

# 16 | *The Arab Economy in Israel*

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## 16.1 Introduction

This chapter deals with the state of the economy of Israeli Arabs. All indicators of this economy point to inferior outcomes. These imply a significant loss of output relative to potential. This situation has negative effects on the standard of living in the economy, engendering lower than potential tax revenues, and higher fiscal transfer payments. It exacerbates the inherent problems of Arab society, a big minority within Israel. The relatively low level of economic development has a negative impact on the relations between Jews and Arabs and hinders the creation of an integrated society.

This chapter presents key data of this economy and a dynamic model of barriers facing Arabs in Israel. We have chosen to undertake the analysis from two perspectives: (1) human capital acquisition and related barriers; and (2) the labor market and related barriers.

The gaps between the Arab and Jewish populations are the result of these barriers, as well as low-quality transportation infrastructure and the weakness of Arab local authorities. The chapter also examines the various differences between Arabs and Jews by gender, all the while distinguishing between human capital barriers and labor market barriers.

The data on the Arabs in Israel do point to an improvement over time in most of the aforementioned issues; however, they also point to the continued existence of major gaps relative to Jewish society. The dynamic empirical analysis, which is based on a model of optimal economic decision-making within a general equilibrium framework,

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shows an increase over time in barriers to the acquisition of human capital in highly skilled occupations, and, in parallel, a reduction in labor market barriers in all occupations.

This chapter proceeds as follows. Section 16.2 presents data on Arab society. Section 16.3 describes the current situation in the acquisition of human capital, including a discussion of barriers. Section 16.4 surveys the labor market and its barriers. Section 16.5 presents a model based on Hsieh, Hurst, Jones, and Klenow (2019) which makes it possible to break down and quantify the barriers and the levels of discrimination, both in the acquisition of human capital and in the labor market. The chapter ends with a brief concluding section.

## 16.2 Arab Society and the Arab Economy: Background

In this section we outline some key facts on Arab society and its economy within Israel. We focus on the issues we deem central for our analysis.

### 16.2.1 *Characteristics of the Arab Population in Israel*

The Arabs are a sizable minority in Israel. In what follows we focus on some salient features.

#### 16.2.1.1 Demographic Structure

As of the end of 2018, the Arab population in Israel numbered about 1.88 million, which represents 20.9 percent of the total population of 8.97 million.<sup>1</sup> According to the forecast of the Central Bureau of Statistics (CBS), this rate is expected to decline after 2035, reaching about 19.3 percent in 2065 (Halihal, 2017).

The Arab population in Israel is composed of more than 1.6 million Muslims, 18 percent of Israel's population, about 134,000 Christians, which constitutes about 1.6 percent of the population, and about 143,000 Druse, which constitutes about 1.6 percent.<sup>2</sup> The Muslim population's rate of growth has declined over the past two decades, reaching 2.3 percent per annum in 2018. Nonetheless, it is still higher

<sup>1</sup> Press release of the Central Bureau of Statistics (CBS), December 31, 2018b.

<sup>2</sup> Press releases of the CBS: April 17, 2019a, August 12, 2019b, and November 24, 2018a.

than the Jewish growth rate (1.7 percent per annum), the Druse growth rate (1.4 percent per annum), and the Christian growth rate (1.5 percent per annum).

The total rate of fertility (average number of children that a woman is expected to bear during her lifetime) of the Muslim population was 3.20 in 2018. It has fallen in recent years but is still higher than that of Christian women (2.06 children), Druse women (2.16 children), and Jewish women (3.17 children).

The Muslim population in Israel was composed of about 316,000 households (12 percent of the total in Israel) in 2018. These are relatively large households: about 4.7 individuals on average as compared to 3.9 individuals in a Druse household, 3.1 individuals in a Jewish household, and 3.0 individuals in a Christian household. There are six or more members in about 32 percent of Muslim households, as compared to only 9 percent of Jewish households and 6 percent of Christian households.

### 16.2.1.2 Geographical Dispersion

The Arab population is concentrated primarily in the north of Israel. As of 2018, about one-half of the Muslim population in Israel live in the north (35.3 percent in the northern district and 13.7 percent in the Haifa region); 21.9 percent live in the Jerusalem region, 11.0 percent in the center, 16.9 percent in the southern region, and 1.2 percent in the Tel Aviv area. The city with the largest Muslim concentration is Jerusalem with about 337,000 Muslims, which account for 21.1 percent of the Muslim population in Israel and 36.6 percent of Jerusalem's total population. There is also a large concentration in the towns of Rahat (68,900), Nazareth (55,000), and Umm el Fahm (55,100).<sup>3</sup> The Druse in Israel live in two main regions: about 81 percent in the north and about 19 percent in Haifa.<sup>4</sup> Of the Arab Christian population in Israel, 70.6 percent live in the north, 13.3 percent in the Haifa region, and 9.6 percent in the Jerusalem region.<sup>5</sup>

### 16.2.2 *Arabs Living in Mixed Towns versus Arab Towns*

Most of the Arab population live in separate towns, while only about 1 percent live in Jewish towns. An examination of the population

<sup>3</sup> CBS, press release, August 12, 2019b.    <sup>4</sup> CBS, press release, April 17, 2019a.

<sup>5</sup> CBS, press release, November 24, 2018a.

distribution points to differences according to type of town (Bank of Israel, 2017 using data from the 2008 census). With respect to economic indicators, the situation of Arabs living in Jewish neighborhoods is superior to that of Arabs living in Arab neighborhoods in mixed towns and to that of Arabs living in Arab towns.

Arabs who live in Jewish towns or in Jewish neighborhoods in mixed towns enjoy higher socioeconomic-demographic outcomes. Thus, their rates of employment are relatively high and so are their annual incomes. The neighborhood socioeconomic ranking (which ranges from 1 to 20, where 20 represents the highest ranking) is 8.9 in Jewish neighborhoods in mixed towns and 10.1 in Jewish towns. By contrast, the ranking in mixed towns is 6.3 and in Arab towns it is only 4.7.

The total annual income per standardized individual (aged 25 or older) in Arab households located in Arab neighborhoods in mixed towns is more than 20 percent higher than among Arab households in Arab towns. But the rate of home ownership is higher in Arab towns (86 percent as compared to 59 percent).

