hanson (2005).

⁸ In addition, Beine et al. (2006) show that in countries characterized by high-quality human capital, such as Israel, the option of emigration mainly affects the field of studies rather than the decision of acquiring human capital.

focus on workers who are 30-50 years old, since this is the age group in the prime of their careers and who have largely completed their education.

The results are presented in Table 1. For many reasons, the overall number of émigrés (see "number of émigrés aged 30-50" in the table) is very low compared to the various estimates of the number of Israelis emigrating to the United States. This is in part due to restricting our sample to the 30-50 age group, and also because we only have information on the country of birth, and many *yordim* from Israel were not actually born in Israel. (Only about half of Israeli citizens are Israeli-born.) Also, it could be the case that some of the *yordim* have passed away, and some of them could be in the US illegally, and therefore avoid taking part in the census or do not provide truthful answers (despite the pledge of census takers not to make the information available to the Immigration Authorities).

However, our main purpose for using the U.S. data is to compare immigrants from Israel to those of other countries, rather than measuring the number of immigrants from Israel. Since a considerable number of those leaving Israel are not Israeli-born, which is unlike the situation in other countries, comparing Israel to other countries may be biased. Also, another problem with the data is that the U.S. Census does not distinguish between those born in Israel versus Palestine. So, when we compute the percentage of Israelis who leave the country (or percentage which are college graduates), we are likely to be counting some Palestinians as *yordim* in our calculations, even though the extent of Palestinian emigration to the U.S. is considerably lower—according to various estimates—than Israeli emigration.

We focus on 28 countries which represent the largest exporters of immigrants to the United States. The sample includes mostly Western economies, which form a better basis for comparison with Israel than do poor countries.⁹ Table 1 shows that the average index of emigration, i.e., the number of emigres per 10,000 residents, is 33.36, with the index for Israel being nearly three times as high: 95.51. Only two countries have a higher index—Ireland (143.9) and Portugal (99.21). When examining the index for educated émigrés, i.e., those with a college degree, the average index is 12.41 and Israel's index is more than three times higher, 41.45. Using this index, Israel is now higher than Portugal, and the gap between Israel and Ireland (49.09) narrows considerably. When taking into account the bias caused by the fact that many of the Israeli émigrés are not Israeli-born, it is likely that, percentage-wise, Israel would in fact be located at the top of the table among countries losing their educated citizens to the United States.

We now turn our attention to characterizing the *yordim* according to the 1995 Israeli Census and the indicator for *yerida* status as of 2004. Our goal is to understand the factors which influence the decision to emigrate from Israel, and examine whether the evidence is consistent with the "brain drain" phenomenon. As such, we examine whether the decision to emigrate is correlated with income, education, and occupation. Furthermore, we examine the issue separately for native Israelis, veteran immigrants, and recent immigrants.

⁹ According to Carrington and Detragiache (1999), it is specifically émigrés from developing countries that are typified by a large percentage of high education – probably due to the American Immigration Authority's policy with regard to those countries.

Table 1
Indices of emigration to the United States

Country of Origin	No. of 30-50-year-old émigrés	Percentage college graduates	No. of college graduates	Population of country of origin	Émigrés per 10,000 residents	College graduate émigrés per 10,000 residents
Denmark	10,275	52	5,329	5,368,854	19.14	9.93
Finland	8,170	55	4,487	5,172,033	15.80	8.68
Norway	9,030	55	4,943	5,183,545	17.42	9.54
Sweden	17,174	56	9,584	8,876,744	19.35	10.80
GB*	307,694	42	128,600	59,778,002	51.47	21.51
Ireland	55,877	34	19,061	3,883,159	143.90	49.09
Belgium	12,034	53	6,397	10,274,595	11.71	6.23
France	89,213	47	42,323	59,765,983	14.93	7.08
Netherlands	34,318	49	16,691	16,067,754	21.36	10.39
Switzerland	17,295	60	10,300	7,301,994	23.69	14.11
Greece	70,825	27	19,366	10,645,343	66.53	18.19
Italy	147,789	27	39,532	57,715,625	25.61	6.85
Portugal	100,044	10	9,700	10,084,245	99.21	9.62
Spain	46,546	39	18,020	40,077,100	11.61	4.50
Austria	15,936	43	6,877	8,169,929	19.51	8.42
Czechoslovakia	19,990	41	8,230	10,256,760	19.49	8.02
Germany	429,158	34	145,130	83,251,851	51.55	17.43
Hungary	20,498	39	7,969	10,075,034	20.35	7.91
Poland	176,737	27	47,587	38,625,478	45.76	12.32
Romania	48,294	43	20,877	22,317,730	21.64	9.35
USSR/Russia	271,364	53	143,202	144,978,573	18.72	9.88
China	709,415	55	387,300	1,284,303,705	5.52	3.02
Japan	225,484	48	108,981	126,974,628	17.76	8.58
Korea	388,783	45	173,128	70,548,195	55.11	24.54
Thailand	57,773	35	19,987	62,354,402	9.27	3.21
India	667,434	65	432,037	1,045,845,226	6.38	4.13
Israel/Palestine	57,589	43	24,994	6,029,529	95.51	41.45
Turkey	39,649	45	17,974	67,308,928	5.89	2.67

* England, Scotland and Wales.

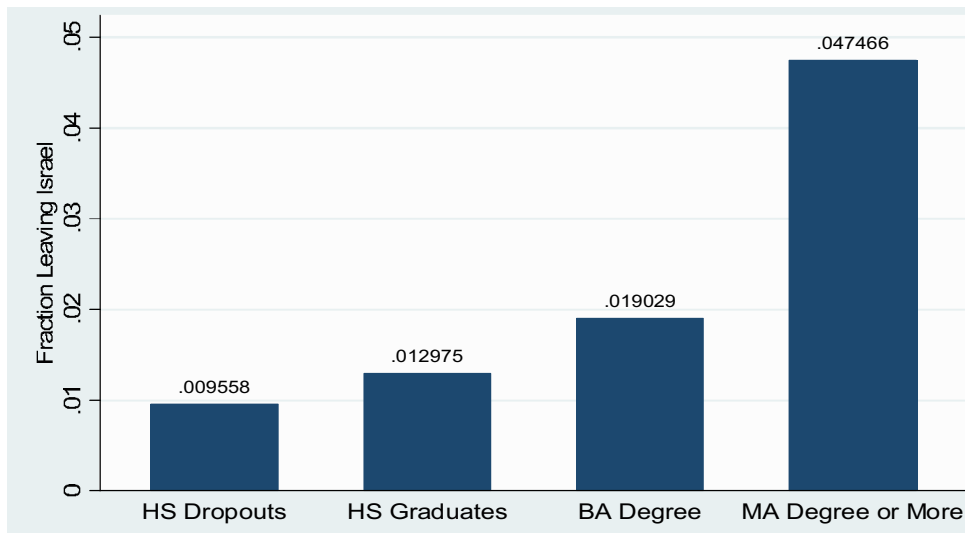
It should be noted that our goal is to examine the composition of the *yordim*, not to improve on the estimates made by the Central Bureau of Statistics concerning the annual rate of emigration, which has been estimated to be 19,000 *yordim* per year in recent years, and approximately 25,000 in the year 2005.

