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ABSTRACT

Obstacles to Labour Market Participation among Arab Women in Israel

This study investigates the factors that underlay the low labour force participation rate among Palestinian-Arab women in Israel relative to Jewish women despite the high educational attainment among this group. We focus on four factors that could explain this pattern: (i) socioeconomic factors such as age and education, (ii) culture factors such as the religiosity of the individual-woman and her family, (iii) family structure and related public policies, and (iv) the early retirement of Arab women from the labour market. We find that all four of these factors affect the probability of Palestinian-Arab women participating in the labour market. We conclude by discussing the implications of our findings for labour market policies.

JEL Classification: J01, J15, J13, J18, J26

Keywords: labour market participation, Arab women, public policy, gender, nationality, religiosity, early retirement

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1. Introduction

The labour force participation (LFP, hereafter) rate among Palestinian women in Israel has been consistently and significantly lower than Jewish women and Palestinian men. In 2016, three out of four Arab females in Israel were out of the labour force, compared to only one out of three Jewish women.[1] Recent studies have attempted to explain the persistent low rate of economic activity among Palestinian women in Israel by focusing on cultural influences such as religion, gender norms, and patriarchy (Sa'ar, 2017; Abu-Baker, 2016; Yonay, Yaish, & Kraus, 2015), spatial segregation (Lewin-Epstein & Semyonov, 2019; Schnell & Shdema, 2016), state policies, and employer discrimination on the grounds of ethnicity/nationality or religion (Lewin-Epstein & Semyonov, 2019; Sa'ar, 2015; Yonay & Kraus, 2017).

While these studies clearly demonstrate the importance of the issue, their contribution to a conclusive answer of why the LFP rate among Palestinian women in Israel is low remain largely inadequate and partial due to three reasons. First, most of these studies have primarily offered explanations that are well established in the literature (for example see: Herzog, 2004; Khattab, 2002; Margalioth, 2003; Semyonov, Lewin-Epstein, & Brahm, 1999). Second, most of these studies are unable to empirically examine the claims in relation to the impact of culture. Third, the prime concern of these studies is to explain why Palestinian women are less likely to enter the labour market, while less attention is paid to whether and why Palestinian women tend to leave the labour market in greater proportions than Jewish women and Palestinian men.

This study seeks to goes beyond the existing literature by focusing on four factors that determine LFP among Palestinian women. The first factor is socio-economic factors such as educational attainment. The second factor is cultural beliefs and attitudes towards women working outside the home. Arab women are more likely to face traditional norms and constraints with regards to their participation in the formal labour market, especially in religious households. The third factor is family structure: women with more children at home and little access to childcare support are less likely to participate in the labour market. Related, the geographic mobility of women with children may be particularly low as they need to seek work close to home in order to fulfil childcare duties. The fourth factor is that the early retirement of Arab women from the labour market relative to Jewish women is likely to exacerbate the disparities in labour market participation rates across the two groups. Overall, the main contribution of this paper is to use novel data sources to quantify the different channels

[1] Author's calculations using the Israeli Labour Force Survey and Social Survey.

that explain the earning gap between Jewish and Arab women in Israel, thereby improving our understanding of how policies should be designed to foster greater labour force participation among Arab women in Israel.

To examine these factors, we use two main data sources. The first dataset is the Israeli Labour Force Survey (1995-2016) and the Social Survey (2002-2016). A key strength of the Social Survey is that it includes detailed information on religious and cultural factors that may affect labour force participation. We find that socioeconomic factors, religious/cultural, as well as public policy-related factors are important in explaining the gap in labour market participation between the two groups. We also find that Palestinian women are much more likely to retire early than Jewish women. We find that the differences in retirement age between Jewish and Arab women are driven by women who previously worked in high-skilled occupations. We argue that factors facilitate the entry of Palestinian women into the labour market (pull factors) is one piece of the puzzle, however, to complete it we need to consider factors causing women to retire early (push factors).

The paper is structured as follows. Section 2 describes related literature. Section 3 discusses relevant background. Section 4 presents the main data used for the analysis. Section 5 presents our empirical model. Section 6 presents the main results. Section 7 concludes and discusses the implications of our findings.

2. Literature Review

This paper focuses on four factors that may help explain the low female labour force participation rate among Arab women in comparison to Jewish women. This section discusses existing literature related to these four factors.[2]

The first explanation is that differences in socio-economic characteristics accounts for differences in labour force participation among women from minority racial groups (Read and Cohen, 2007), A large strand of literature places focus on human capital and explores the extent to which variation in educational attainment can account for differences in minority women's labour supply (Kahn and Wittington, 1996; Read, 2004; Read and Oselin, 2008). Most empirical studies focusing on American women provide support for the hypothesis that

[2] Due to space and data limitations, we do not discuss the multiple other factors that may also be important in explaining female labour force participation rates among Arab women. These factors include but are not limited to a lack of employment opportunities and labour market discrimination.

education is a main driver of labour force participation among women (England et al., 2005; Evertsson et al., 2009).

Several studies have explored the role of human capital among Arab women living in Western countries. Contrary to the employment-boosting effect that education typically has for Western women, these studies suggest that the effect of education on employment among Arab women living in these countries is muted. For example, Read & Cohen (2007) use census data in the U.S. and find that higher education only weakly predicts higher employment for Arab women, contrary to the strong relationship between education and employment for most other ethnic groups. Read and Oselin (2008) find that Arab women use their education as a resource to fulfil their duties as wives and mothers instead of participating in the labour market (the education-employment paradox). Similarly, Khattab and Johnston (2015) find that Muslim women in Britain with degrees have a lower likelihood to attain a job commensurate with their qualifications than their White British Christian counterparts.

In the context of Israel, many studies have documented the low labour market participation of Arab women despite their high educational attainment (Khattab, 2002; Kraus et al., 2018; Lewin-Epstein and Semyonov, 2019; Meler, 2016; Meler, 2019). As noted by Yashiv and Kasir (2013), although human capital variables such as higher education and marital status are important in explaining labour force participation of Arab women in Israel, a sole focus on such factors is not sufficient to explain the gap in participation among Arab and Jewish women. This motivates our approach to incorporate multiple factors in addition to the standard human capital variables when attempting to understand labour market participation.

The second explanation is that cultural factors and resulting attitudes towards women working outside the home deter female labour force participation among minority groups (Aromolaran, 2004; Reimers 1985, Grossbard-Shechtman and Neuman, 1998; Abu Baker, 2002). In practice, existing studies examining the role of cultural factors focus on variables such as religion, the degree of religiosity, and the use of "modern" technology such as computers and cars (Moghadam, 2004; Spierings et al., 2010). A few studies have quantitatively examined the impact of cultural factors on Muslim women living in Western countries. Abdelhadi (2017) investigates the correlation between female employment and the level of religiosity of Muslim women in the US (measured by mosque attendance, prayer habits, and self-reported perceptions of the importance of women) and find a positive correlation between mosque attendance and employment. In contrast, a woman's prayer habits and the

importance of the place of religion have no significant impact on employment. Antecol (200) and Fernandez and Fogli (2009) provide further evidence on the impact of cultural factors on employment in other contexts.

In the context of Israel, the literature on the impact of culture on labour force participation among Arab women remains primarily qualitative in nature. Abu-Baker (2016) provides a discussion of how the laws, customs, and practice imposed on Palestinian minorities make it difficult for them to achieve the economic security of Jewish majorities. Sa'ar (2017) provides anthropological evidence on how cultural schema faced by Palestinian women interact with institutional factors such as discriminatory employment policies and economic privatisation to affect labour force participation. This paper contributes to this literature by using detailed information on several important dimensions of culture at the individual level to quantify the impact of these cultural factors. In this endeavour, this paper is most closely related to Yashiv (2010) who examines the impact of "modern" culture on the labour market outcomes of Arab women using data from 2005. In contrast to Yashiv (2010), this paper focuses on a longer time horizon (2002-2016) and allows for the impact of cultural factors to differ across Arab and Jewish women.

The third explanation is that family structure and childcare policies affect women's propensity to participant in the labour market (Greenlees and Saenz, 1999; Tienda and Glass, 1985). It is well recognized that children in the household can be an important constraint to women's labour force participation (van der Lippe and van Dijk 2002; Pignatti, 2016). In particular, children of pre-school age tend to have the strongest negative effect on women's labour force participation (Khoudja & Platt, 2018). Furthermore, in countries where childcare is not easily accessible for structural or monetary reasons, mothers are likely to be primarily responsible for raising the child while the father is in paid work. In the context of Israel, given that Arab women tend to have a higher fertility rate than Jewish women in Israel, the child-rearing responsibilities may deter labour force participation. It has been recognized that a lack of services such as welfare centres for mother and children, at reasonable prices, discourage a significant proportion of women who might otherwise seek work (Almagor-Luten, 2009; Stier and Lewin-Epstien, 2001).