With respect to the age distribution, Arab families are relatively young, but the distribution varies across locations. The median age of the head of the Arab household in a Jewish neighborhood in a mixed town is 36 and in a Jewish town is 31, as compared to 41 and 44 in Arab towns and in Arab neighborhoods in mixed towns, respectively. It is 48 among Jews.

### 16.2.3 *The Housing Shortage*

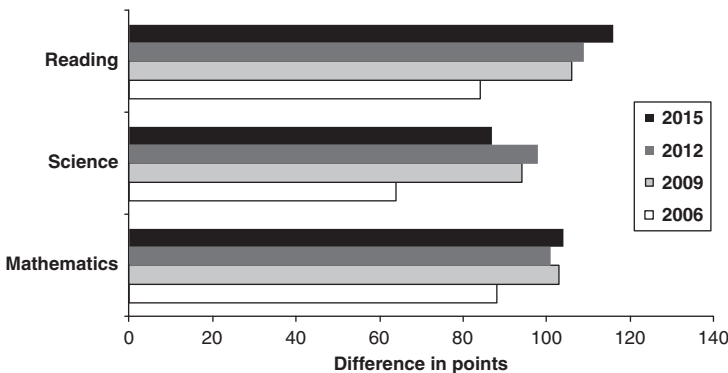
Housing density is higher in Arab society than among the Jewish population, though it has declined over the years. According to the Bank of Israel (2017), the main reasons for the housing shortage in the Arab sector are as follows: Arab towns have limited areas of jurisdiction; they have no approved and detailed zoning plans; there are no records of land rights, and therefore builders find it difficult to obtain credit from the banks and households find it difficult to get a mortgage; there are not many private reserves of land; and, until recently, the State marketed very little land in Arab local authorities, construction tended to be low-rise, residents refrained from building new neighborhoods, and population growth was relatively high (Bank of Israel, 2017).

### 16.3 Human Capital

Education is one of the most important factors in determining the quality of human capital, labor productivity, and economic outcomes. The results produced by the education system over the years provide evidence of significant gaps between Arab and Jewish students, which are reflected in lower attendance rates and scholastic achievement. This is due to the insufficient allocation of resources to the Arab sector and low teaching quality in the Arab education system.

The difference in outcomes of students is already evident at a young age. There are high dropout rates in middle and high school, the substantial decline over the years notwithstanding. There are significant gaps in achievement between Arabs and Jews, as measured by the international PISA test (Figure 16.1). The achievements of Arab speakers on these tests has improved over the past decade, but gaps remain substantial and in some cases have even widened.

The significant gaps in achievement between the two populations can also be seen in the TIMSS (Trends in International Mathematics and Science Study) test, which looks at the proportions of high and low achievers in science and math. The scores indicate that the proportion of high achievers in math and science among Hebrew speakers is higher than the median of all the participating countries, while the proportion



**Figure 16.1** Differences in PISA test achievements between Hebrew-speaking and Arab-speaking students by field of study, 2006–2015.

Source: National Authority for Measurement and Evaluation in Education (RAMA), Ministry of Education.

of low achievers in these two subjects is lower than the median; in contrast, among Arab-speaking students, the proportion of high achievers is similar to the international median, but the proportion of low achievers is double the median (Ministry of Education, 2016).

Among high school graduates in the Arab sector, the rate of matriculation, which is the basis for continuing on to higher education, is relatively low. Although the difference has narrowed by about one-quarter relative to 2009, it remains substantial.

With respect to high school graduation, the situation of women is better than that of men and the rate of improvement among women has been higher. The proportion of Grade 12 students who meet the entrance requirements of universities in Israel rose among males from 25.7 percent in 2007 to 30.6 percent in 2014 and among females from 33.7 percent to 46.8 percent (see Gharrah, 2018).

An examination of the achievements of Arabs and Jews on the matriculation exams and on the psychometric exam shows that the achievements of Arabs are lower in quantitative thinking, verbal ability, and English.

The data show that the difference in psychometric exam scores is larger than in the matriculation exam scores, and the difference is also evident in the test of basic skills, which is part of the PIAAC (Programme for the International Assessment of Adult Competencies) survey of adult skills. According to the most recent CBS data (2014–2015), the average scores of Jews were similar to the OECD average: 264 in reading, 262 in mathematics and 280 in problem solving in a computerized environment. The scores for Arabs were about 40 to 50 points lower (up to about a full standard deviation): 225, 212, and 238, respectively. Similarly, 34 percent of the Arabs were found to lack basic computer skills, as opposed to only 9 percent of Jews (CBS, 2016).

The proportion of Arab students in higher education has risen over the years, primarily as a result of the opening of academic tracks under the auspices of the universities and also the increased accessibility to higher education by means of academic teachers colleges in the periphery, where the Arab population is concentrated. Nonetheless, the proportion of Arabs in higher education is still lower than their proportion of the population, and these gaps are higher for the more advanced degrees. Similarly, the duration of studies for Arab students is about 33

percent longer than that of Jewish students and the dropout rate is higher by about 50 percent.<sup>6</sup>

Another indication of the limited accessibility of higher education for the Arab population can be found in the data of the Planning and Budget Committee and the Council for Higher Education regarding the distribution of Arabs among the institutions of higher learning (Council for Higher Education, 2019). Most of the Arab students in an undergraduate program in Israel are studying in a college rather than in a university. Thus, in the 2017–2018 academic year only 15.7 percent of Arab undergraduate students were studying in one of the main campuses of the universities (as compared to 24.1 percent in teacher's colleges and 31.2 percent in colleges under the auspices of the universities). Although the proportion of Arab students studying in a university has grown over the years (from 8.1 percent in 2000 to 15.7 percent in 2018), the rate of growth in colleges was higher. Thus, the proportion of Arab students studying in colleges that are under the auspices of the universities rose sharply during the same period from 16.6 to 31.2 percent.

Furthermore, there is a relatively high proportion of Arab students studying abroad. According to the Knesset Center for Research and Information, 9,260 Arab-Israeli students were studying abroad in 2012, with about 60 percent of them in Jordan and the Palestinian Authority.<sup>7</sup> Moreover, in 2012 the proportion of Arab students in all institutions of higher education in Israel (apart from the Open University) was only 11.5 percent, while their proportion of all Israeli students studying abroad was 38–47 percent (46–55 percent if the students studying in the Palestinian Authority are taken into account).