As mentioned above, our data come from the 1995 Israeli Census and an indicator for

yerida status as defined by the Central Bureau of Statistics for 2004. An individual is defined to be a *yored* if he/she is an Israeli citizen who has been abroad for at least 365 consecutive days, and if he/she returned from abroad, he/she did not stay in the country for more than 90 days after his return. (That is, he/she did not move back to Israel but came back only for a short visit.) Figure 1a shows the rate of people leaving Israel by education group for a sample of 30- to 40-year-old individuals. We focus on those over the age of 30 in order to restrict the sample to those who have already completed their education. Figure 1a makes it clear that education has a significant impact on the extent of *yerida*. During the period of 1995-2004, the rate of those leaving the country among high school graduates (those with a high school certificate but without a college/university degree) is about 1.3%, and the rate drops to under one percent for individuals who dropped out of high school. That is, the rate of *yerida* among high-school graduates is about 35% higher than the rate among those who did not complete high school.

The gaps are even larger when we look at those with a first degree or those with an MA degree or higher. More than 4.7% of those with an MA degree or higher left Israel during this time period, which is almost 2.5 times more than those with a first degree, over 3.5 times more than high school graduates, and nearly 5 times more than high school dropouts.

Figure 1a
Rate of *Yerida* as of 2004 among Jews aged 30 to 40 in the 1995 census, by education



It is only natural to suspect that the criterion chosen for leaving the country creates a bias which artificially increases the rate of educated *yordim*. Many individuals live abroad for a few years in the context of work, such as government assignments, academic sabbaticals, company assignments, etc. These workers typically have no intention to leave the country permanently, but they might nonetheless be defined as *yordim* by the Central Bureau of Statistics. To the extent that educated people are more inclined to live abroad on

a temporary basis for these reasons, it is possible that the gaps reported in Figure 1a overstate the true gap between the different education groups. However, if we narrow our definition of *yordim* to those leaving the country for two years rather than one, this will obviously cause a decrease in the rate of *yordim* from all education groups, but does not cause a change in the relative pattern. This is also true if we restrict the definition of *yordim* further by including only those that left the country for three years or more.

Moreover, we can assess the accuracy of the *yored* variable by comparing the status of those that were considered *yordim* in 2002 with those that are defined as *yordim* in 2004. Among the group of high school dropouts, about 98% of those defined by the Central Bureau of Statistics as *yordim* at the end of 2002 are also defined as such at the end of 2004. Similarly, the rates for high school graduates, college graduates, and those with an MA degree or higher are approximately 99%, 96% and 98% respectively. We do not see a systematic pattern which indicates that the educated *yordim* are more likely to come back after two years. This finding indicates that the pattern across education groups in *yerida* status in Figure 1a appears to be a real phenomenon.

Figure 1b describes the rate of *yordim* by education group for a sample of 40- to 50-year-old individuals. As expected, the numbers are lower, and there is a certain decrease in the relative gaps between the groups, yet the basic pattern remains unchanged—educated people are much more likely to leave Israel than less-educated individuals.

Figure 1b
Rate of Yerida as of 2004 among Jews aged 40 to 50 in the 1995 census, by education

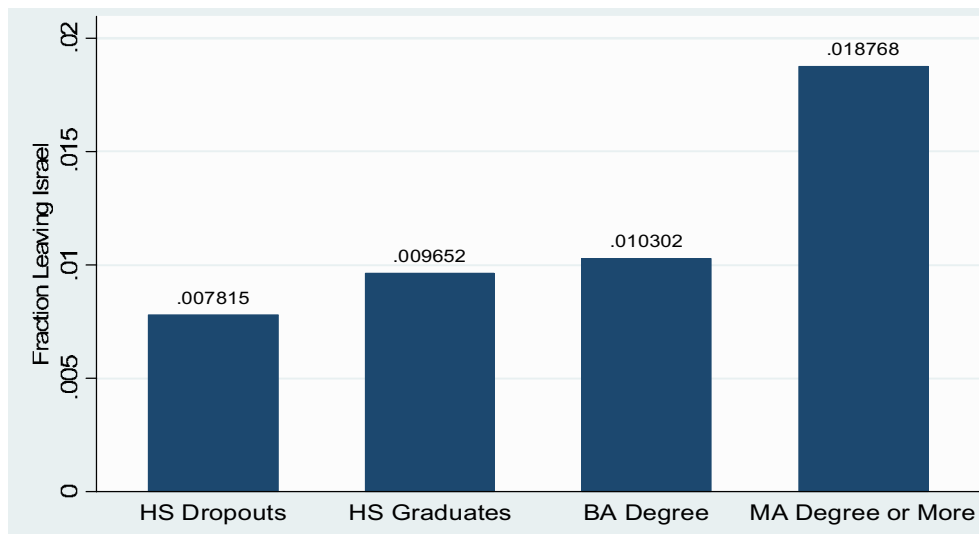


Figure 1c narrows the sample down to 30- to 40-year-old individuals who were born in Israel. The magnitudes are much lower in Figure 1c than in Figure 1a, which indicates that native Israelis have a much lower rate of *yerida* than those who were born outside of Israel. However, even among natives, the relationship between education and the propensity to

leave Israel is strong. For example, Figure 1c shows that 0.7% of native high school dropouts left the country during this period, while the number rises to 0.86% for native high school graduates (i.e. 24% more than high school dropouts). The rate goes up to 1.17% for college graduates, meaning that the difference between those with a first degree and those without one is about 36%. A little over 2.4% of those holding a masters degree left the country during the period—more than twice the rate among college graduates (without an MA degree) and three times the rate among individuals without a first degree. In other words, the relationship between education and *yerida* is similar among native Israelis to that in the total sample. However, the magnitudes are significantly lower, and the gaps between the various education groups are somewhat lower.