A smaller strand of research also examines the impact of transportation policy on labour force participation. The main assumption of this literature is that journeys to and from work can impose an opportunity cost on women, especially those with young children. Therefore,

there is a role for public transportation policy to alleviate this travel cost faced by women. A recent report by the International Labor Organization finds that limited access to safe transportation is the greatest challenge to labour force participation that women face in developing countries, reducing their participation probability by 15.5 percentage points (ILO, 2017). In the context of Israel, Malchi (2013) notes that a lack of public transportation in Arab villages and across Arab localities can hinder the labour market participation of women. Schnell and Shdema (2016) provide evidence that geographic proximity to the economic center (Tel Aviv) is important for the labour market prospects of workers. In particular, those who live closer to the centre enjoy better opportunities for jobs and networks that might facilitate the process of searching for a good job. To the extent that females are less geographically mobile than males (e.g. due to childcare responsibilities), such findings suggest that there is a role for public transportation policy in reducing the labour market frictions for women.

The fourth explanation is that, conditional on working, Arab women are more likely than Jewish women to retire early from the labour market. The early retirement among this group may contribute to the overall gap in female labour force participation. Early retirement also reduces the total lifetime expected returns from working, which may deter younger women from entering the workforce in the first place. Currently, most research on early retirement focuses on advanced countries, addressing gender differences in the time on retirement and reporting different factors influencing the decision to continue working or retire for men and women (Komp, et al., 2010). Dahl et al. (2000) provide evidence that there are gender-differences in trends in early retirement in Norway. Looking on gender and race differences, Mudrazija (2010) indicated that race/ethnicity differences in the labour force status and retirement decision making are real. This is particularly true for the differences between Hispanics and whites in the US. In the context of Israel, there is currently little research on the disparities in early retirement ages between Jewish and Arab women. Existing work focuses on retirement ages on men (Yashiv and Kasir, 2013) and tends not to decompose retirement ages by ethnic-nationality (Litwin, 2009) as a factor related to low employment rate. To the best of our knowledge, this is the first paper that contributes to analyse early retirement decisions for Jewish and Arab women in Israel separately.

Overall, this paper contributes to the existing literature in the following ways. First, it focuses on all four factors that may drive female labour force participation, rather than each factor in isolation. This is helpful because the drivers of ethnic inequalities are unlikely to occur in isolation. Different drivers are likely to intersect and jointly result in unequal labour market

outcomes (e.g. Nazroo and Kapadia, 2013; Dale and Krueger. 2002). Second, there are still many unanswered questions regarding the low labour force participation rate of Palestinian women in Israel. This group is an interesting population to study because they suffer disadvantages resulting from two components of their identity, ethnic-nationality and gender, which can mutually amplify and exacerbate labour market inequalities. In contrast, most research in this field is concentrated on female employment from immigrant groups, mainly in the U.S. and European countries.

3. Background and Context

The Palestinian Arab society in Israel (constitute 21% of the total population) has undergone a massive social change in the last decades. A particularly important, is that the educational attainment that has significantly increased. Significant increase noticed among women and as in other societies, the rise in the educational level in Palestinian society, has drawn more Palestinian Arab women to the labour market, however, their rate still low till recently.

There are two important features of the labour market patterns of Arab women in Israel that are worth noting. First, the labour force participation rate (LFPR) of Palestinian Arab women is low in comparison to Arab-Israeli males, Jewish-Israeli women, and women in other developed countries. Based on data published by the Israeli Central Bureau of Statistics, the LFPR of Arab-Israeli between 25 and 54 years old was around 10% until the beginning of the nineties, when it began to rise slowly, reaching 35% in 2016. In comparison, the LPFR of Israeli Jewish women and women in developed countries is much high. A recent estimate indicates that almost 70% of Jewish women in Israel are actively engaged in the labour force, a figure that is confirmed in the descriptive statistics below.

Second, the low LPFR of Arab women in Israel is peculiar given the increase in educational attainment among this group. In 1970, the percentage of Arab-Israeli females with elementary or high school education was 38%; this figure rose to 78.27% in 2011. In 2001, 5.7% of women had tertiary education; this figure rose to 15.63% in 2016.[3] Furthermore, Arab-women's educational attainment has surpassed that of Arab men in Israel. In 2016, the percentage of Arab men with 16+ years of education was 13.95%; whereas the figure was 15.66% for Arab-Israeli women.[4] The improvement of female educational attainment over male educational attainment continues to the present day.

[3] Author's calculations using Labour Force Survey.
[4] Similar results are reported by Abu-Baker (2016).

Table 1 and Figure 1 highlights the pattern of low LFPR among Arab-Israeli women compared to Arab-Israeli men, Jewish-Israeli women, and men and women in OECD countries and the U.S. Using data from the 2016 wave of the Israeli Labour Force Survey, Table 1 shows that roughly 40% Arab-Israeli women participate in the labour market; whereas this figure is between 60% to 78% among Jewish-Israeli women, women in OECD countries, and women in the US. The table also shows that compared to Arab-Israeli men, 67% of whom are engaged in the labour force, Arab-Israeli women's LFPR is low.

Figure 1 uses the Israeli Labour Force Survey to demonstrate how employment rates have changed across time by gender and ethnic nationality. The figure demonstrates the large difference in levels between the employment rates of Jewish women and Arab women. The trend for Arab women is at the bottom of the figure. Although the trend for Arab women is low in levels, the figure depicts a gradual increase over the years from 19% in 1995 to over 35% in 2016.

There is variation across educational groups in LFPR. Labour force participation is higher among female college graduates who mainly work in female-dominated occupations such as teaching, nursing, and social welfare. The employment rate of college graduates has been stable across time. The LFPR of women with less education has, however, been slowly increasing. Thus, the overall rise in the LFPR of Arab-Israeli women stems mainly from a combination of increased educational achievements and increased employment among women with less education (Fuchs and Wilson, 2018).

4. Data

4.1. Data Source

In this analysis, we use two sources of data: (i) The Israeli Labour Force Survey from 1995 to 2016 and (ii) the Social Survey from 2002 to 2016.[5] The labour force survey has a larger sample than the social survey while the social survey contains a wider range of variables that capture the cultural factors faced by women. Using both these datasets therefore provides us with a fuller picture of the factors that affect female labour force participation.

The Israeli Labour Force Survey. The Israeli Labour Force Survey (LFS) is a representative panel survey of permanent residents living in Israel who are over the age of 15. Roughly 9,000

[5] Both these sources of data are provided by the Israeli Central Bureau of Statistics.

households participate in the survey in each survey period, resulting in over 20,000 individual observations per survey period.

The LFS contains information on the key variables that allow us to examine the socioeconomic, religious/cultural, and public policy determinants of labour market participation. In particular, the data contains information on gender, age, education, and marital status, and the number of children. For religion, the LFS contains detailed information on the religion of the respondent as well as their degree of religiosity. There is also detailed information on labour market outcomes such as employment status, the number of months worked in the previous year, their occupation, and any reason for not working (e.g. injury, retirement). More details on the LFS can be found in the appendix.

The Social Survey. The Social Survey (SS) from 2002 to 2016 is a survey conducted annually on a sample of persons aged 20 and older. The main purpose of the SS is to provide up-to-date information on the welfare of Israelis and on their living conditions.

The SS contains information on several variables that make it suitable for our analysis. First, similar to the LFS, it includes information on socioeconomic factors such age gender, age, education, marital status, and the number of students. Second, it contains detailed information on the religion and religiosity of the respondent. A key asset of this dataset is the availability of information on the religiosity of the respondent's family when the respondent was 15. This allows us to instrument for current religiosity with family religiosity at age 15, arguably overcoming the potentially endogeneity of current religiosity levels. Third, the SS contains information on the "modernity" and "knowledge" of the respondent. In particular, information on whether the respondent uses a computer, has a driving license, and their Hebrew proficiency is available. Lastly, the survey also contains information on public policy measures that might affect work patterns. The SS provides information on the satisfaction of citizens with the public transport system in the district that they live in. More details on the SS can be found in the Appendix.

4.2. Sample

Since this analysis is interested in explaining the discrepancies in labour market participation between Arab and Jewish women in Israel, we restrict our sample to Jewish and Arab women 18-64 years old living in Israel during the time of the survey. When using the SS, we need to restrict the sample to individuals 20-64 since this survey only samples individuals above 20 years old.