There is also a significant difference between the genders with respect to the integration of Arabs in the higher education system, with women integrating more successfully than men. The proportion of Muslim women receiving a bachelor's or master's degree is substantially higher than that of Muslim men, but somewhat lower in the case of a Ph.D. Furthermore, there has been a significant upward trend in the proportion of Arab women in the higher education system over the years. The proportion of Arab women aged 20–64 with thirteen years or more of

<sup>6</sup> See the Ministry of Finance, the Ministry for Social Equality, and the Prime Minister's Office (2016).

<sup>7</sup> Letter to Member of Knesset Yaakov Margi, Chairman of the Education, Culture and Sports Committee, January 16, 2019.

schooling rose from 14.5 percent in 2001 to 32.3 percent in 2014, as compared to a much more moderate increase among men from 20.6 percent to 27.9 percent (see Gharrah, 2018).

Among those graduating with a bachelor's degree, the proportion of Arab students is particularly high in the fields of education and teaching and in paramedical fields. In these occupations there is an oversupply in the labor market, and therefore they are characterized by low potential income. There is a relatively low proportion of Arabs in hi-tech and the exact sciences, fields that are in high demand in the labor market, although the proportion has increased in recent years. There has also been a significant increase in the proportion of Arab students studying engineering at the Technion, Israel's leading technology institute, in recent years.

A significant portion of the aforementioned gaps between Jews and Arabs stems from disparities in budget allocation within the education system in the pre-academic stage. Figure 16.2 presents the Ministry of Education budget per Arab student relative to that per Jewish student.

The budget per Arab student was 2.4 percent less in 2018 than that per Jewish student, a difference that has narrowed from 7.1 percent in 2015. It is also worth noting that households in the Arab sector allocate a smaller sum to the education of their children than Jewish households, due to, *inter alia*, their lower level of income (Ministry of Education, 2019).

The difference in the average cost of Jewish and Arab students widens as we move from kindergarten to high school and as the socioeconomic situation worsens.

In conclusion, the Arab sector faces numerous barriers in the development of human capital, due to under-budgeting and the low quality of the Arab education system. As a result, the dropout rate among Arab students is much higher, the grades of those who stay in school are lower, and their matriculation rates and psychometric scores are lower. There is lower participation in higher education in the Arab sector, dropout rates of Arab students are higher, the duration of studies to attain a degree is longer, and there is a high concentration of Arabs in fields of study with low potential earnings.



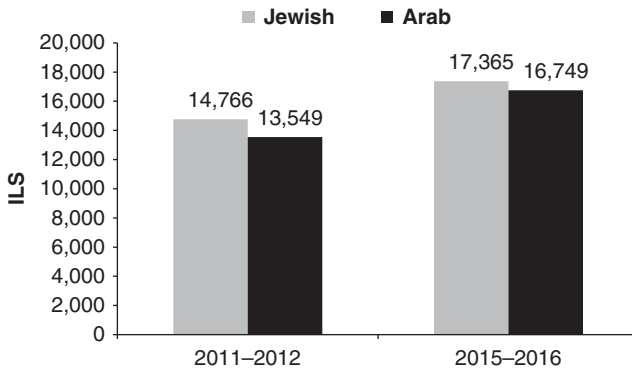


Figure 16.2 Budget per student in the education system, by sector.

Notes: Not including the Circassians, and other unclassified populations.

Source: Education transparency site, Ministry of Education (<http://ic.education.gov.il>)

## 16.4 The Labor Market

The labor market is a focal point of our analysis. In this section we describe its key features. In the next section we study the dynamics of barriers related to it.

### 16.4.1 The Current Situation

Israeli Arabs are not fully integrated in the labor market, which is manifested in low rates of employment, low wages, and a relatively high proportion of workers in jobs for which they are overqualified.<sup>8</sup>

The rates of employment among Israeli Arabs are lower than those among Jews. This is particularly the case among women, where about 38 percent of Arab women of working age (25–65) are employed as compared to about 82 percent of Jewish women. The relatively low rates of employment among Arab women are the result of many factors, including a relatively low level of education (though it has risen in recent years); traditional cultural norms with respect to the role of women and whether a woman should work outside the home; a limited geographical distribution and the resulting distance from places of employment; the high cost of commuting; and discrimination (Kasir

<sup>8</sup> This section is partly based on Kasir (Kaliner) and Tsachor-Shai (2016).

(Kaliner) and Yashiv, 2013). There is a high level of variation in labor force participation rates among Arab women, such that women with little education (and who, therefore, lack the skills demanded by the labor market) and who hold traditional views with respect to the role of women do not choose to work, while women with a higher level of education and a more modern approach do tend to join the labor force.

The most prevalent phenomenon in the labor market with respect to Arab men is relatively early retirement (Kasir (Kaliner) and Peled-Levi, 2015). The phenomenon of early retirement is in contrast to labor force participation among Jews in Israel, among Palestinians, and among men in Western economies, and even relative to the patterns in Muslim and Arab countries. Kasir (Kaliner) and Yashiv (2011) found that the most important fact in explaining the drop in the participation rates of Arab men at a young age is the high proportion employed in jobs requiring physical ability, which diminishes with age. Moreover, they can be replaced by foreign workers once they become less physically fit. The option of receiving various forms of government benefits makes it possible for them to leave the labor market when they become less physically able. This early retirement is also related to the cultural characteristics of Arab society, in which there is a widespread practice of children supporting their parents from a very young age.

Most Arab men are employed in occupations that require low levels of education (Figure 16.3).

An analysis by industry, shows a high concentration of Arab workers in industries that are intensive in unskilled labor, such as construction, wholesale and retail commerce, repair of cars, motorcycles, motorbikes and appliances, and traditional manufacturing. There is also a relatively high concentration in education. Arab men are employed at lower rates than Jewish men in occupations requiring a high level of education, such as managers, academic occupations, engineers and technicians, and some of those with higher education are employed in occupations for which they are overqualified (Lazarus and Miaari, 2015). Others from the start avoid a field of study in which their chances of finding employment are low. Most of those with a high level of education are employed in community-oriented jobs in the public sector and only a small minority of the university graduates are employed in the hi-tech sector. An examination of the distribution of occupations among Jews and Arabs by level of education shows that the gaps in level of education explain much of the gaps in occupations between Jews and Arabs.