Figure 1c

Rate of Yerida as of 2004 among Jews born in Israel aged 30 to 40 in the 1995 census, by education

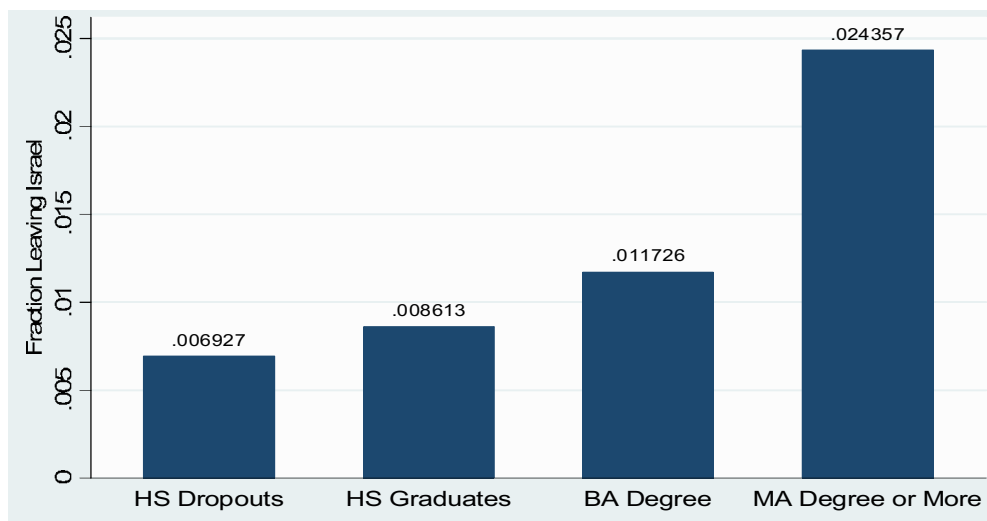


Figure 1d shows the patterns of *yerida* by education groups among veteran immigrants, defined as those who were born outside of Israel but arrived in Israel before 1989 (i.e., those that have lived in Israel for at least 15 years at the time of the 1995 census). Again, the relationship between education levels and the probability of leaving Israel is similar to that in the whole sample and in the sample of native Israelis only. The magnitudes are higher than among native Israelis, except for the high school dropouts where the gaps between native Israelis and veteran immigrants are not significant.

Figure 1d
Rate of Yerida as of 2004 among veteran immigrants aged 30 to 40 in the 1995 census, by education

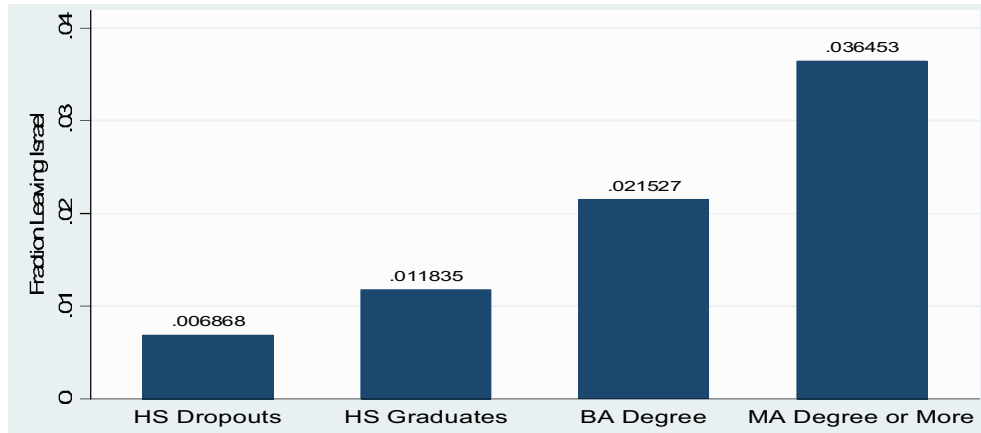
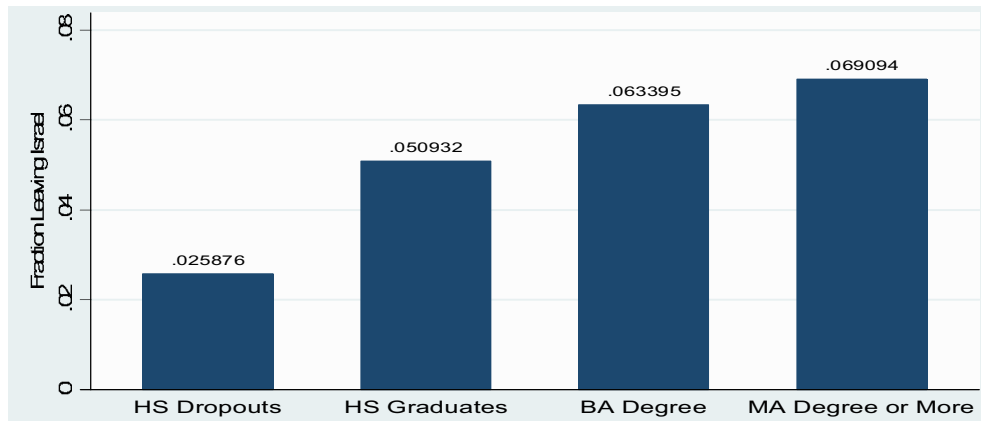


Figure 1e presents the results for recent immigrants (those who born outside Israel and came to Israel after 1989). The rate of *yerida* for recent immigrants is considerably higher than among veteran immigrants and native Israelis. The difference between the recent immigrants and the veteran immigrants is 90% for the masters degree group, 294% for college graduates, 430% for high school graduates, and 377% for high school dropouts. The effect of education on *yerida* is strong for recent immigrants as well. The gaps between the education groups in terms of percentage points are higher for recent immigrants than for native Israelis and veteran immigrants. However, the relative gaps (percentage difference) between the education groups are lower than among the more veteran groups.

Figure 1e
Rate of Yerida as of 2004 among new immigrants aged 30 to 40 in the 1995 census, by education



We now examine the relationship between occupational status and *yerida*. According to economic theory, sectors characterized by high rates of emigration will be those where the skills of workers will be more easily transferred to a different country. For example, the transferability of skills will be high when the language barrier is low, costs for being certified are low, or the investment required to adapt a person's human capital to the destination country is small. The propensity to emigrate may also depend on whether the sector is highly regulated or controlled by labor unions. A sector that is controlled by strong labor unions is typically characterized by narrow salary gaps among union members, which means that the return to exerting effort and performing well is low. If this is true, workers who are ambitious may seek a higher return to their effort and ability by leaving the country.

Figure 2a shows the patterns of emigration from Israel for different occupations. Academic faculty ("Lecturers") have the highest rate of *yerida* at 7.8%. They are followed by physicians with a relatively high rate of *yerida* at 6.5%. Engineers and scientists (who are not academic faculty) are far behind, with 3.7% and 3.2% respectively. Teachers and "other" have much lower rates of *yerida* at 1.4% to 1.6% respectively.

These results are consistent with the simple economic framework described above. Doctors and academic faculty have high rates of *yerida*, most likely because their salaries are highly regulated by the government and governed by strong unions. In addition, their skills are highly transferable to the United States. In contrast, teachers are highly dependent on their language skills, and therefore, they leave Israel in lower rates due to the language barrier.