Furthermore, we make one other sample restriction for the LFS. Since the LFS is a panel where individuals are interview roughly 4 times over a course of a year and since the variables that we are interested in do not vary much across individuals over time (e.g. nationality, religion, religiosity), for each individual we only keep the last observation. For example, if an individual is interview twice in year *T*, once in quarter 1 and another in quarter 4, we only keep the quarter 4 observation. This sample restriction helps us avoid having to treat observations from the same person as different observations. Robustness checks illustrate that our results are robust to this sample restriction.

4.3. Harmonization of variables across surveys and time

Across the two surveys, there is a large degree of overlap in the way the variables are defined and constructed. Where these variables do not overlap, we construct them such that they are consistent across the two surveys. For example, while the LFS contains information on the number of children under 5, the SS only contains a binary indicator of whether the individual has any children under 5. In this case, we use the information in the LFS to construct an analogous binary indicator to match the variable available in the SS. The only discrepancy between the two surveys is in the base age category. While the base age category is 18-24 in the LFS, it is 20-24 in the SS.[6]

Within a given survey, there is some change in methodology in how variables are defined and how the respondents are surveyed. For example, from 1996 to 2011, the LFS adopted a quarterly survey system. In the quarterly system, units are interviews 4 times over the course of 18 months.[7] From 2012 onwards, the ILFS adopted a monthly survey system. In the monthly system, units are interviewed 8 times over the course of 16 months.[8] With this switch, there were also several changes to how variables were defined. These changes include a switch from using a continuous age variable to age categories and a switch in occupation codes. We harmonize all these variables across time to ensure comparability across survey years. Furthermore, we include survey year dummies in all our regressions to ensure that any variation across year is not driven by changes in survey methodology.

[6] This is due to different sampling in the two surveys. While the LFS samples individuals above 15, the SS samples individuals about 20.

[7] They are first interviewed in the first quarter of the survey, the following quarter, then following a break of two quarters, they are interviewed in the following two quarters in a manner parallel to those of the first two investigations.

[8] They are interviewed monthly in the first four months and then following a break of 8 months, they are interviews four more times consecutively in the following months.

4.4. Descriptive Statistics

Table 2 contains some descriptive statistics for our main sample of interest by nationality. In Panel A, we present statistics on labour market outcomes. In both the LFS and SS, the descriptive statistics indicate that Arab women are far less likely to be employed or to be in the labour force compared to Jewish women. For example, both surveys indicate that roughly 70% of Jewish women are employed or in the labour force whereas less than 30% of Arab women are employed or in the labour force.

In Panel B, we present some basic socioeconomic characteristics of the sample. Both surveys indicate that the majority of the sample (over 40%) are between 35-54 years old. The Arab population appears to be slightly younger than the Jewish population, with almost a quarter of the Arab population being between 35-44 years old. While almost 50% of Jewish women have a bachelor's degree of more, less than a third of Arab women have this level of educational qualification. This raises the possibility that differences in labour market participation rates may be driven by different levels of human capital. Lastly, this panel also indicates that Arab women are much more likely to have a child under 5 years old compared to Jewish women. Roughly 30% of Arab women in the sample have at least one child under 5 whereas 23% of Jewish women have at least one child under 5. The existing literature suggests that pre-school age tend to have the strongest negative effect on women's labour force participation (Khoudja & Platt, 2018), therefore this finding also raises the possibility that differences in labour market outcomes could be driven by differences in family structure.

Finally, Panel C begins by presenting statistics on the marital status of the women in the sample. The statistics indicate that although the proportion of Jewish and Arab women who are married are fairly similar, Jewish women are much more likely to be divorced or separated compared to Arab women. In particularly, while 10% of Jewish women in the sample are divorced or separated, 5% or fewer Arab women are divorced or separated. This indicates that there may be cultural dissimilarities between the two groups which may also affect their attitudes towards labour market participation. In particular, to the extent that divorce or separation can be interpreted as a signal of modern values, these statistics provide preliminary suggestions that Jewish women living in Israel are more modern than Arab women living in Israel. The subsequent rows of the panel suggest that Arab women tend to be more religious than Jewish women with 61% reporting that they are religious or very religious. Jewish women are also twice as likely as Arab women to use a computer at work and almost 30 percentage

points more likely to have a driving license. Unsurprisingly, Jewish women are more likely to report having good levels of Hebrew.

5. Empirical Strategy

This study is interested in understanding how differences in labour force participation rates between Jewish and Arab women in Israel can be explained by socioeconomic, religiosity/cultural, and public policy-related factors. Our main empirical specification can be written as follows:

$$Y_i = \alpha_0 + \beta_1 Arab_i + \beta_2 X_i + \beta_3 R_i + \beta_4 P + \beta_5 M_i + \gamma T + \epsilon_i \quad (1)$$

The variables in equation (1) are defined as follows. Y_i is the labour market outcome of individual i. We focus on two outcomes: (a) whether the individual is employed and (b) whether the individual is in the labour force. It is worth commenting on the distinction between these two definitions of labour market participation. Definition (a) requires that individuals have worked for at least one hour in the previous week; definition (b) includes individuals who have worked for over one hour in the previous work and individuals who have not worked in the previous week but are currently actively seeking work.

The variable $Arab_i$ takes on the value of 1 if the individual is Arab and 0 otherwise. This variable is available for all years in both datasets. We construct this variable by defining Arab as Muslims, Druze, and Christians.

The vector X_i consists of sociodemographic variables of the individual. In this vector, we include dummies for age categories (24 or below, 25-29, 30-44, 45-54, 55-59, 60-64), dummies for the highest education attainment level (less than secondary school, secondary school, matriculation, non-academic post-secondary degree, Bachelors, Masters, and PhD), dummies for marital status (single, married, divorced or separated, and widowed). These variables are available from 2001 onwards in the LFS and for all years in the SS.

R_i is a vector of religiosity variables (secular, traditional, religious, very religious). This variable is available from 2014 onwards in the LFS while it is available for all years in the SS. To overcome concerns that the degree of religiosity is endogenous to labour market outcomes, we use the SS to estimate instrumental variable (IV) versions of equation (2) where we instrument for the degree of religiosity in the survey period by the religiosity of the participant's family at age 15. In particular, a dummy for each level of family religiosity is used to instrument for each corresponding level of respondent reported religiosity. These instruments are likely to

be valid for two reasons: (a) family religiosity at age 15 is likely to influence respondents' own religiosity; (b) family religiosity at age 15 is unlikely to directly influence labour market outcomes in midlife other than via its effect on the respondent's own religiosity and resulting attitudes towards labour market participation.

P is a vector of family structure and public policy variables. As discussed previously, policies such as the availability of childcare services and public transportation is likely to affect the opportunity cost of working and therefore influence the labour market participation of women. Unfortunately, the LFS and SS both do not include information on the availability of childcare services. Therefore, we instead use a binary indicator for having any children under 5 as a measure of family structure. To the extent that the presence of young children exerts a negative effect on labour force participation, this would suggest that there could be a role for childcare services to ameliorate this negative effect of young children on labour force participation. To examine the effects of public transport on labour force participation, we use a variable in the SS that captures the percentage of respondents in a given district who are satisfied with the public transport in that region.

M_i is a vector that captures the "modernity" of the woman. In this vector, we include indicators for whether the woman typically uses a computer, has a driving license, and indicators for her Hebrew proficiency level. The inclusion of this vector is motivated by existing research which suggests that cultural factors, and in particular a woman's degree of "modernity", affects labour supply (Yashiv, 2010).

Finally, T is a vector of year and district dummies. The year and district dummies respectively help account for variation across survey years and across districts that might affect labour market outcomes.[9]

In equation (1), we are interested in the β coefficients. β_1 captures the difference in labour force participation rates between Arab and Jewish women, conditional on the other variables included in the regression. β_2 to β_5 capture the effects of the other variables on labour force participation. Where possible, we extend equation (1) to allow for interactions between the Arab indicator and the X, R, P, M indicators. This allows for the effects of these variables of interest to vary by ethnic-national groups.

[9] We do not include district dummies in the regressions that include a variable for the percentage of respondents who are satisfied with the public transport in their region. This allows us to exploit district level variation in satisfaction with public transport.

6. Results

6.1. Labour market disparities between Jewish and Arab women

Table 3 presents results from a simplified version of equation (1) where only an Arab indicator is included. The coefficient on the Arab indicator captures the disparity in labour market participation between Jewish and Arab women. The results from the LFS (columns 1 and 3) indicate that Arab women are 37 percentage points (pp) less likely than Jewish women to be employed or to be in the labour force. Results from the SS (columns 5 and 7) depict a similar picture, suggesting that Arab women are 34 pp and 31 pp less likely to be employed or in the labour force compared to Jewish women. This finding is consistent with Yashiv and Kasir (2013) who document the low participation rate of Arab women relative to Jewish women.

