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Introduction

Family structure, derived from individuals' decisions to start families and bring children into the world, serves as a cornerstone for demographic forecasting and the estimation of local and national population growth. These forecasts serve as the basis for the allocation of land for housing, the provision of public services, and more. Demographic research in Israel focuses on changes in the characteristics of family structure (such as the age of marriage and the total fertility rate) in order to predict growth at the national level. Researchers have also taken a wider view, analyzing trends to predict the future sectoral distribution of the country's population.

In recent years, family structure in Israel has undergone substantial changes, including an across-the-board decrease in birth rates (Weinreb & Shraberman, 2022; Weinreb, 2023), a decrease in the marriage rate, and an increase in the average age of marriage (Weinreb, 2022; 2023). Although the marriage rate in Israel is similar to that in other high-income countries (Figure 1a), Israel is more similar to neighboring developing countries than to developed ones in terms of birthrate (Appendix Figure 1b). This uniqueness affects both the demography and future economy of Israel and its diverse population groups.

Understanding the mechanisms driving the change in family structure within and across sectors — including social norms that emerge from social interaction — is essential not only in order to interpret overarching trends but also as a tool to improve demographic predictions at the local and national levels.

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This is especially true in a diverse and diversifying society where individual decisions are influenced by those of peers and neighbors from other population groups, as well as those by family members, friends, and key figures who may reside in a distant area of the country or even abroad. The goal of this study is to measure the extent to which Israelis are aligned with their social networks in terms of decisions about parenting and marriage (hereafter: normative influences) and how sociocultural norms or spatial cross-cultural norms are reflected in those decisions. The study is intended to provide a basis for improving demographic forecasts at the national and local levels and to enable more accurate planning based on the expected family structure in local authorities and in the country as a whole.

Studies that have looked at the dynamics of parenting and marriage in Israel have primarily focused on factors such as religious observance, education, economic development, and child allowances, and their impact on fertility.[1] The *normative influences* we consider have not yet been studied in Israel, even though they constitute a fruitful field of research in other countries, with some researchers arguing they are important mechanisms for explaining changes in fertility on a national level.[2] The goal of the current research is to conduct such an examination for Israel and to identify the factors that are correlated with marriage and parenting decisions on the individual level, especially normative influences. We empirically define these normative relationships as the correlation between an individual's personal marital circumstance and family size on the one hand and those of similar individuals in the same social network, where the same network is people of similar age (hereinafter denoted *spatial networks*) or people of similar age belonging to the same population (independent of their location, hereinafter denoted *sociocultural network*). In this study, we do not examine the mechanisms that determine norms in the spatial or sociocultural networks, and therefore it is impossible to know to what extent they result from a direct influence of one individual on another or from the simultaneous influence of external factors on others and on the individual.[3] Therefore, this study focuses on describing the correlation

1 See, for example, Guttman et al., 1993; Manski and Mayshar, 2003; Okun, 2017.

2 See for example Bongaarts and Watkins, 1996.

3 In the literature, it is conventional to refer to the first mechanism as an endogenous effect or social interaction and to the second as an exogenous effect or normative influence; however, as mentioned, we do not make this distinction.

between individuals in different networks, rather than understanding the causal mechanisms that create this correlation. As explained below, distinguishing between correlation and causality has little real importance when discussing the impact of our findings on the aforementioned policy objectives.

The empirical results suggest that normative networks go a long way in explaining family structure in Israel. An increase of 1% in the marriage rate in the sociocultural and spatial networks corresponds to an increase of 0.5 and 0.4 percentage points, respectively, in the likelihood that the individual will be married. Furthermore, each additional child in the average family in the sociocultural and spatial networks corresponds to 0.90 and 0.25 more children in the individual's household, respectively. In addition, when normative networks are considered, some of the other background factors completely lose their predictive power for marriage or parenting. Finally, there appears to be differences in the level of correspondence with spatial and sociocultural norms across population groups. For example, Arabs are more in synch with their local neighbors than are Jews.

Review of the literature

Sociological, demographic, and economic research often focuses on the effects of normative influences in an individual's network on their decisions, alternating between the labels of social interaction, normative influence, and peer effects.[4] Since the 1990s, researchers have demonstrated these effects in various countries. Bongaarts and Watkins (1996) showed that a change in norms is the primary mechanism responsible for a decline in birth rates in a number of countries, particularly in Africa. Subsequently, researchers have demonstrated how the effect of normative influence on fertility changes with the development of the economy and market activity — both theoretically (Kohler, 2001) and empirically (Kohler et al., 2001).

4 Differences in the terminology of normative influence exist both within a specific discipline and between disciplines, as described by Kohler et al. (2001). Generally, there will be a correspondence between the name of the phenomenon and the mechanism that drives the correspondence: social interaction refers to the direct influence of others in the group on the individual, while normative influence refers to root factors that predetermine both the individual's behavior and the behavior of others in the group. We do not deal with this distinction here.

In recent decades, researchers have also examined these topics in high-income countries. Bühler and Fratczak (2007) focused on Poland. They based their research on a sample of 758 individuals (without children and with up to three children) and found that personal network influences predict parents' decisions to expand their families. The researchers also found that fertility-related social capital, such as access to informal childcare frameworks on the family or at the community level, only begins to have an effect once individuals already have at least one child. Philipov et al. (2006) examined, among other things, the effects of norms on women's *intentions* to have a first or second child in Bulgaria and Hungary in 2001–2002, and found that factors such as religious observance and perceptions about parenting predict the intention to give birth at a statistically significant level.