It is worth mentioning, however, that it is reasonable to assume that the results for doctors and academic faculty are slightly inflated, due to the many sabbatical trips which could cause them to be counted as *yordim* even though they might return after a year or two. However, even for these two groups, comparing the *yerida* indicator for 2002 with that of 2004 demonstrates that only 6.4% of physicians defined as *yordim* in 2002 returned to Israel by the end of 2004, and among university faculty this figure was only 2.6%.

Figure 2a
Rate of *Yerida* as of 2004 among Jews aged 30 to 40 in the 1995 census, by occupation

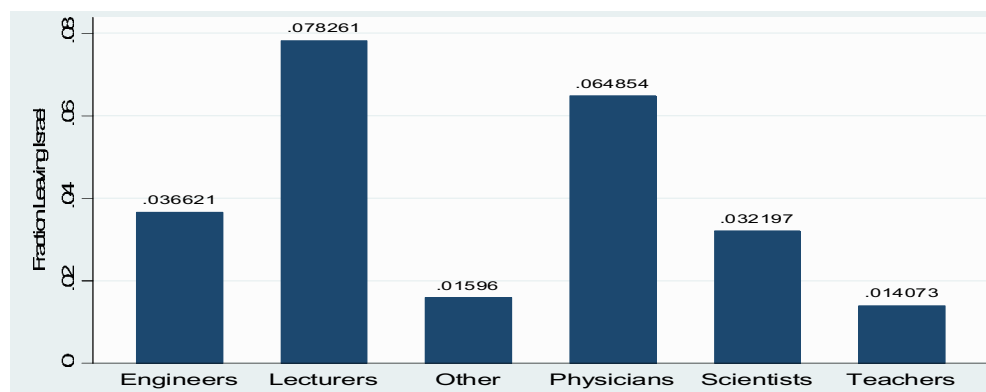
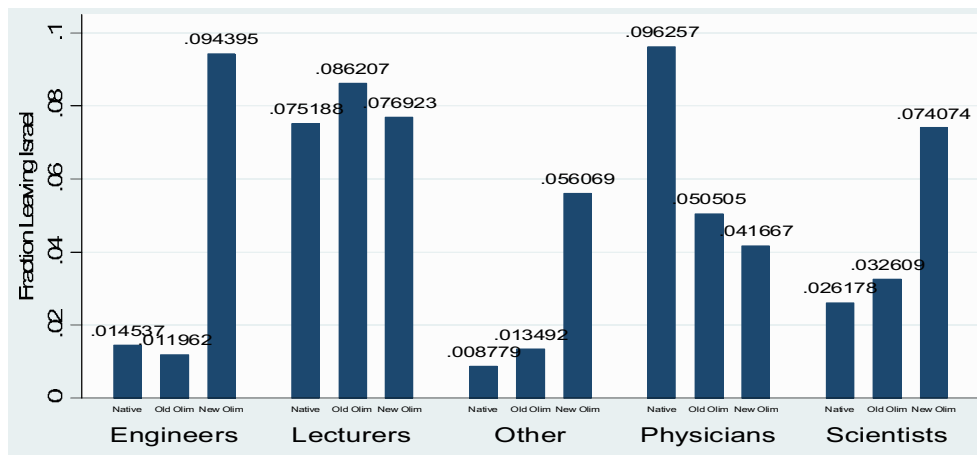


Figure 2b displays the patterns of *yerida* across occupations for native Israelis, veteran immigrants, and recent immigrants. For simplicity, we merged the teachers with "other." Figure 2b illustrates several interesting and surprising findings, and it is beyond the scope of this paper to explain each one comprehensively. For example, while it is true that recent immigrants tend to have higher rates of *yerida* than natives or more veteran immigrants, this is not the case for doctors. Among native doctors, 9.6% of them are defined as *yordim*, which is double the rate for veteran and recent immigrants. This finding could stem from the difference in the way that institutions in the United States accept a medical degree received from an Israeli medical school versus a medical degree received in the former Soviet Union. In addition, Israel went to great lengths to assist doctors from Russia to be certified and licensed to practice in Israel, while a medical degree from Russia was not easily accepted in the U.S.

Figure 2b

Rate of Yerida as of 2004 among Jews aged 30 to 40 in the 1995 census, by occupation, and divided into native Israelis, veteran immigrants, recent immigrants



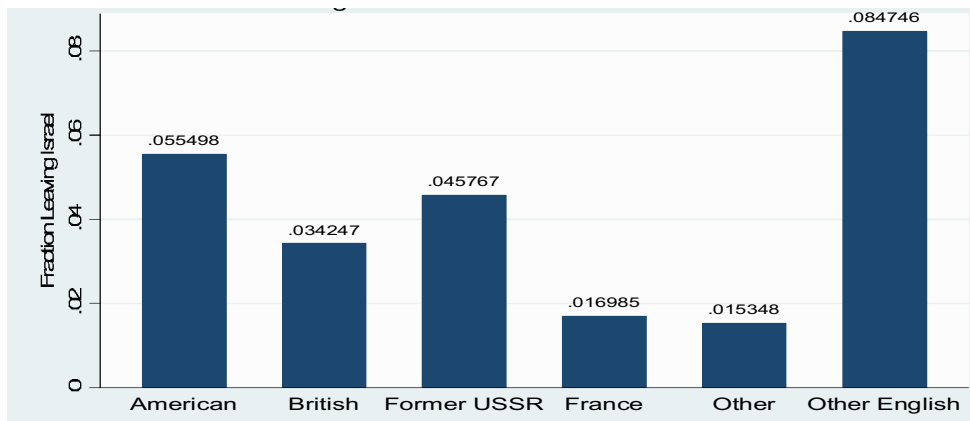
For engineers, Figure 2b shows that there is a huge gap in the rate of *yerida* between new immigrants and the other two groups. Engineers who are new immigrants left the country at a rate of 9.4%, while the rates for natives and veteran immigrants are 1.45% and 1.2% respectively. Here, too, we can only speculate about the reasons behind this huge difference, but two possible factors come to mind. First, many engineers have public sector jobs characterized by high salaries, a high probability of receiving *tenure* (permanent status), and high entry barriers. Workers with the right "connections" have an easier time finding employment as engineers with the Israel Electric Corporation, Mekorot (the Israel water company), the Ports Authority, and other government monopolies. Recent immigrants are unlikely to have the social networks necessary to land such a job. It is also possible that recent immigrants are more likely to have acquired their skills abroad, and these skills are less suited to the demand for engineers in the Israeli labor market, and perhaps more suited to the skills required in other countries.