In the even columns of this table, we break down the Arab indicator into three distinct religious groups: Muslims, Druzes, and Christians. The results from these columns indicate that the disparities in labour market outcomes between Arabs and Jewish women are predominantly driven by Muslim women who are over 40 pp less likely to be employed than Jewish women. There is also an economically and statistically significant difference between the labour force participation rates between Druze women and Jewish women.

In comparison to Muslims and Druzes, there is less disparity between Christians and Jewish women. Although the estimated difference is statistically significant (8-9 pp less likely to be employed), the difference in employment rates between Jewish and Christian women is almost 5 times smaller than the difference in employment rates between Jewish women and Muslim women. One potential reason for this is that Christian women in Israel are more modern and secular compared to Muslim and Druze women. Both these traits might increase labour participation rates. The variation in labour market participation across different religious Arab groups supports the findings of Khattab (2002) who find that Christian women have the highest labour force participation rate relative to Muslim and Druze women.[10]

6.2. Socioeconomic factors

Table 4 presents estimates of equation (1) where the *X* vector is included in addition to the Arab indicator. The coefficient on the Arab indicator suggests that even when controlling flexibly for age, education, and marital status, there remains a statistically significant and

[10] In Table A1 of the appendix, we have estimated the same regression using the full LFS sample. The results are very similar in magnitude.

economically meaningful disparity in labour market participation between Jewish and Arab women. In particular, using data from the LFS, the coefficients suggest that Arab women are over 25 pp less likely to be employed or be in the labour force compared to Jewish women, conditional on age, education, marital status, and district of residence.

The significant differences in the estimated coefficient on the Arab indicator in Table 3 and 4 (-0.37 vs. -0.27) indicates that a significant proportion of the disparity in labour market participation across the two groups can be explained by socioeconomic factors. The coefficients on the age category indicators suggest an inverted U-shape age and labour market participation profile. In particular, women between 35-44 years old have the highest labour market participation rate, defined both in terms of employment and being in the labour force, while women over 60 have the lowest labour market participation rate.

The coefficients on the education attainment indicators indicate that the probability of being employed and being in the labour force increases with educational attainment. Those with a bachelor's degree are over 35 pp more likely than those with less than a secondary school degree to be employed or in the labour force. The effect of education on labour force participation continues even beyond the bachelor's level, although at a more gradual rate. The positive relationship between educational attainment and labour force participation documented in this table is consistent with a large causal and correlational literature suggesting that education increases labour market participation especially among women (Khattab, 2002; Yashiv, 2010; Yashiv and Kasir, 2013; Totouom et al., 2018; Kingdon and Unni, 2001).

The coefficients on the marital status indicator variables show that married women are significantly less likely than single women to be employed or in the labour force. For example, using data from the SS shows that married women are 5 pp less like to be employed and over 7 pp less likely to be in the labour force. One potential reason for this is that married women are more likely to have children or other family duties that increases the opportunity cost of working. Another reason is that married women are likely to have another wage-earner in the household (their husband), decreasing any incentives to participate in the labour market.

The coefficient on the divorced/separated indicator shows that divorced/separated women are 2-3 pp more likely to participate in the labour market compared to single women, conditional on age and educational attainment. One potential reason for this is that divorce and separation, both fairly rare marital events in traditional societies, signals that such women are more "modern". In turn, their modern outlook might influence their propensity to participate

in the labour force. Our empirical findings on the effect of marital status on labour market outcomes are consistent with lifecycle labour supply models which predict a tradeoff between utility from marriage and labour market participation/wage (Blundell and Macurdy, 1999; Blundell et al.,2007; van der Klauuw, 2007)

6.3. Religiosity

Table 5 presents estimates using the LFS where the Arab indicator and X and R vectors are included. Our main interest is in the effect of religiosity on labour market participation. Therefore, we do not present the coefficients on the X vectors for ease of reading the table.

In column (1) and (3), the model imposes that the religiosity variables have the same effect on Jewish and Arab women. The coefficients here indicate a strong effect of religiosity on labour market participation. For example, religious women are 6 pp less likely to be employed or in the labour force than secular women while very religious women are almost 10 pp less likely to be employed or in the labour force. Columns (1) and (3) also show that when the religiosity variables are included in addition to the socioeconomic variables, the coefficient on the Arab indicator decreases in magnitude from over -0.27 to -0.243, suggesting that differences in religiosity also contribute to disparities in labour market participation.

In columns (2) and (4), we present estimated coefficients from models where the Arab indicator is interacted with the religiosity indicators. The estimated coefficients indicate that the effect of religiosity is even stronger for Arab women than Jewish women. For example, the effect of being religious for Jewish women is a 8.8 pp decrease in the probability of being employed while the effect of being religious for an Arab women is over 28 pp (-0.088-0.196).

In Table 6, we present analogous results using the SS sample. The results from the probit models (columns 1 to 4) are very similar to the results found using the LFS sample. Columns (5) to (8) use IV probit models, instrumenting the religiosity binary indicators by family religiosity levels at age 15. The estimated coefficients from the IV model are remarkably similar to the estimates from the standard probit model, suggesting that endogeneity is unlikely to be a serious concern. For example, the probit estimate suggests that religious individuals are 6.5 pp less likely to be employed than secular individuals (column 1) while the IV estimate suggests that religious individuals are 4.7 pp less likely to be employed than secular individuals.

The main difference between the standard probit and IV probit estimates can be seen in the interaction models where the dependent variable is employment. While the standard probit model indicates a statistically significant difference between traditional Jewish women

compared to secular Jewish women (column 2: 2.8 pp), the IV probit model indicates no statistically significant difference between these two groups (column 6). Reassuringly, comparing columns (2) and (6) and columns (4) and (8) indicates that the religiosity variables are stable for Arab women, again highlighting that endogeneity is unlikely to be a concern. Overall, these results demonstrate that it is important to consider religiosity as a key determinant of labour supply. These results are consistent with the findings of Khoudja and Fleishmann (2014) who find a negative religiosity-labour market participation gradient.[11]

6.4. Public policies

Table 7 and 8 presents the effect of public policies on labour market outcomes using the LFS and SS respectively. Columns (1) and (3) of table 7 shows that conditional on nationality, age, education, and marital status, having a child under 5 years old reduces one's probability of participating in the labour market by 8 pp. Compared to the effect of educational attainment examined in Table 4, having at least one child under 5 years old is sufficient to offset the increase in labour force participation resulting from acquiring a Bachelor's degree compared to a non-academic post-secondary school degree. In terms of public policies, these estimates indicate that childcare services in Israel could be improved to support the labour market participation of women with young children. The disparity in labour market participation rates between women with and without young children suggests that having young children to look after presents an important obstacle to working.

Columns (2) and (4) indicate that the negative effect of having a child under 5 on labour market outcomes is more detrimental for Arab women compared to Jewish women. In particular, for Arab women, having a child under 5 decreases their probability of participating in the labour force by over 10 pp. One potential reason for this is that there are differences in access to childcare services across these two groups. Another potential reason is that the norms associated with the rightful role of mothers differs across these two groups.

Table 8 performs the same exercise using the SS. The estimates in columns (1)-(2) and in columns (5)-(6) are similar in magnitude to those from the LFS. In columns (3)-(4) and columns (6)-(7), the regressions include a variable for the percentage of respondents who are satisfied with the public transportation in their subdistrict of residence. The estimated coefficients indicate a positive correlation between the percentage of respondents who are

[11] Khoudja and Fleishmann (2014) measure religiosity by the extent to which participants agree with the statement "My religion is an important part of myself."

satisfied with public transport in a given district and the rate of labour force participation in that subdistrict. Furthermore, this effect is stronger among Arabs.

Overall, these results indicate that family structure and geographic mobility are important factors in explaining the labour force participation gap between Jewish and Arab women.

6.5. Modern Outlook and Behaviour

Columns (1) and (3) of Table 9 presents coefficient estimates of models that augment the socioeconomic variables (age, education, and marital status) with variables that capture Hebrew proficiency and the degree to which the woman's outlook and behaviour is modern ("modernity"). Columns (2) and (4) of this Table interacts these additional variables with the Arab indicator. For these regressions, we only use the 2005 and 2006 waves of the SS since only these two years contain measures of both computer-use and ownership of a driving license.