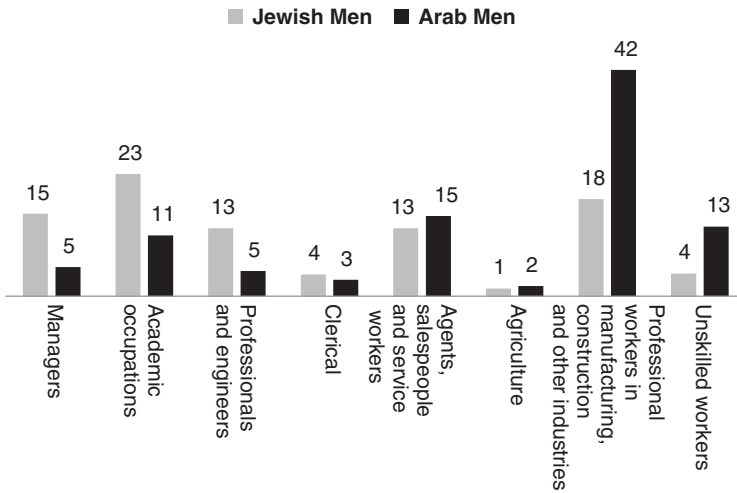


Figure 16.3 Distribution of employment of Arab and Jewish men by occupation, 2016 (%).

Notes: Unknown occupations were omitted.

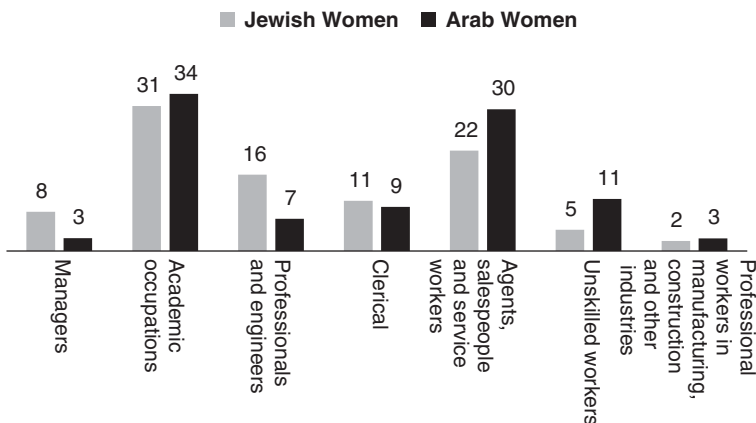
Source: CBS Labor Force Survey (2016)

In the case of Arab women, about 35 percent of those in the labor market are employed in an academic occupation, as compared to only 31 percent among Jewish women (Figure 16.4).

Nonetheless, the proportion of Arab women who are working in unskilled jobs (about 11 percent) is substantially higher than that of Jewish women (5 percent). It can be seen that there is a high concentration of Arab women working in sales and services (about 30 percent) and also in education and health services (see also Kasir (Kaliner) and Yashiv, 2014). The concentration of Arab women in these occupations is partly the result of a lack of jobs in other occupations in Arab towns. The lack of variety of workplaces in Arab towns, together with their preferences to work in their own locality – due both to the traditional character of Arab society and to the high cost of commuting (Caesarea Forum, 2010) – has an impact on the field of study chosen by Arab women.

### 16.4.2 Employment and Wages

Apart from the level of human capital, there are other factors that influence the low rates of employment among the Arab population



**Figure 16.4** Distribution of employment of Arab and Jewish women by occupation, 2016 (%)

Notes: Occupations in which less than 2 percent of Arab and Jewish women are employed and unknown occupations were omitted.

Source: CBS Labor Force Survey (2016)

and their productivity and wages, including discrimination in the labor market; the shortage of daycare centers and the lower subsidization of daycare; the low level of transportation infrastructure; the lack of accessible places of employment; and the economic situation and functioning of Arab local authorities.

The Arab population in Israel suffers from discrimination and labor law violations, due to both their status as a minority group and the fact that most of them are part of a weak group of workers (who have a relatively low level of education and earn a low wage). Discrimination in hiring and in wages is a barrier to suitable employment for many Arabs (Caesarea Forum, 2010). Violations of labor laws in the case of Israeli Arabs are more common in the case of women, skilled workers, and unskilled agricultural workers, who have low negotiating power.

One of the sources of discrimination in the labor market is, according to Becker (1957), discrimination by customers who prefer to purchase goods and services from places of employment where most of the employees belong to the majority group. Bar and Zussman (2017) found evidence of discrimination in the (online) market for services, such as renovations, painting, electricity repairs, cleaning, and transportation, which is consistent with a model of customer discrimination

against Arabs. They found that a significant proportion of Jewish customers preferred to obtain services from suppliers that employed mainly Jewish workers and that these preferences were strongly related to concerns about personal security. It was also found that these customer preferences affect hiring decisions and that the price of services in firms who employ Arab workers is lower than among firms that employ only Jews.

The wage difference between Jews and Arabs exists at all levels of education, among both men and women (Table 16.1). Interestingly, it is among individuals with only a matriculation certificate that wage gaps are narrower.

Bank of Israel (2016) used a Mincerian wage equation to examine the causes for the disparity in hourly wages among men and found that differences in skill levels explain most of the disparity in hourly wages (about 80 percent) between Arab and Jewish men.

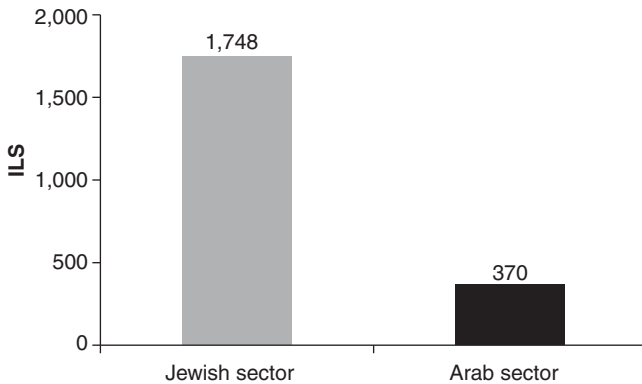
Asali (2006) examined wage discrimination, studying wage differences between Jewish and Arab men in the period 1990–2003. The observable factors that explain the wage differences are divided into three categories: human capital differences, hiring discrimination, and wage discrimination. The findings point to the existence of wage discrimination and that it worsened over the sample period. Thus, wage discrimination in 1991–1992 was found to account for 5–10 percent of the wage difference and during the period 1999–2003 for 20–30 percent. Cohen and Haberfeld (2007) investigated the effect of the increase in income inequality in the Israeli labor market during the period 1975–2001 on income differences. They found that discrimination against Arab workers did not lessen from 1992 onward and perhaps even intensified. Miaari, Navuoni and Hattab (2011) found significant wage discrimination throughout the period 1997–2009, with varying intensity according to economic events, such as the large wave of immigration, the Intifada, and fluctuations in the number of foreign workers.