Scientists exhibit a pattern similar to engineers, whereby the new immigrants leave the country at much higher rates than native Israelis or veteran immigrants. Academic faculty ("Lecturers") leave the country at a high rate, but there is no clear pattern across the three groups. As for the rest of the population, the total rate of *yerida* is lower for all groups relative to other occupations, but new immigrants still leave the country at a much higher rate than the other two groups within the same occupation.

Figure 3 explores the issue of why immigrants tend to leave the country at a high rate, by presenting the rate of *yerida* for immigrants by country of origin. The figure shows that English speaking immigrants tend to leave Israel at the highest rate, most likely due to the lack of a language barrier and visa problems to enter the United States or Europe. Immigrants from France have the lowest rate of *yerida*, while Russian immigrants leave Israel at a rate that is similar to native English-speaking immigrants.

Figure 3

Rate of Yerida as of 2004 among immigrants aged 30 to 40 in the 1995 census, by country of origin



We now turn our attention to examining the effect of income on *yerida*. Theoretically, income has an ambiguous effect on the tendency to emigrate. On the one hand, a lower income should increase a person's inclination to try his luck overseas. On the other hand, individuals with high ability, despite having a relatively high level of income within Israel, may be able to earn a much larger income in the United States. This is especially true if the labor market is very rigid due to strong unions or regulations, so that high ability workers find it harder to translate their high ability into high income. For these types of workers, emigration is a way for them to escape the burdens of high regulation and high taxes, and go to a more competitive environment where their talent and skill is rewarded and encouraged at a higher rate.

Figure 4a displays the relationship between income (adjusted for age) and *yerida*. The diagram reveals a weak positive relationship, three hundredths of a percent on average for

each decile,¹⁰ despite the two groups which deviate from the trend significantly—the second decile from the bottom and the top decile. Regarding to the top decile, the rate of *yerida* is lower than the previous decile, which may reflect the idea that these workers have landed a "cushy job" which will not be easy to find in the United States. A breakdown of the top decile into five groups, as shown in Figure 4b, provides some, albeit weak, support for this theory. Within the top decile, there is a negative relation between income and *yerida*.

Figure 4a

Rate of Yerida as of 2004 among native Israeli Jews aged 30 to 40 in the 1995 census, by income deciles

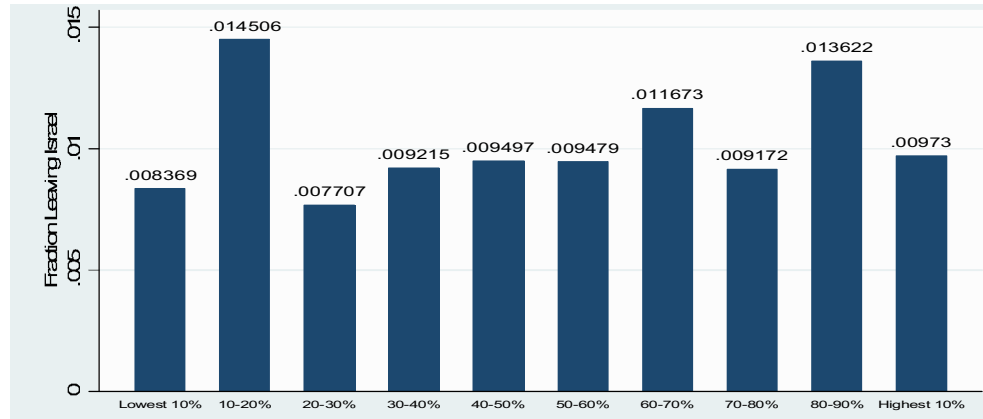
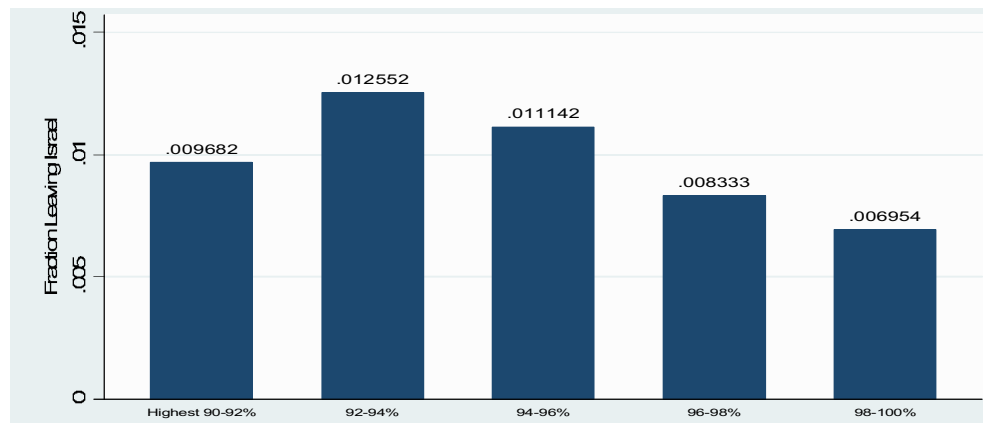


Figure 4b

Rate of Yerida as of 2004 among native Israeli Jews aged 30 to 40 in the 1995 census - breakdown of the top decile of income distribution



¹⁰ Linear regression coefficient without the effect of education. When you add education to the regression, see Table 3 below, the impact of income is not significant.

With regard to new immigrants, Figure 5 reveals a slightly different picture. If we ignore the bottom decile, we get a positive correlation between income and the tendency to leave the country. That is, on the whole, the effect of the State repressing its talented population overcomes the "landing a cushy job" effect. This pattern is particularly evident in the lower-middle part of the income distribution—the second to seventh decile. Those who have not succeeded in landing a good job, but who have ability, diligence, or education which are reflected in their income, demonstrate a higher tendency to emigrate. On the other hand, among immigrants who managed to squeeze into the top three deciles of income, the dominant factor is the effect of landing a "cushy job." The higher one's income (within the top tail of the distribution), the smaller the tendency to give up the job in Israel in favor of emigration. In contrast to native Israelis, we see no significant trend within the top decile.