When the modernity variables are included in the regression in addition to basic socioeconomic variables, the coefficient on the Arab indicator drops in magnitude from over -0.25 (Table 4) to roughly -0.17. This decrease in the magnitude of the coefficients is larger than when religiosity variables (Table 6) and public policy variables (Table 8) are included in the regression, indicating that differences in the modernity of outlook can explain a large proportion of the disparity in labour market outcomes. These results therefore contribute to a growing literature that indicates the importance of modernity and consequential attitudes towards work on labour market participation (Yashiv, 2010; Yashiv and Kasir, 2013). These results also lend support to policies that aim to improve labour market participation by increasing training in computer skills and other technical skills.

In particular, columns (1) and (3) suggest that there is a positive relationship between the degree of modernity and labour market participation. Women who use computers are 16-17 pp more likely to be employed or be in the labour market. Similarly, women who have driving licenses are 3-5 pp more likely to be employed and in the labour force. There is little evidence that Hebrew proficiency is positively correlated with labour market participation.

When the modernity and Hebrew proficiency variables are interacted with the Arab indicator, the results provide weak evidence that these effects vary across nationalities. Column (2) suggests that the effect of having a driving license on the probability of being employed is larger for Arab women than Jewish women; however, this estimate is only significant at the 10 percent level. There is no differential impact of having a driving license on being in the labour

force between Jewish and Arab women (column 4). Furthermore, there is also no evidence that the impact of Hebrew proficiency levels on labour market participation differs across Arab and Jewish women, as indicated by the lack of significance of the estimated interaction between the Arab indicator and Hebrew proficiency levels.

7. Early Retirement

Thus far, the preceding results indicate that Arab women are significantly less likely than Jewish women to participate in the labour market conditional on a given age. An equally important and related question is whether Arab women are more likely to retire early than Jewish women. In this section, we examine whether Arab women are more likely to retire early than Jewish women and whether this varies across occupations.

We examine this using two strategies. In the first strategy, we create aggregate labour market participation rates for a refined demographic cell. A demographic cell is defined by the interaction of the following characteristics: nationality (Arab or Jewish), age group, education bins, marital status, occupation (1-digit codes for 8 categories), district of residence, and survey year. We then regress the proportion of individuals employed (or in the labour force) in that cell on nationality, age categories, and the interaction between two variables while controlling for marital status, educational attainment, district and year indicators. The interaction between the age categories and the nationality indicator is of particular interest and will inform us about how the effect of age on labour market participation differs across Jewish and Arab women.

Figures 2 and 3 uses the estimates from these models to plot age profiles for employment (Figure 2) and labour force participation (Figure 3), separately for Jewish and Arab women. The patterns depicted in these figures provide clear evidence that Arab women are much more likely to leave the labour force early compared to Jewish women. In particular, both figures show a dramatic drop in employment and labour force participation rates after age 44-54, indicating that Arab women are likely to retire after age 55. The figures show that by age 60-64, the gap in employment and labour force participation between Jewish and Arab women is almost 40 pp. To the best of our knowledge, this is one of the first studies that documents the relatively early retirement of Arab women compared to Jewish women.

To provide more direct evidence of the differences in retirement age between Jewish and Arab women, in the second strategy we exploit the panel nature of the LFS to find

individuals who retire over the period when they are interviewed. In particular, we find individuals who were employed in $t-1$ but retired and not in the labour force in t. Note that due the fact that the LFS is a fairly short panel (of roughly 1.5 year), there are not many individuals that retire over this time span. Among these individuals, we find their age of retirement and their previous occupation before retirement. We then construct a dummy variable for retiring before age 55, the age at which Figures 2 and 3 indicate a drop-off in labour market participation. Finally, we estimate probit models to explain variation in the probability of retiring before age 55, controlling for educational attainment and occupation dummies. In particular, we estimate the following equation:

$$\Pr(\text{retire before } 55_{\text{i}}) = \alpha + \beta Arab_i + \gamma X_i + \delta Occ_i + \epsilon_i \qquad (2)$$

where the dependent variable is an indicator for retiring before 55, the vector X_i includes education dummies, and Occ_i is a vector of 1-digit occupation dummies.

These estimated coefficients for equation (2), presented in Table 10, indicates that Arab women are 16.8 pp more likely than Jewish women to retire before age 55, conditional on educational attainment and occupation (column 1). Thus, the microdata confirms the pattern observed in Figures 2 and 3: Arab women are significantly more likely to retire early than Jewish women. In columns (2) to (4) of Table 10, we estimate the regression by occupational categories. Low-skilled occupations include unskilled workers, industry/construction works, and skilled agricultural workers. Middle-skilled workers include those in sales/services, clerical workers, and managers. Lastly, high-skilled workers include associate professionals and academic professionals. The estimates indicate heterogeneity across occupations: the early-retirement effects are strongest for individuals working in high-skilled occupations and weakest for individuals working in low-skilled occupations. For example, among women who work in high-skilled occupations, Arab women are 26 pp more likely to retire early than Jewish women. Among women who work in middle-skilled occupations, Arab women are 13.7 pp more likely to retire early than Jewish women. Among low-skilled workers, there is no statistically significant difference in the retirement ages of Arab and Jewish women.[12]

Given the limited work looking at differential retirement ages between Jewish and Arab women, we believe that these findings have important implications for policy. Since high-skilled occupations tend to be remunerated better than lower-skilled occupation, the fact that

[12] Note that there are no individuals with more than a BA qualification in this subsample.

early retirement tends to be concentrated in this occupation has implications for intergenerational mobility among the Arab community.

8. Conclusion

This paper presents novel evidence on the differences in labour market outcomes between Jewish and Arab women living in Israel. We document two important differences in labour market outcomes across the two groups. First, Arab women are over 25 pp less likely to be employed or to participate in the labour market compared to their Jewish counterparts, even when controlling for important socioeconomic and cultural factors. Second, Arab women are much more likely to retire early than Jewish women.

We examine the factors that could contribute to differences in labour market participation between Jewish and Arab women. We find that socioeconomic factors, religious and cultural, as well as public policy-related factors are important in explaining the gap in labour market participation between the two groups. These results suggest that in addition to improving institutional access to economic opportunities such as higher education and employment recruitment processes, policymakers should also pay attention to supplementary factors that might facilitate the effects of such institutions. For example, the impact of culture and religion suggests that cultural norms affect female labour participation, even when conditioning on standard economic variables such as educational attainment. This result is in accordance with previous research in other contexts about Muslim women. Our results also suggest that childcare services and good public transport can be important means to encourage the participation of Arab women in the labour force.

We find that the differences in retirement age between Jewish and Arab women are driven by women who previously worked in high-skilled occupations. This raises the concern that even if entering a high-skilled occupation provides some means to improve economic outcomes, the early retirement of Arab women who enter this occupation will impede any progress in closing the economic gap between Jewish and Arab women. These findings therefore suggest that once labour force participation is encouraged among younger workers, measures should be taken to delay the retirement of Arab women so that the gains from labour market participation can be reaped across the life cycle and across generations.

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Tables and Figures

Table 1: Labour force participation rate among 15-64 y/o in Israel, OECD countries, and the United States (2016)

	Arabs	Jews	OECD	US
Men	67.88	78.87	80.2	78.7
Women	36.44	77.58	63.6	67.3

***Sources**:* The figures on Israel are taken from the Israeli Labour Force Survey (author's calculations), on the OECD from the OECD's website, and on the United States from the International Labor Organization's website. ***Notes**:* Does not include Arabs living in East Jerusalem and in the Golan Heights.

Table 2: Descriptive statistics of the main sample

	Labour Force Survey		Social Survey	
	Jewish	Arab	Jewish	Arab
	(1)	(2)	(3)	(4)
Labour market outcomes				
Is Employed	0.67	0.29	0.74	0.36
	(0.47)	(0.45)	(0.44)	(0.48)
In Labour Force	0.72	0.32	0.79	0.43
	(0.45)	(0.47)	(0.41)	(0.50)
Social economics variables				
25-29 years old	0.13	0.13	0.13	0.15
	(0.33)	(0.33)	(0.33)	(0.36)
30-34 years old	0.11	0.12	0.13	0.14
	(0.31)	(0.33)	(0.33)	(0.35)
35-44 years old	0.21	0.23	0.22	0.25
	(0.40)	(0.42)	(0.42)	(0.43)
45-54 years old	0.19	0.17	0.21	0.18
	(0.39)	(0.37)	(0.41)	(0.39)
55-64 years old	0.17	0.11	0.19	0.11
	(0.38)	(0.31)	(0.39)	(0.31)
Bachelors or more	0.48	0.30	0.33	0.20
	(0.50)	(0.46)	(0.47)	(0.40)
Has child under 5 y/o	0.23	0.29	0.26	0.36
	(0.42)	(0.45)	(0.44)	(0.48)
Other variables				
Married	0.58	0.60	0.64	0.73
	(0.49)	(0.49)	(0.48)	(0.44)
Divorced or separated	0.10	0.05	0.11	0.05
	(0.30)	(0.22)	(0.31)	(0.21)
Religious or very religious	0.04	0.07	0.30	0.61
	(0.21)	(0.26)	(0.46)	(0.49)
Uses computer at job			0.64	0.29
			(0.48)	(0.45)
Has driving license			0.71	0.45
			(0.45)	(0.50)
Good Hebrew			0.67	0.43
			(0.47)	(0.49)
Observations	248603	52503	34883	8625

Notes: This table presents descriptive statistics for the main sample. See Section 3.2. in main text for sample selection procedure.