Daycare is an important factor in a woman's decision to work outside the home (Shahar, 2012). The subsidization of daycare encourages labor force participation among women whose earning potential is diminished by the high cost of daycare. Over the past decade, the proportion of working mothers who make use of daycare among the Arab population has increased more rapidly than among the Jewish population. The proportion of working Arab women whose children are in daycare reached 64.2 percent in 2013 as compared to 49.3

Table 16.1 Average labor income – Arabs vs. Jews (in NIS)

|  | Men    |        |                | Women  |       |                |
|--|--------|--------|----------------|--------|-------|----------------|
|  | Jews   | Arabs  | Difference (%) | Jews   | Arabs | Difference (%) |
| Completed elementary school or middle school | 8,529  | 6,974  | -18            | 4,648  | 3,805 | -18            |
| High school diploma (without matriculation)  | 10,077 | 7,025  | -30            | 5,665  | 3,812 | -33            |
| Matriculation certificate                    | 8,749  | 7,163  | -18            | 6,255  | 3,930 | -37            |
| Nonacademic post-high-school certificate     | 12,137 | 11,058 | -9             | 7,771  | 4,598 | -41            |
| Bachelor's degree                            | 17,721 | 10,909 | -38            | 10,462 | 7,778 | -26            |

Source: CBS, Household Expenditure Survey (2017)



**Figure 16.5** Budget for daycare centers subsidies, average per child aged 0–3, 2013.

Notes: Computed for all children in the relevant age range, not only for those in daycare.

Source: Ministry of Finance (2015)

percent in 2004 (Pichtelberg-Bermatz and Greenstein, 2015). The main reason for this change is apparently the greater access to government daycare services for preschoolers in the Arab sector. Nonetheless, the proportion of working Arab women who use this service remains about 20 percentage points lower than for Jewish women.

The proportion of Arab children in recognized daycare is 4.5 percent, even though their proportion of the population is about 23.5 percent (The State Comptroller, 2016). Moreover, according to Ministry of Finance (2015) figures, there is a difference of about 80 percent between the budget for subsidization of daycare in the Arab sector and the corresponding budget for the Jewish sector (Figure 16.5).

Up until 2011, there were almost no daycare centers built in the Arab sector and since then the supply of public daycare centers has been expanded from 39 to about 80 (of about 1,800 daycare centers in Israel) in 2016; however, these constitute only about 4.4 percent of all daycare centers in Israel. Since 2014, 20 percent of the budget for the construction of daycare centers has been earmarked for the Arab sector. However, this allocation is not sufficient to eliminate existing differences due to the cumulative under-budgeting over the years (see Ministry for Social Equality, 2016). Similarly, there has been only partial usage of the construction and subsidization budget in the

Arab sector, due to, among other things, bureaucratic barriers and the limited amount of land allocated for construction. Thus, there is still a lag in the construction of new daycare centers.

## 16.5 A Model of Occupational Selection and the Occupational Distribution

A prominent characteristic of the population of Arab men is, as mentioned above, high concentration in low-skilled and low-earning occupations, while in the case of Arab women it is a low rate of labor force participation (Kasir (Kaliner) and Yashiv, 2011). The key questions therefore concern the relative roles of pre-labor-market barriers to the acquisition of human capital, barriers in the labor market after the acquisition of human capital, and workers' preferences for occupations. Answers to these questions require an explicit discussion of the worker's decision to acquire education and to participate in the labor force.

We present a model of occupational choice proposed by Hsieh et al. (2019) and apply the model to data on the Israeli economy, with the goal of understanding the situation of Israeli Arabs. The model is based on an enhanced version of the Roy (1951) occupational choice model, in a general equilibrium framework, which can be used to examine differences in occupational outcomes between various groups in the population. Specifically, the model takes into account decisions regarding the acquisition of education, barriers to investment in human capital, various barriers related to the labor market, such as discrimination, and occupational preferences.

In what follows, we briefly describe the model, including the relevant optimization decisions. The full presentation of the model can be found in Hsieh et al. (2019).

### 16.5.1 *The Model*

**Workers.** The economy is composed of a continuum of workers, each of whom is either in the labor market in a given occupation or is in the household sector. We assume three types of occupations: those requiring a high level of skill, those requiring a mid-level, and those requiring a low level. We divide the population into four groups: Arab men, Arab



women, Jewish men, and Jewish women. We will look at three periods of a worker's life cycle.

Each worker has a level of skill in each of these occupations and in the household sector. Workers have preferences for working in a particular occupation and preferences vary across groups.

Workers invest in human capital and choose an occupation in an initial "pre-period," and following that they work for three periods (young, middle, and old age). The investment in human capital and the chosen occupation are fixed at the end of the "pre-period." In each of the three periods, the workers choose between working in the occupation they chose and informally working in the household sector.

**Accumulation of Human Capital.** Workers use time and goods in order to acquire human capital during the "pre-period." This human capital remains fixed throughout their lifetime. There is no accumulation of additional human capital after the end of the "pre-period," apart from specific human capital, i.e., a return on accumulated on-the-job experience.

**Forces that Affect the Allocation.** It is assumed that discrimination exists in the labor market, as well as barriers to investment in human capital. Discrimination in the labor market can be viewed as kind of "tax" on wages. It is assumed that firm owners discriminate against all the workers in a particular group, such that the "tax" affects all of the members of the group equally and at every point in time. This idea is based on Becker (1957) who assumed that firm owners discriminate against workers belonging to particular groups due to taste discrimination, whereby firms owners get lower utility when employing workers from groups for which they have a lower preference.

The barriers to investment in human capital are manifested in the higher monetary cost of acquiring specific skills for a particular occupation. Examples include discrimination in favor of certain groups in the development of certain skills; the allocation of fewer resources; restrictions on acceptance to higher education or to training programs; differences in the quality of schools between communities; and social norms that prevent the members of a certain group from entering a particular occupation.