Figure 5

Rate of Yerida as of 2004 among new immigrants aged 30 to 40 in the 1995 census by income deciles

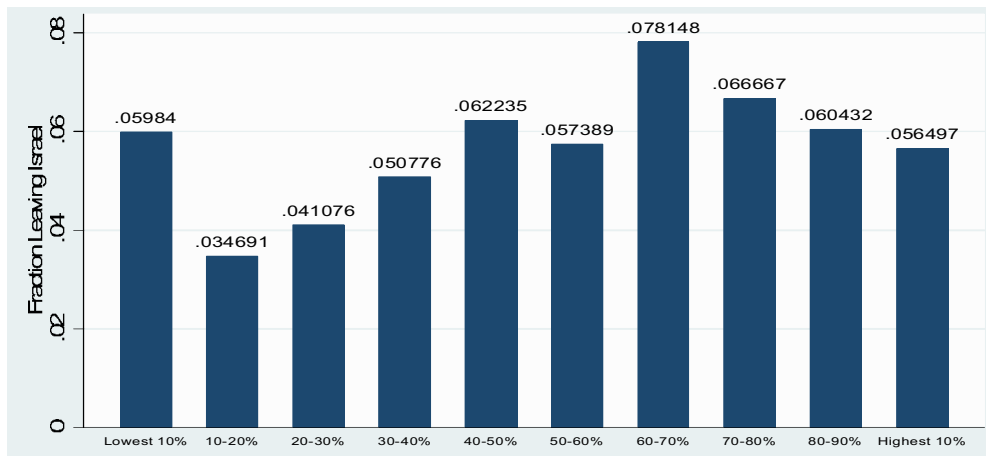


Table 2 presents summary data on emigration for various education groups, immigrants versus natives, and by sex and marital status. As seen earlier, educated individuals emigrate more whichever way we look at the data, except for unmarried Israeli-born males. Among educated individuals, married people tend to emigrate more than single people, whereas the reverse is true for those with less education. This pattern is especially pronounced for native Israelis. Among immigrants, there is no systematic relationship between education, marriage, and emigration.

Table 2
Rate of Yerida as of 2004 among Jews aged 30 to 40 in the 1995 census

	Men		Women	
	College Graduates	Less than College	College Graduates	Less than College
<u>Overall</u>				
Married	2.30	1.05	2.25	0.92
Not Married	2.54	1.56	2.05	1.31
<u>Native Israelis</u>				
Married	1.20	0.74	1.14	0.66
Not Married	1.10	1.16	1.19	0.98
<u>All Olim</u>				
Married	3.35	1.45	3.27	1.26
Not Married	4.42	2.34	2.76	1.71
<u>Post 1989 Olim</u>				
Married	5.62	3.71	4.88	3.20
Not Married	6.94	4.58	2.98	2.75

In order to examine the statistical significance of the effect of education on the tendency to emigrate, Table 3 presents the coefficients from regressing emigration status on years of education, marital status, sex, and income. Regressions are presented for veteran immigrants and recent immigrants. The effect of education is positive and highly significant, and this relationship is 3.8 times stronger among immigrants than for natives. This result says that immigrants are not only more likely to leave than natives, but the "brain drain" phenomenon is much stronger for immigrants than for natives.

Table 3
Linear regression model estimates explaining the probability of being a "yored" as of 2004 among Jews aged 30 to 40 in the 1995 census (standard deviation in parentheses)

	Dependent Variable = 1 if individual is <i>Yored</i> in 2004	
	All Natives	Recent Immigrants (post 1989)
Constant	0.0175 (0.0025)	0.0991 (0.0110)
Education	0.0007 (0.0001)	0.0027 (0.0004)
Married	-0.0031 (0.0008)	-0.0024 (0.0042)
Male	0.0014 (0.0006)	0.0107 (0.0025)
Log Total Earned Income	-0.0001 (0.0001)	-0.0011 (0.0007)

The data clearly show that educated people are more likely to emigrate from Israel, but it is impossible to know why this is the case from the census data used above. A questionnaire which we distributed to 320 Israelis living in the United States helps to shed light on the reasons underlying the patterns seen so far.¹¹ However, the sample is quite small and is not a representative cross-section of the population of [Israeli] émigrés in the United States. However, with this caveat in mind, the survey data do provide some support for certain explanations underlying the patterns of emigration that we see in the census data.

Table 4 shows that the general issue of employment was highly relevant for the decision to emigrate. The large majority of respondents, 71%, stated that their partner/spouse's job was "highly relevant," and 81% stated "unemployment in Israel" as very relevant factors in the emigration decision. However, respondents also mentioned that they were worried about the burdens of high taxes and the high cost of living in Israel (this was "highly relevant" for 66% and 75% respectively). Interestingly, respondents were more worried about the quality of schools in Israel than about the political situation. Overall, these results support the idea that the decision to emigrate is directly related to the economic opportunities that people find in Israel versus overseas.

Table 4
The degree of relevance of various factors in the decision to leave Israel
(percent)

	Highly relevant	Relevant	Not relevant
Partner's/spouse's work	71	6	21
Unemployment in Israel	81	12	6
Interest at work	34	28	37
Income from work	43	21	34
Taxation in Israel	65.6	15.6	18.75
Studies	43	25	31.25
Quality of schools	75	6	15.6
Political and security situation	65.5	21.8	15.6
Extent of regulation	81	12.5	6
Cost of living in Israel	75	12.5	12.5

3. CONCLUSIONS AND DISCUSSION OF POLICY IMPLICATIONS

One of the chief factors explaining economic development is the level of human capital in an economy. Poor countries, which are typically characterized by a low percent of highly educated people, generally suffer from a significant brain drain.¹² The beneficiaries of this phenomenon are developed countries which absorb the best young men and women from poorer countries, without incurring the cost of investing in their education. Our paper shows

¹¹ In collaboration with Maayan Tzuk and with the aid of Sarid Institute.

¹² Carrington and Detragiache (1999).

that Israel, despite being a developed country, suffers from a significant brain drain, instead of being a magnet for educated immigrants.¹³

We now discuss why Israel is different from most developed countries regarding the brain drain, and what policies could be helpful for coping with it. Our discussion will be somewhat speculative, but due to the importance of the issue, we think it is worthwhile to raise conjectures which are consistent with economic theory and with the data.

The most striking finding in this paper is the very high rate of emigration for new immigrants, who came mostly from the former Soviet Union. Many of the young educated people of this group left Israel to go to Western countries, and surprisingly enough, there is a fairly wide phenomenon of emigrating back to Russia. Russia, which is much poorer than Israel, does have a very flexible labor market which rewards successful workers and encourages risk-taking by budding entrepreneurs by imposing a very low income tax rate—about 13%. As a result, workers who are talented and educated often earn a higher standard of living than in Israel, and this could be an important factor creating the particularly strong "brain drain" of Russian immigrants.

In contrast to Russia, let us consider the case of Italy. Italy is richer than Israel, but is similar to Israel in the sense that it is one of the few developed countries that suffers from a serious brain drain. At the end of the 1990's, Italy lost more than 3% of all university graduates each year. As opposed to Italy and Israel, other developed countries typically enjoy a "brain gain" from immigration (more educated people enter rather than leave the country).¹⁴ The similarities between Israel and Italy could perhaps illuminate the reasons for the brain drain in these two countries. The Italian labor market, similar to its Israeli counterpart, is characterized by traditions and institutions which provide strong protection for employed workers, often to the detriment of those seeking to find a job. Young educated people in Italy suffer from a lack of competition in the labor market, where hiring practices lack transparency and are often based on personal contacts and nepotism rather than rewarding individual skills.¹⁵ As a result, new college graduates often have difficulty finding a job with a salary that can compete with alternatives in other countries, and therefore, they are encouraged to try their luck elsewhere in order to be rewarded for their talents and human capital investments.