Table 3: Relationship between nationality and labour market outcome

	Labour Force Survey				Social Survey			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Is Employed		In Labour Force		Is Employed		In Labour Force	
Arab	-0.371***		-0.371***		-0.340***		-0.309***	
	(0.002)		(0.002)		(0.004)		(0.004)	
Muslim		-0.455***		-0.446***		-0.412***		-0.369***
		(0.002)		(0.002)		(0.005)		(0.005)
Druze		-0.398***		-0.397***		-0.356***		-0.295***
		(0.007)		(0.007)		(0.015)		(0.014)
Christian		-0.088***		-0.098***		-0.070***		-0.069***
		(0.004)		(0.004)		(0.011)		(0.010)
Observations	301,106	301,106	301,106	301,106	43,508	43,508	43,508	43,508

Notes: Marginal effects from probit regressions reported. Regressions include year dummies. Robust standard errors in parentheses. ***Source***: LFS 1995-2016; SS 2002-2016.

* p<0.05 ** p<0.01 *** p<0.001

Table 4: Relationship between Socioeconomic characteristics and labour market outcome

	Labour Force Survey				Social Survey			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Is Employed		In Labour Force		Is Employed		In Labour Force	
Arab	-0.258***	-0.256***	-0.266***	-0.262***	-0.243***	-0.238***	-0.226***	-0.218***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.005)	(0.005)	(0.005)	(0.005)
Age Categories								
25-29	0.129***	0.134***	0.125***	0.137***	0.093***	0.114***	0.077***	0.106***
	(0.003)	(0.004)	(0.003)	(0.003)	(0.008)	(0.009)	(0.007)	(0.008)
30-34	0.150***	0.157***	0.136***	0.153***	0.084***	0.115***	0.046***	0.088***
	(0.004)	(0.004)	(0.003)	(0.004)	(0.008)	(0.009)	(0.008)	(0.008)
35-44	0.169***	0.176***	0.147***	0.163***	0.107***	0.141***	0.060***	0.103***
	(0.003)	(0.004)	(0.003)	(0.004)	(0.007)	(0.009)	(0.007)	(0.008)
45-54	0.164***	0.171***	0.131***	0.148***	0.104***	0.140***	0.047***	0.091***
	(0.003)	(0.004)	(0.003)	(0.004)	(0.008)	(0.009)	(0.007)	(0.008)
55-59	0.058***	0.067***	0.015***	0.035***	0.017	0.057***	-0.050***	-0.000
	(0.004)	(0.005)	(0.004)	(0.005)	(0.010)	(0.011)	(0.009)	(0.010)
60-64	-0.131***	-0.121***	-0.192***	-0.170***	-0.175***	-0.130***	-0.253***	-0.199***
	(0.004)	(0.005)	(0.004)	(0.005)	(0.010)	(0.012)	(0.010)	(0.011)
Educational Attainment								
Secondary school	0.181***	0.181***	0.189***	0.191***	0.162***	0.163***	0.167***	0.170***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.009)	(0.009)	(0.009)	(0.009)
Matriculation	0.235***	0.234***	0.218***	0.218***	0.233***	0.229***	0.208***	0.204***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.009)	(0.009)	(0.009)	(0.009)
Non-academic post-sec	0.320***	0.321***	0.312***	0.314***	0.312***	0.313***	0.296***	0.298***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.009)	(0.009)	(0.008)	(0.008)
BA	0.377***	0.377***	0.360***	0.362***	0.389***	0.388***	0.357***	0.358***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.009)	(0.009)	(0.008)	(0.008)
MA	0.401***	0.401***	0.378***	0.379***	0.409***	0.408***	0.370***	0.369***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.010)	(0.010)	(0.009)	(0.009)
PhD	0.445***	0.445***	0.424***	0.425***	0.448***	0.447***	0.397***	0.398***
	(0.010)	(0.010)	(0.009)	(0.009)	(0.022)	(0.022)	(0.020)	(0.020)
Marital Status								
Married		-0.013***		-0.031***		-0.051***		-0.072***
		(0.003)		(0.003)		(0.006)		(0.006)
Divorced		0.018***		0.030***		-0.032***		-0.013
/Separated		(0.004)		(0.004)		(0.009)		(0.009)
Widow		-0.039***		-0.050***		-0.097***		-0.102***
		(0.006)		(0.006)		(0.014)		(0.013)
Observations	230,069	230,069	230,069	230,069	42,916	42,916	42,916	42,916

Notes: Marginal effects from probit regressions reported. Regressions include year and district dummies. Robust standard errors in parentheses. ***Source***: LFS 2001-2016 and SS 2002-2016

* p<0.05 ** p<0.01 *** p<0.001

Table 5: Relationship between religiosity and labour market outcome

(Labour force survey after 2014)

	(1)	(2)	(3)	(4)
	Is Employed		**In Labour Force**	
Traditional	-0.025***	0.003	-0.020***	0.010*
	(0.004)	(0.004)	(0.004)	(0.004)
Religious	-0.057***	-0.017**	-0.053***	-0.014*
	(0.005)	(0.006)	(0.005)	(0.006)
V religious	-0.102***	-0.088***	-0.093***	-0.078***
	(0.006)	(0.006)	(0.006)	(0.006)
Arab	-0.243***	-0.112***	-0.246***	-0.118***
	(0.004)	(0.008)	(0.004)	(0.008)
Arab		-0.168***		-0.166***
X Traditional		(0.010)		(0.009)
Arab		-0.196***		-0.184***
X Religious		(0.012)		(0.011)
Arab		-0.063*		-0.078**
X V religious		(0.031)		(0.028)
Observations	63,328	63,328	63,328	63,328

Notes: Marginal effects from probit regressions reported. Regressions include age dummies, education bins, marital status, district dummies, and year dummies (see Table 4). Robust standard errors in parentheses. ***Source***: LFS 2014-2016

* p<0.05 ** p<0.01 *** p<0.001

Table 6: Relationship between religiosity and labour market outcome (Social Survey)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Is Employed		**In Labour Force**		**Is Employed (IV)**		**In Labour Force (IV)**	
Traditional	-0.016**	-0.003	-0.018	-0.007	-0.005	0.011	-0.006	0.007
	(0.005)	(0.006)	(0.019)	(0.023)	(0.005)	(0.006)	(0.018)	(0.022)
Religious	-0.065***	-0.028***	-0.069***	-0.034	-0.047***	-0.008	-0.050**	-0.013
	(0.005)	(0.006)	(0.018)	(0.023)	(0.005)	(0.006)	(0.017)	(0.022)
V religious	-0.145***	-0.121***	-0.150***	-0.126**	-0.127***	-0.103***	-0.132***	-0.107*
	(0.008)	(0.009)	(0.034)	(0.046)	(0.007)	(0.008)	(0.031)	(0.043)
Arab	-0.231***	-0.101***	-0.230***	-0.097*	-0.214***	-0.082***	-0.213***	-0.079
	(0.005)	(0.011)	(0.007)	(0.046)	(0.005)	(0.010)	(0.007)	(0.041)
Arab		-0.120***		-0.113		-0.129***		-0.121*
X Tradition		(0.014)		(0.065)		(0.013)		(0.058)
Arab		-0.194***		-0.180**		-0.190***		-0.181***
X Religious		(0.013)		(0.060)		(0.012)		(0.054)
Arab		-0.195***		-0.168*		-0.181***		-0.161*
X V religious		(0.023)		(0.086)		(0.020)		(0.076)
Observations	42,916	42,916	42,916	42,916	42,916	42,916	42,916	42,916

Notes: Marginal effects from probit regressions reported in columns (1) to (4). Marginal effects from IV probit regressions reported in columns (5) to (8) where the religiosity variables are instrumented by family religiosity at age 15. Regressions include age dummies, education bins, marital status, district dummies, and year dummies (see Table 4). Robust standard errors in parentheses. ***Source***: SS 2002-2016