**Occupational Choice.** When individuals decide to invest in human capital, they assume that they will be working in that occupation. The choice of whether or not to work is made at a later stage. The occupational choice is essentially the choice of an occupation during the initial period of an individual's working life in order to maximize his lifetime utility subject to his budget constraint. The individual's utility is positively affected by his level of consumption, negatively affected by the time he invests in human capital, and positively affected by the utility gained from working in each of the occupations.

**Labor Force Participation.** After choosing an occupation, the individual decides whether to work in it or in the household. If the individual chooses to work in the household, his consumption will consist of income from household production less the payments for the investment in human capital (repayment of loans obtained to finance the investment in human capital).

**Firms Producing a Consumption Good.** Firms produce the consumption good using workers in the three occupations. Following Becker (1957), firm owners (in the final goods sector) discriminate against workers in certain groups. This is manifested in lower utility from employing workers who belong to those groups. The utility of each firm owner is the firm's basic level of profit, which is affected by the firm's discrimination policy and the extent of the owner's prejudice. Thus, when the firm owners hire a worker from a group they favor less, they compensate themselves for the aforementioned loss in utility by paying a lower wage to that worker. Since it is assumed that these are the preferences of all firm owners (an homogeneity assumption), there is a full offset. In other words, the lower wage exactly compensates for the owners' loss of utility from employing workers whom they favor less.

**Firms Producing Education (Schools).** These firms sell education to workers, who use it as an input to acquire human capital. As in the case of firms that produce the consumption good, the firms that produce education also discriminate against various groups.

**Equilibrium.** Competitive equilibrium in this economy is composed of individuals' choices of consumption and the investment of time and goods in human capital over their lifetimes; their choice of occupation

during the “pre-period”; the decision to participate in the labor force in each subsequent period; the total effective units of labor from each group in each occupation; the total output of the economy; and the wages in each of the occupations.

### 16.5.2 Empirical Testing of the Model

The model is tested using census data and the calibration of its key parameters. We start by briefly describing the data used.

#### 16.5.2.1 The Data

All data are from the CBS. The employment data are taken from the censuses of 1972, 1983, 1995, and 2008; the wage and schooling data for 1972 and 1983 are also taken from the censuses, while for 1995 and 2008 the data are taken from the Income Survey.

The analysis includes four groups: Jewish men, Arab men, Jewish women, and Arab women, all aged 25–69. We do not include the unemployed, since the model does not explain unemployment; rather, only workers and individuals not participating in the labor force are included. We define three age groups: young (25–34), middle aged (35–49), and old (50–69).<sup>9</sup>

We thus obtain a panel of six cohorts over six years – the first consists of the young in 2008 and the sixth consists of the old in 1972. There is information on the following cohorts: for cohorts 3 and 4 we have all three life-cycle points; for cohorts 2 and 5 there are two points, and for cohorts 1 and 6 only one point.

The division into occupations is based on the CBS occupation classification at the level of one digit. We divide occupations according to skill level (low, mid, and high) as follows:

1. In the 1995 and 2008 censuses, the division is based on the 1994 CBS uniform classification of occupations:
  - *Highly skilled occupations* – academic occupations (0), professionals and engineers (1), and managers (2).
  - *Middle-skilled occupations* – clerical (3) and agents, salespeople, and service workers (4).

<sup>9</sup> The minimal working age is 25, such that the differences due to military service and the use of time at an early age do not have a direct effect on the analysis.

- *Low-skilled occupations* – agriculture (5), professional workers in manufacturing, construction, and other industries (6–8), and unskilled workers (9).<sup>10</sup>
2. In the 1972 and 1985 censuses, the division is based on the 1972 occupation classification:
- *Highly skilled occupations* – scientific and academic (0), professionals, engineers, and similar occupations (1), and managers (2).
  - *Middle-skilled occupations* – service workers (5), agriculture (6), professional workers in manufacturing, construction and transportation, and other professional laborers (7–8), and other workers in manufacturing and transportation and unskilled laborers (9).

### 16.5.2.2 Results

As mentioned above, the goal of the analysis is to identify the forces determining the occupational allocation of the various groups and their rate of labor force participation. The model makes it possible to identify three such forces: barriers in the labor market, pre-labor-market barriers (human capital barriers), and occupational preferences.

The model predicts that for each group, the rate of labor force participation will be higher among individuals who choose to work in higher-earning occupations. The model also implies that the differences between the groups with respect to occupation are the result of the operation of two factors: skills and barriers in the labor market. When barriers rise in the labor market the proportion of individuals choosing to work declines. In groups characterized by high participation rates, the model suggests that the proportion of individuals choosing high-earning occupations is high, or the barriers they face in the labor market are low.

After calibrating the model using census data, we get the following results. Table 16.2 and Figure 16.6 show occupational preferences and the total barriers facing the cohorts that were young in the census years for Arab men and women.

<sup>10</sup> It should be emphasized that we are dividing occupations according to skill level rather than income level.

Table 16.2 *Occupational preferences and total barriers facing the young cohorts**A. Occupational preferences of the young cohorts*