Although it is a special case, the kibbutz movement in Israel is another example of the link between public policy and the brain drain. The reluctance of kibbutz members to adapt their system to changing times and to deal with the serious economic crisis that the kibbutz movement underwent during the 1980's, caused a massive desertion of their best young people. Sticking to the system caused most kibbutzim, after only two decades, to completely abandon the values of equality and mutual responsibility. Kibbutz veterans, who relied on the younger generation to support them, found themselves destitute in many kibbutzim.

¹³ As mentioned in the introduction, concurrently with the brain drain there is also immigration to Israel, some of which by persons with higher education; however in recent years these are smaller in scope than the scope of emigration.

¹⁴ Carrington and Detragiache (1999).

¹⁵ Soro-Bonmati (2001) and Checchi et al. (1999).

The kibbutz constitutes a prime example of Israel's socialistic tendencies and the consequences of this ideology. What happened to the Kibbutz movement is now happening to the country as a whole, as the best and the brightest seek an environment which rewards their skill and hard work. To combat this, the government needs to adopt a variety of actions aimed at encouraging economic growth, lowering taxes, and seeking to improve the quality of public services and the quality of the environment. We are living in an increasingly globalized economy where countries are competing for the best workers. These competitive forces will put pressure on all countries to encourage growth, saving, and entrepreneurship with low taxation and other policy instruments.¹⁶ If Israel wants to compete in this global market, it must react accordingly.

With the current set of social policies, the brain drain problem could get even worse. In Israel, a small population of workers is supporting a large population of children and non-working adults, to an extent unheard of in other developed countries. Most of this burden is placed on the shoulders of educated people, who pay a disproportionate share of taxes. The magnitude of this burden hurts the growth rate of the economy and can even be considered a danger to the existence of the State of Israel. Israel's military supremacy is a result of its qualitative and economic advantage over its neighbors, who have only accepted its existence because of its military prowess. A lack of economic prosperity accompanied by heavy taxation of the working population will only increase the rate of emigration of those shouldering the burden, which in turn will exacerbate the damage to the economy.¹⁷ Israel, without its qualitative and economic edge, will not be able to hold on to its productive citizens for very long, and will not be able to attract new educated immigrants. Therefore, it will be difficult for Israel to maintain its military superiority compared to its enemies—a superiority emanating from having a population which is highly educated and technologically "savvy."¹⁸

Israeli universities provide an eye-opening example of the way in which high taxation and labor market rigidities have encourage the emigration of some of Israel's finest academic talent. The university system is governed by a collective labor agreement which does not allow for payment of competitive salaries based on achievement, and does not allow universities to match offers given by universities outside of Israel. Talented young people who go to Europe and the United States to pursue their PhD at top universities often refuse job offers from Israeli universities upon completing their studies, despite their desire to live in Israel, because of the much lower salary offered. In the Unites States, market

¹⁶ Haupt and Janeba (2004), Edwards and de Rugy (2002).

¹⁷ Consistently with the findings of this research, according to a survey of the Manufacturers Association of Israel, about a third of young executives in the Association intend to transfer some of the production lines overseas. In addition to the need for proximity to the target markets, these executives mention the cost of manpower in Israel, the political situation, the excessive regulation, and the strikes at the ports as chief reasons for their intention to move part of the business activity out of Israel. (The survey was conducted by Midgam research Institute.)

¹⁸ Israel's taxation of the top twenty percent in the income distribution is among the highest in the world (Moav and Yifrach, 2006, Hazak, 2006), a rate creating a strong incentive for the productive population (whose percentage of the total population is smaller than that in developed countries) to try its luck somewhere else. The trend of giving exemptions and benefits to a large part of the public while increasing the burden on others encourages the emigration of young educated people.

forces and the competition for productive academics determine a person's salary. In contrast, there is no mechanism for universities in Israel to pay competitive salaries to attract talent or keep it from leaving, and the relationship between performance and salary is quite weak. Promotions in Israel are often based on age or personal contacts, rather than productivity. In addition, in contrast to the rest of the world, salaries are equalized across disciplines. For example, an economics professor in the US could earn four times as much as a professor of English. In Israel, this is not allowed. One could raise many objections to the American system and extol the virtues of having an egalitarian system in Israel—where all faculty members (with the same seniority) are paid the same amount regardless of their field, productivity, or whether they work at one of the prestigious universities or at lower ranked public college.¹⁹ But, this ideology has a cost, and we are witnessing it today with the decline of many leading departments in Israel which simply cannot compete with the salaries being offered abroad.

To take a concrete example, the combination of high taxes and low salaries (uniform across fields) leaves a beginning lecturer at an Israeli university with a net income of less than \$2000 a month. If this person works in the US, he will earn a net salary of over \$6000 a month if he is in Economics or over \$10,000 if he works in a business school. Such a huge gap makes it nearly impossible to attract the talent that is needed to maintain a leading university with an international reputation. This is reflected in the lamentable fact that leading American universities far outrank Israeli universities in their achievements.

European countries, where the wage system at universities is similar to that in Israel, have suffered from a similar problem—losing their best researchers to the United States. But, unlike Israel, most countries are stemming the tide by finding ways to pay salaries that are increasingly competitive in the global market. Britain is leading this process, but economies of the Continent, such as Germany, France and others, have also found ways to remunerate their best researchers and put a stop to the emigration to the United States. If Israel does not follow suit, the best scientific minds will continue to leave the country, and many departments will continue to deteriorate into mediocrity or worse.²⁰

Reforms are also important for the private sector, where wages are determined by the laws of supply and demand. As mentioned, the high rate of taxation (compared to the US) pushes Israelis who are talented and educated towards emigration. A high-tech employee who earns NIS 20,000 a month feels he has difficulty supporting his family. Half his income and about two-thirds of his marginal income are taken by the various tax authorities: income tax, national insurance, health tax, VAT, purchase taxes, local taxes (*Arnona*), licensing fees, Israel Broadcasting Service fees. True, he is far better off than an unemployed person or workers who make minimum wage. But, in many cases, he has the

¹⁹ The correlation between the rank and seniority and the economic alternatives is not very high.