* p<0.05 ** p<0.01 *** p<0.001

Table 7: Relationship between public policies and labour market outcome

(Labour force survey)

	(1)	(2)	(3)	(4)
	Is Employed		**In Labour Force**	
Arab	-0.255***	-0.249***	-0.261***	-0.254***
	(0.002)	(0.003)	(0.002)	(0.003)
Had child under 5 y/o	-0.082***	-0.077***	-0.082***	-0.076***
	(0.003)	(0.003)	(0.002)	(0.003)
Arab X		-0.023***		-0.026***
Has child under 5		(0.005)		(0.005)
Observations	230,136	230,136	230,136	230,136

Notes: Marginal effects from probit regressions reported. Regressions include age dummies, education bins, martial status, district dummies, and year dummies (see Table 4). Robust standard errors in parentheses. ***Source***: LFS 2001-2016
* p<0.05 ** p<0.01 *** p<0.001

Table 8: Relationship between public policies and labour market outcome (Social Survey)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Is Employed		**Is Employed**		**In Labour Force**		**In Labour Force**	
Arab	-0.237***	-0.224***	-0.245***	-0.832***	-0.216***	-0.207***	-0.220***	-0.711***
	(0.005)	(0.006)	(0.005)	(0.055)	(0.005)	(0.006)	(0.004)	(0.050)
Had child under 5 y/o	-0.078***	-0.069***	-0.081***	-0.080***	-0.077***	-0.071***	-0.081***	-0.080***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)	(0.005)	(0.005)
Arab X Has child under 5		-0.037***				-0.024*		
		(0.010)				(0.009)		
% satisfied with transport			0.113***	0.038			0.090***	0.022
			(0.026)	(0.026)			(0.025)	(0.025)
Arab X % satisfied with transport				1.084***				0.908***
				(0.102)				(0.093)
Observations	42,916	42,916	42,916	42,916	42,916	42,916	42,916	42,916

Notes: Marginal effects from probit regressions reported. "% satisfied with transport" refers to the percentage of citizens in the respondent's subdistrict who report being satisfied or very satisfied with public transport. All regressions include age dummies, education bins, marital status, and year dummies (see Table 4. Columns (1), (2), (5), (6) also include district dummies. Robust standard errors in parentheses. ***Source:*** SS 2002-2016

* p<0.05 ** p<0.01 *** p<0.001

Table 9: Relationship between modernity and labour market outcome (Social survey)

	(1)	(2)	(3)	(4)
	Is Employed		**In Labour Force**	
Arab	-0.168***	-0.188***	-0.172***	-0.191***
	(0.020)	(0.027)	(0.018)	(0.024)
Modernity variables				
Uses computer	0.167***	0.171***	0.162***	0.166***
	(0.016)	(0.017)	(0.015)	(0.017)
Has driving license	0.046***	0.032*	0.034**	0.020
	(0.014)	(0.015)	(0.013)	(0.014)
Hebrew level				
Poor	-0.081*	-0.081	-0.068*	-0.058
	(0.034)	(0.045)	(0.030)	(0.041)
Average	-0.056*	-0.037	-0.046	-0.053
	(0.027)	(0.042)	(0.024)	(0.039)
Good	0.008	0.030	-0.010	-0.005
	(0.029)	(0.054)	(0.026)	(0.051)
Very good	0.057	-0.130	0.105***	-0.072
	(0.033)	(0.074)	(0.031)	(0.076)
Arab X Modernity variables				
Arab X		0.067*		0.056
Has driving license		(0.032)		(0.029)
Arab X		-0.009		-0.015
Uses computer		(0.031)		(0.028)
Arab X Hebrew level				
Arab X poor		-0.007		-0.025
		(0.069)		(0.061)
Arab X average		-0.038		0.011
		(0.056)		(0.050)
Arab X good		-0.038		-0.007
		(0.065)		(0.060)
Arav X v good		0.191*		0.189*
		(0.083)		(0.083)
Observations	5,837	5,837	5,837	5,837

Notes: Marginal effects from probit regressions reported. Robust standard errors in parentheses. All regressions include age dummies, education bins, marital status, district dummies, and year dummies. ***Source:*** SS 2005-2006

* p<0.05 ** p<0.01 *** p<0.001

Table 10: Early Retirement (LFS)

Dependent variable: Probability of being retired before 55				
	(1)	(2)	(3)	(4)
	All Jobs	**Low-skilled**	**Middle-Skilled**	**High-skilled**
Arab	0.168***	0.134	0.137*	0.263***
	(0.036)	(0.073)	(0.059)	(0.063)
Educational attainment				
Secondary school	0.006	0.027	0.041	-0.117
	(0.033)	(0.073)	(0.042)	(0.065)
Matriculation	-0.017	0.042	-0.007	-0.045
	(0.032)	(0.072)	(0.042)	(0.077)
Non-academic post-sec	-0.001	-0.009	0.029	-0.009
	(0.031)	(0.067)	(0.043)	(0.069)
BA	0.011	0.083	-0.010	0.023
	(0.032)	(0.088)	(0.041)	(0.070)
MA	-0.050		-0.025	-0.054
	(0.031)		(0.048)	(0.067)
Dep var mean	12.24	11.22	11.71	13.64
Observations	1,304	206	648	434

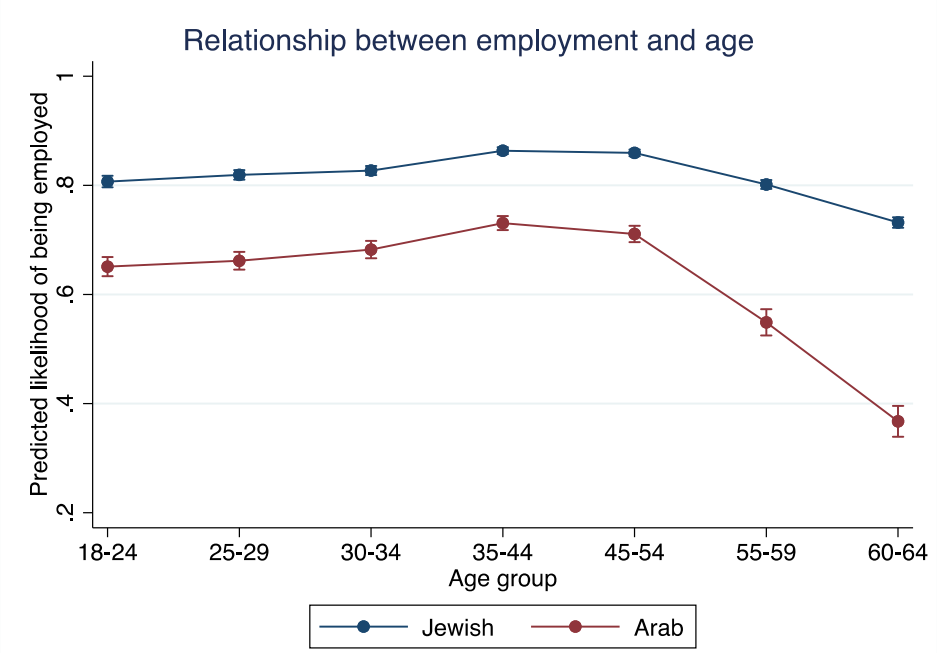
Notes: Sample includes individuals who retired over the survey period when they are sampled (so that age of first retirement can be observed). Marginal effects from probit regressions reported. Regression in column (1) includes 9 1-digit occupation dummies. Column (2) estimates the regression on low-skilled workers (unskilled, industry/construction, and skilled agricultural workers). Column (3) estimates the regression on middle-skilled workers (sales/services, clerical workers, and managers). Column (4) estimates the regression on high-skilled workers (associate professionals and academic professionals). All regressions include year dummies. Robust standard errors in parentheses. ***Source:*** LFS 1995-2006