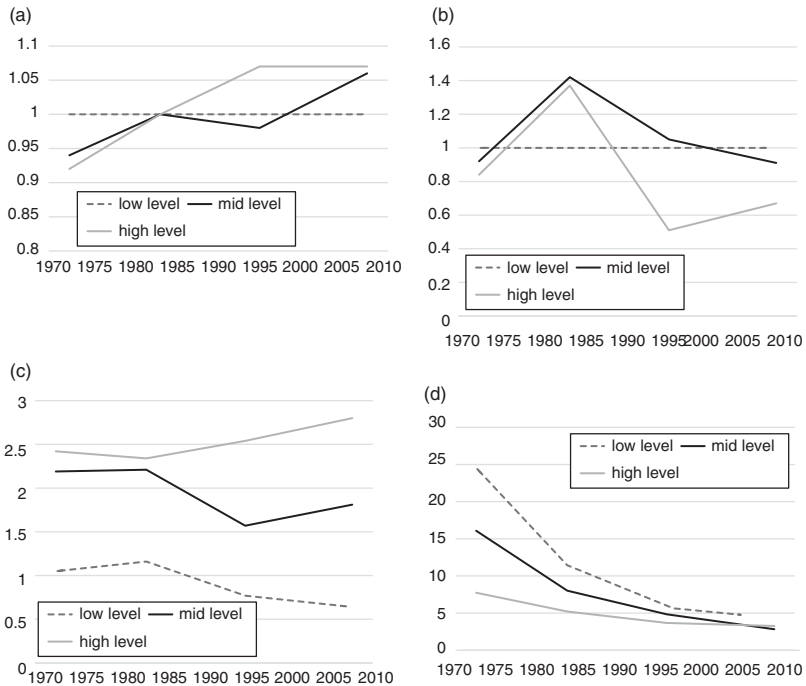
| Year | Arab women      |                 |                  | Arab men        |                 |                  |
|------|-----------------|-----------------|------------------|-----------------|-----------------|------------------|
|      | Low-skill level | Mid-skill level | High-skill level | Low-skill level | Mid-skill level | High-skill level |
| 1972 | 1.00            | 0.92            | 0.84             | 1.00            | 0.94            | 0.92             |
| 1983 | 1.00            | 1.42            | 1.37             | 1.00            | 1.00            | 1.00             |
| 1995 | 1.00            | 1.05            | 0.51             | 1.00            | 0.98            | 1.07             |
| 2008 | 1.00            | 0.91            | 0.67             | 1.00            | 1.06            | 1.07             |

*B. Total barriers facing the young cohorts*

| Year | Arab women      |                 |                  | Arab men        |                 |                  |
|------|-----------------|-----------------|------------------|-----------------|-----------------|------------------|
|      | Low-skill level | Mid-skill level | High-skill level | Low-skill level | Mid-skill level | High-skill level |
| 1972 | 24.54           | 16.09           | 7.74             | 1.05            | 2.19            | 2.42             |
| 1983 | 11.43           | 8.02            | 5.21             | 1.16            | 2.21            | 2.34             |
| 1995 | 6.13            | 4.84            | 3.67             | 0.77            | 1.57            | 2.54             |
| 2008 | 4.74            | 2.83            | 3.27             | 0.64            | 1.81            | 2.80             |

Consider first the occupational preferences of the Arab population. The low-skill occupations in each group are normalized to 1, and occupations with values greater than 1 indicate a preference for the occupation relative to the base occupation. It can be seen that Arab men have no clear pattern of preference for an occupational level over time. This result indicates that the high concentration of Arab men in low-skill occupations is not the result of individuals' preferences but rather the barriers they face. In contrast, the various occupational preferences among Arab women changed significantly over time.

Next, consider total barriers facing individuals in each group in the occupational choice stage relative to those facing Jewish men. The value of the barriers for the latter is normalized to 1. To the extent that the value is greater than 1, the barrier facing the group will be higher and vice versa.



**Figure 16.6** Occupational preferences and total barriers

- a Occupational preferences, Arab men
- b Occupational preferences, Arab women
- c Total barriers by occupation, Arab men
- d Total barriers by occupation, Arab women

Table 16.2 shows a downward trend in the barriers facing young Arab men in low- and mid-skill occupations. On the other hand, and in contrast to conventional wisdom, the results point to the opposite trend in the high-skill occupations. Thus, Arab men have an incentive not to choose these occupations. From 1995 onward, Arab men have an incentive to choose low-skill occupations and therefore it appears that the market “prefers” Arab workers in low-skill occupations. These results, in addition to the model’s results regarding preferences, indicate that the high concentration of Arab men in low-skill occupations is the result of barriers they face in other occupations, rather the result of their preferences.

With respect to the barriers faced by Arab women in choosing an occupation, convergence can be seen in the barriers in all occupations. Thus, barriers were very high relative to Jewish men in the 1970s, but they

decreased significantly up until 2008. Nonetheless, it appears that the barriers facing Arab women are still high relative to Arab and Jewish men, which apparently reflects the fact that they are members of a minority group and a group that has more traditional views. Interestingly, the highest barrier is in the low-skill occupations. The high volatility in the values of preferences for an occupation make it impossible to draw any conclusions with regard to the tendency of Arab women in their choice of occupation. However, it can be said that the effect of the various barriers on the occupational choice of Arab women is declining over time.

It should be recalled that barriers consist of barriers in the labor market and barriers to human capital accumulation. The model makes it possible to separate the barriers into these two components and to understand what drives the trends in total barriers. Table 16.3 and Figure 16.7 show the results with respect to labor market barriers and human capital barriers and their combination, for the three occupation levels.

**Table 16.3** *Labor market and human capital barriers*

**A. Labor market barriers**

| Year | Arab women      |                 |                  | Arab men        |                 |                  |
|------|-----------------|-----------------|------------------|-----------------|-----------------|------------------|
|      | Low-skill level | Mid-skill Level | High-skill level | Low-skill level | Mid-skill Level | High-skill level |
| 1972 | 10.19           | 13.96           | 7.74             | 1.05            | 2.19            | 7.74             |
| 1983 | 3.88            | 6.54            | 3.00             | 1.16            | 2.21            | 1.65             |
| 1995 | 3.67            | 4.55            | 1.59             | 0.93            | 1.57            | 1.18             |
| 2008 | 2.49            | 2.83            | 1.49             | 0.77            | 1.81            | 1.07             |

**B. Human capital barriers facing cohorts that were young in 2008**

| Year | Arab women      |                 |                  | Arab men        |                 |                  |
|------|-----------------|-----------------|------------------|-----------------|-----------------|------------------|
|      | Low-skill level | Mid-skill level | High-skill level | Low-skill level | Mid-skill level | High-skill level |
| 1972 | 2.41            | 1.15            | 1.56             | 1.00            | 1.00            | 1.18             |
| 1983 | 2.95            | 1.23            | 1.73             | 1.00            | 1.00            | 1.42             |
| 1995 | 1.67            | 1.06            | 2.31             | 0.83            | 1.00            | 2.15             |
| 2008 | 1.90            | 1.00            | 2.19             | 0.83            | 1.00            | 2.61             |