²⁰ Notwithstanding the above, it is worth mentioning that there are in the public system, especially in higher education and in medicine, various mechanisms enabling some remuneration for excellence – whether within the formal system of such that circumvent the collective wage agreements. Kristal and Cohen (2005), for example, claim that the influence of the labor unions on wages has decreased, and that inequality in wages in public services has gone up during they years 1970-2001. Similarly, Zussman and Zakai (2005) document flexible mechanisms such as promotions and personal benefits which circumvented the wage agreements.

option of emigrating and materially improving his standard of living, while at the same time receiving an exemption from military reserve duty as an extra benefit.

In September 2005, upon publication of the Central Bureau of Statistic's data on the extent of emigration from Israel, then Minister of Internal Affairs Ophir Pines said that "the grim data oblige the government to do some soul-searching and begin fighting the phenomenon forthwith." Indeed, the emigration of the country's best young people and the plummeting level of *aliyah* (immigration to Israel) are not only problems per se, but are symptoms of a larger issue—the failure of the State of Israel to create a society that provides a high quality of life that will attract the best and the brightest of the Jewish people to immigrate, rather than pushing its talented citizens to search for a life outside the country. This paper, which shows that a disproportionate number of those leaving the country are well-educated, can help the Israeli government formulate a plan of action rather than merely a declaration of the need for soul-searching and urgent attention to the issue.

The objective of keeping potential émigrés from leaving Israel requires a variety of actions: lowering taxes on the middle-high class, curbing the power of labor unions, and other measures to increase competition and economic growth. Current policies are encouraging our brightest to leave the country in order to fulfill their potential. In recent years, tax rates have declined, but the tax burden placed on medium-to-high earners is still very high compared to Western averages, particularly the United States and Britain.²¹

These policy implications are not self-evident. For example, then-Minister Zevulun Orlev claimed at the 2003 Caesarea Conference that if the government practices a policy insensitive to the needs of the weaker population, it would not only make citizens feel that the State does not take responsibility for their fate, but would also lead to phenomena such as increased emigration and shirking of military duty. Our research shows that if welfare policy has any effect on emigration, the effect is in the reverse direction: those who carry the burden are the ones most likely to leave, not those that receive the benefits. Israel's educated population is the sector that pays the price for the failures of Israel's welfare policy—a policy which encourages many citizens to choose a life without work and to have many children without considering whether they can support them. The rapid growth of the non-working sector, combined with the low birthrates and high rates of emigration for educated workers, leave an increasingly heavy burden on those educated people who are left behind.²²

²¹ Israel is characterized by a low per capita income compared with the émigrés' destination countries, especially the U.S., and therefore it is not practical to expect that the income of educated workers in Israel will be equal to that in the U.S. Any discussion of wage and taxation policy should also take into account objectives other than limiting the brain drain, for instance reducing inequality. Therefore it would seem that a growth-encouraging economic policy is called for, both in order to keep Israel's stronger citizens in the country and to create resources for other social objectives.

²² It is worth mentioning, however, that the fact that the educated emigrate in large numbers stems not only from the high demand for capable émigrés but also from the supply of work licenses in the target countries. It is possible that had there been free immigration practices, the proportion of non-educated / non-professional émigrés from Israel to the United States would have been higher.

REFERENCES

- Becker, S.O., P. Ichino, and G. Peri, (2003). "How large is the brain drain from Italy?" CESifo Working Paper 839, Munich.
- Beine, M., F. Docquier, and G. Rapoport, G. (2001). "Brain drain and economic growth: theory and evidence", *Journal of Development Economics* 64, 275-289.
- Beine Michel, Docquier Frederic and Rapoport Hillel (2004). "Brain drain and human capital formation in developing countries: winners and losers manuscript, IZA".
- Borjas, George J, (1987). "Self-selection and the earnings of immigrants," *American Economic Review* 77(4), 531-53, September.
- Carrington, W.J. and E. Detragiache. (1999). "How extensive is the brain drain?" *Finance & Development* (June), 46-49.
- Checchi, D., A. Ichino, and A. Rustichini (1999). "More equal but less mobile. education financing and intergenerational mobility in Italy and in the US", *Journal of Public Economics* 74 (3), 351-393.
- Chiquiar, Daniel and Hanson, H. Gordon, (2005). "International migration, self-selection, and the distribution of wages: evidence from Mexico and the United States," *Journal of Political Economy*, April 113, 239-281.
- Chiswick, Barry, R. (1999). "Are immigrants favorably self-selected?" *American Economic Review*, Papers and Proceedings 89, 181-5.
- Docquier, F., O. Lohest and A. Marfouk (2005). "Brain drain in developing regions (1990-2000)", IZA, Discussion Paper No. 1668.
- Edwards, C. and P. de Rugy, P. (2002). "International tax competition. A 21st-Century Restraint on Government", *Policy Analysis*, 431.
- Haupt, A. and E. Janeba (2004). "Education, redistribution, and the threat of brain drain" NBER Working Paper 10618.
- Hazak, G. "Is the tax rate in Israel too high?" Manuscript, Van Leer Institute (Hebrew).
- Kristal. T. and Y. Cohen (2005). "Decentralization of collective agreements and rising wage inequality in Israel" Tel-Aviv University, working paper.
- Moav O. and M. Ifraj (2006). "The degree of generosity toward the working population in Israel compared to OECD countries, Manuscript, Shalem Institute (Hebrew).
- Mountford, A.(1997). Can a brain drain be good for growth in the source country?, *Journal of Development Economics* 53, 287-303.
- OECD (2003). Trends in international migration: continuous reporting system on migration, Annual Report 2002, Paris.
- Soro-Bonmat'ı, A. (2001). "From school to work: a comparison of labor market transitions and leaving home decisions of young people in Germany, Italy and Spain", Doctoral Thesis, European University Institute, Department of Economics.
- Sandford, C., M. Godwin, and P. Hardwick, (1989). Administrative and compliance costs of taxation, Fiscal Publications, Bath (U.K.).
- Schiff, M. (2005). "Brain gain: claims about its size and impact on welfare and growth are greatly exaggerated", IZA discussion paper, n. 1599.
- Vaillancourt, F.(1989). "The administrative and compliance costs of personal income and payroll taxes", Canadian Tax Foundation, Toronto.

- Vidal, J.P.(1998). "The effect of emigration on human capital formation", *Journal of Population Economics* 11,589-600.
- Wildasin, D.E. (2000). "Factor mobility and fiscal policy in the EU: Policy Issues and Analytical Approaches", *Economic Policy* 31,337-378.
- Zusman, Z., and D. Zakai (1998). "A paradox: an increase in doctors supply and a sharp increase in veterans' wages, 1990-1995" *Economic Quarterly (Hebrew)* 77, 3-41.
- Zusman, Z., and D. Zakai (2005). "Wage differentials in the public sector in Israel during the nineties—policy or wage crawling?" *Bank of Israel Economic Review (Hebrew)*.