* p<0.05 ** p<0.01 *** p<0.001

Figure 1: Employment rate, by gender and ethnic nationality, 1995-2016

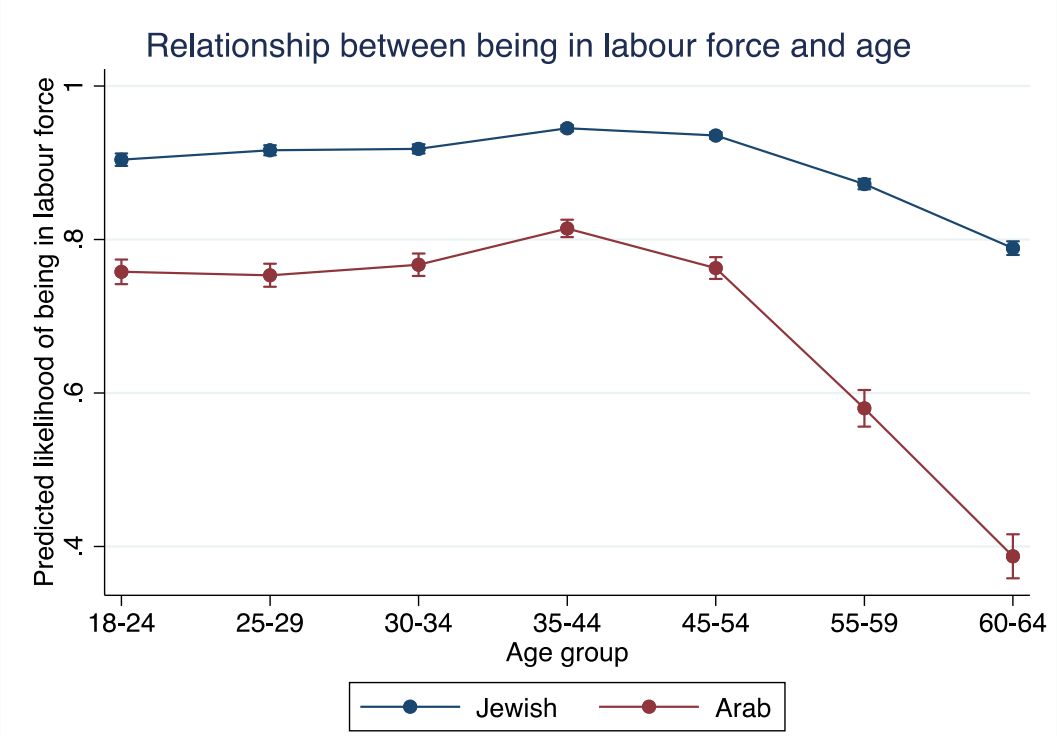
Source: Authors' calculation based on Israeli Labour Force Survey, 1995-2016. ***Notes:*** Sample does not include Arabs from East Jerusalem and the Golan Heights. The data relate to the major segment of the labour force – persons aged 15 to 64.

Figure 2: Predicted probability of being employed by nationality and age



Source: Labour force survey

Figure 3: Predicted probability of being in labour force by nationality and age



Source: Labour force survey

Appendix

A. Data Appendix

The Israeli Labour Force Survey

The Israeli Labour Force Survey began in 1954. The survey population includes the entire permanent population ages 15 and over. From 1995 to 2011, the ILFS adopted a quarterly survey system. In the quarterly system, units are interviews 4 times over the course of 18 months. They are first interviewed in the first quarter of the survey, the following quarter, then following a break of two quarters, they are interviewed in the following two quarters in a manner parallel to those of the first two investigations. From 2012 onwards, the ILFS adopted a monthly survey system. In the monthly system, units are interviewed 8 times over the course of 16 months. They are interviewed monthly in the first four months and then following a break of 8 months, they are interviews four more times consecutively in the following months.

The Social Survey

The Social Survey has been conducted annually since 2002 on a sample of persons aged 20 and older. The main purpose of the Social Survey is to provide up-to-date information on the welfare of Israelis and on their living conditions.

The survey population comprises the permanent non-institutional population of Israel aged 20 and older, as well as residents of non-custodial institutions. Questionnaires are administered by Israel Central Bureau of Statistics (ICBS) interviewers using laptops to conduct computer-assisted personal interviews. The interviews are conducted in Hebrew, Arabic and Russian, with about 7,500 people, who represent about 4.5 million people in the age bracket.

B. Additional Tables

Table A1. Relationship between nationality and labour market outcomes

	Labour Force Survey (Full sample)			
	(1)	(2)	(3)	(4)
	Is Employed		In Labour Force	
Arab	-0.384***		-0.383***	
	(0.001)		(0.001)	
Mulsim		-0.462***		-0.452***
		(0.001)		(0.001)
Druze		-0.383***		-0.382***
		(0.003)		(0.003)
Christian		-0.101***		-0.113***
		(0.002)		(0.002)
Observations	1,111,213	1,111,213	1,111,213	1,111,213

Notes: Marginal effects from probit regressions reported. Regressions include year dummies. Robust standard errors in parentheses. ***Source***: LFS 1995-2016; SS 2002-2016.

* p<0.05 ** p<0.01 *** p<0.001

Table A2. Relationship between Socioeconomic characteristics and labour market outcome

	Labour Force Survey (Full Sample)			
	(1)	(2)	(3)	(4)
	Is Employed		In Labour Force	
Arab	-0.277***	-0.258***	-0.277***	-0.261***
	(0.001)	(0.001)	(0.001)	(0.001)
Age Categories				
25-29	0.112***	0.111***	0.110***	0.116***
	(0.002)	(0.002)	(0.002)	(0.002)
30-34	0.136***	0.135***	0.123***	0.131***
	(0.002)	(0.002)	(0.002)	(0.002)
35-44	0.156***	0.153***	0.135***	0.141***
	(0.002)	(0.002)	(0.001)	(0.002)
45-54	0.152***	0.149***	0.123***	0.129***
	(0.002)	(0.002)	(0.001)	(0.002)
55-59	0.052***	0.048***	0.010***	0.016***
	(0.002)	(0.002)	(0.002)	(0.002)
60-64	-0.119***	-0.120***	-0.173***	-0.165***
	(0.002)	(0.002)	(0.002)	(0.002)
Educational Attainment				
Secondary school	0.193***	0.193***	0.205***	0.207***
	(0.002)	(0.002)	(0.002)	(0.002)
Matriculation	0.258***	0.253***	0.247***	0.243***
	(0.002)	(0.002)	(0.002)	(0.002)
Non-academic post-sec	0.326***	0.328***	0.323***	0.327***
	(0.002)	(0.002)	(0.002)	(0.002)
BA	0.395***	0.391***	0.383***	0.382***
	(0.002)	(0.002)	(0.002)	(0.002)
MA	0.423***	0.418***	0.406***	0.404***
	(0.002)	(0.002)	(0.002)	(0.002)
PhD	0.463***	0.462***	0.443***	0.444***
	(0.005)	(0.005)	(0.005)	(0.005)
Marital Status				
Married		-0.008***		-0.023***
		(0.001)		(0.001)
Divorced/Separated		0.023***		0.033***
		(0.002)		(0.002)
Widow		-0.033***		-0.042***
		(0.003)		(0.003)
Observations	871281	871281	871281	871281

Notes: Regressions include year and district dummies. Robust standard errors in parentheses.
* p<0.05 ** p<0.01 *** p<0.001

Table A3. Relationship between religiosity and labour market outcome

(Labour force survey FULL SAMPLE after 2014)

	(1)	(2)	(3)	(4)
	Is Employed		In Labour Force	
Traditional	-0.023***	0.003	-0.019***	0.010***
	(0.002)	(0.002)	(0.002)	(0.002)
Religious	-0.059***	-0.024***	-0.054***	-0.020***
	(0.002)	(0.003)	(0.002)	(0.003)
V religious	-0.106***	-0.092***	-0.099***	-0.084***
	(0.003)	(0.003)	(0.003)	(0.003)
Arab	-0.250***	-0.113***	-0.248***	-0.116***
	(0.002)	(0.004)	(0.002)	(0.004)
Arab		-0.175***		-0.170***
X Traditional		(0.005)		(0.005)
Arab		-0.193***		-0.179***
X Religious		(0.006)		(0.005)
Arab		-0.092***		-0.100***
X V religious		(0.015)		(0.014)
Observations	269351	269351	269351	269351

Notes: Marginal effects from probit regressions reported. Regressions include age dummies, education bins, marital status, district dummies, and year dummies (see Table 4). Robust standard errors in parentheses. ***Source***: LFS 2002-2016

Table A4. Relationship between public policies and labour market outcome

(Labour force survey FULL SAMPLE)

	(1)	(2)	(3)	(4)
	Is Employed		**In Labour Force**	
Arab	-0.257***	-0.248***	-0.260***	-0.248***
	(0.001)	(0.001)	(0.001)	(0.001)
Had child under 5 y/o	-0.079***	-0.071***	-0.078***	-0.067***
	(0.001)	(0.001)	(0.001)	(0.001)
Arab X		-0.033***		-0.041***
Has child under 5		(0.003)		(0.002)
Observations	871,281	871,281	871,281	871,281

Notes: Marginal effects from probit regressions reported. Regressions include age dummies, education bins, marital status, district dummies, and year dummies (see Table 4). Robust standard errors in parentheses. ***Source***: LFS 2002-2016

* p<0.05 ** p<0.01 *** p<0.001