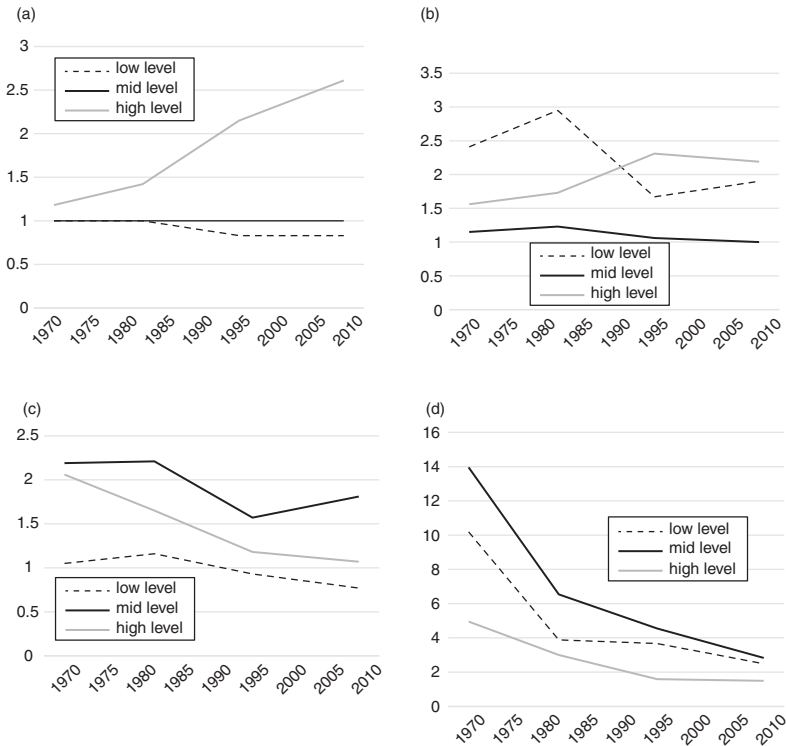


Figure 16.7 Human capital and labor market barriers:

- a Human capital barriers, Arab men
- b Human capital barriers, Arab women
- c Labor market barriers, Arab men
- d Labor market barriers, Arab women

### Arab Men

A downward trend can be seen in *labor market barriers* across all occupation levels. In the high-skill occupations, barriers have been lowered substantially, and in 2008 the barriers to Arab men in the labor market, relative to those facing Jewish men, were quite low. In contrast, in the mid-skill occupations there was a more moderate decline and significant barriers persist. In the low-skill occupations, it appears that Arab men did not face any barriers in the labor market, and since the 1990s they have been lower than the normalized zero



“tax” level. Thus, it appears that the market is “encouraging” Arab men to work in occupations which require only a low skill level.

A different picture emerges with respect to the *human capital barriers* facing Arab men. While in the low- and mid-skill occupations, there have been no significant changes, there appears to have been a major increase in the barriers facing Arab men who choose high-skill occupations.

Therefore, there appears to have been a downward trend in *total barriers* facing Arab men in low- and mid-skill occupations, which is the result of the decline in labor market barriers, while the increase in barriers in the high-skill occupations is the result of human capital barriers, offset only partially by lower labor market barriers.

The model predicts two opposing effects as a result of these trends in labor market barriers. On the one hand, the lowering of *labor market barriers* is expected to raise the wages of Arab men and thus to increase their incentive to work. On the other hand, the increase in *total barriers* in the high-skill occupations “pushes” more men to choose mid- and low-skill occupations, which have lower wages, and therefore there will be a higher concentration of Arab men in those occupations. Thus, as a result of the repeated choice in each period between the labor market and working in the household, and given relatively low wages, Arab men will have a lower rate of labor force participation.

### Arab Women

An examination of *labor market barriers* shows a downward trend at all skill levels. The largest decrease was in the low-skill occupations and the most moderate was in the high-skill occupations. In 2008, labor market barriers facing Arab women in the high-skill occupations were lower than in the other two occupation levels.<sup>11</sup>

When we look at *human capital barriers* facing young Arab women, it can be seen that here as well there was a decrease in the low- and mid-skill occupations and that the relatively high barriers that prevailed in the 1970s declined during subsequent decades, with the most dramatic decrease in the low-skill occupations. In contrast, and as in the case of

<sup>11</sup> Note that the model assumes that the distribution of ability is identical in all the occupations and therefore it may be that high barriers to women in the labor market in the low-skilled occupations, which sometimes require physical labor, is related to the relative disadvantage of women in this respect.

Arab men, there was a moderate increase in barriers facing Arab women in high-skill occupations. In 2008, the biggest barrier was in the high-skill occupations, which is in contrast to the 1970s when the biggest barrier was in the low-skill occupations.

In summary, the downward trend in *total barriers* facing young Arab women in low- and mid-skill jobs is a result of declines in both human capital barriers and labor market barriers. However, it should be recalled that the barriers facing Arab women in these occupations were very high in the past, relative to both Jewish men and Arab men. Therefore, it appears that the process of convergence is not yet complete and in 2008 Arab women still faced high barriers in these occupations relative to the other groups. As in the case of Arab men, we also see two opposing trends among Arab women in high-skill occupations: a decrease in labor market barriers and an increase in human capital barriers. However, and in contrast to Arab men, the net effect of the two trends is a decrease in the barriers in these occupations.

An examination of the trends in the barriers faced by Arab women indicates that the significant decrease in labor market barriers is what led to greater integration of Arab women in the labor force.<sup>12</sup>

## 16.6 Conclusions

We have presented socioeconomic data and the empirical results of a dynamic model catering for occupational choice in the presence of barriers facing the Arab population in Israel. The overall picture is a complex one and cannot be briefly summarized. Nonetheless, it can be stated that despite the progress made in many areas, including education and employment, the socioeconomic outcomes of the Arab population are inferior to those of the Jewish population. In view of the continued existence of substantial disparities, there is a need for greater

<sup>12</sup> In a more detailed analysis, it can be seen that the decrease in total barriers was primarily concentrated in the low and intermediate-skilled occupations. Therefore, according to the model one would expect an increase in the proportion of women that choose low- or intermediate-skilled occupations, in which wages are relatively low. The higher the proportion of Arab women who choose relatively low-skilled occupations, the lower relative overall labor force participation rate we would expect. This is because their incentive to work rather than choose the household sector is relatively low. Therefore, this is apparently the source of the moderating effect on the increase in the participation rate of Arab women.

policy effort on the part of the government. This pertains mostly to investment in human capital and in physical infrastructure capital.<sup>13</sup>

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<sup>13</sup> For some ideas of such policy solutions, see Kasir (Kaliner) and Yashiv (2014).

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