The scientific literature also deals with various networks or circles of belonging in which the individual exists and from which norms are derived. For example, Fiori et al. (2014) focused on the effects of the local-spatial networks in Great Britain, showing that local norms predict the likelihood of women becoming mothers to a great extent, although the effect diminishes with each additional birth. Similarly, McConnell and Valladares-Esteban (2020) demonstrated that in the US the marriage rate among similar individuals in the same state within a certain age range of an individual predicts the likelihood of that individual being married. Büyükkeçeci et al. (2020) examined two additional networks: the family and the workplace. Based on data from the Dutch Central Bureau of Statistics, the researchers showed that the decisions of work colleagues and siblings to have more children significantly influence an individual's decisions, especially in the case of women. In another study that focused on the family network in German society, Büyükkeçeci and Leopold (2021) found that the likelihood of an individual getting married, divorced, or becoming a parent increases in the short term after a sibling gets married, divorced, or becomes a parent, respectively. The researchers also found that the likelihood of getting married decreases after a sibling gets divorced and vice versa.

In the Israeli context, Manski and Mayshar (2003) presented a detailed theoretical analysis of birth patterns in Israel while considering normative influences and incentives such as child allowances. Identification problems prevented the researchers from accurately estimating those normative influences, but the researchers hypothesized that since the founding of the State until the 1980s, these constituted an important factor in explaining

the increase in birth rate in the Haredi sector. Okun (2017) dealt with the relationship between religious observance, norms, and parenting among Jewish men and women aged 25–49, based on data from the 2009 Social Survey. She found that the likelihood of being a parent of at least three children closely tracks the individual's level of religiosity, their preferences regarding religion and community life, and their normative perceptions regarding parenting and family. To the best of our knowledge, the connection between an individual's parenting and marriage decisions and the choices of others in their network has not been studied in Israel.

Normative influences: A statistical analysis

Our analysis utilizes individual and household data from the Household Expenditure and Income Survey conducted by the Central Bureau of Statistics (CBS) in Israel between 2018 and 2020. The database resembles that used by Debowy et al. (2021) and includes data on age, marital status, employment, education, and nationality at the individual level, alongside data on number of children, geographic location, and religiosity at the household level. The core of the analysis is the use of a multivariate model to estimate the effect of normative influences (defined below) on the number of children and the likelihood of being married, given background factors such as age, employment, education, population sector, and geographic location.

To quantify normative relationships, we constructed a series of variables calculated separately for each individual in the sample. The value of these variables is the relevant outcome (marriage or the number of children in the household) averaged over *all other individuals* in the sample who are up to five years older or younger than the individual and who belong to the same gender

and network.[5,6] As discussed above, we focused on two networks with which the individual may exhibit parallel behavior: geographic subdistrict, which roughly represents the individual's neighbors and those in physical proximity; and ethnicity-religiosity group,[7] which roughly represents those culturally similar.

For example, for a 30-year-old secular Arab woman living in the Ramla subdistrict, we separately calculated the average number of children and the marriage rate for all surveyed women aged 25–35 in the Ramla subdistrict, and for all secular Arab women aged 25–35 (regardless of geographic location). We view these numbers as embodying the norms in her spatial and sociocultural networks (respectively).

It is important to address the endogeneity of these variables. Individuals do not choose their age, nor — in the vast majority of cases — their gender, ethnicity, or level of religious observance; however, the choice of residence may indeed be related to unobserved factors that influence the individual's likelihood of getting married or his number of children. Furthermore, many individuals choose to live near those who are culturally similar to themselves, a factor

5 Due to data limitations, it was not possible to accurately attribute a specific number of children of a certain age to each individual in the sample. As a result, we used the number of children under the age of 10 (under the age of 5 for individuals 24 or younger) living in the household as a proxy variable for parents of young children. This necessarily implies that young people (aged 25 or older) who still live with their parents alongside siblings aged 5–9 will be classified as ***parents***; however, we assume that such cases are rare and randomly distributed. In our previous study (Debowy et al., 2021), this variable was shown to have predictive power for employment (especially in the case of women), a finding that partially confirms its relevance.

6 Formally, the network variables for outcome (marriage/children) Y of individual i at age k who belong to group s were defined as:

$$Y_{i,s,k} = \frac{1}{n_i} \sum_{\substack{j \neq i, \\ s_j = s_i, \\ k_i - 5 \leq k_j \leq k_i + 5}}^{n_i} Y_{j,s,k}$$

7 The individual was assigned to one of three ethnic sectors (Jews, Arabs, or Others); Jews were assigned to one of five levels of religiosity (secular, traditional, religious, Haredi, or other) and Arabs and others to one of four levels of religiosity (secular/non-religious, traditional/somewhat religious, religious/very religious, or other). Combining these categories, we generated a total of thirteen ethno-religious groups. As mentioned, non-Jews were not differentiated based on religion (Muslim, Christian, Druze, etc.) but only by religiosity, due to, among other reasons, the sample size and the methodology, which divides each such group into varying networks consisting of very few individuals.

that may confound the effects of the two networks as they have been defined. Therefore, we controlled for the proportion of individuals from the individual's ethno-religious group in the subdistrict of residence in all the estimations.[8]

Ultimately, our methodology is very simple: we estimate regression models in which the individual's marital status or the number of children in the household is the dependent variable and the two effects of the constructed normative influences are the explanatory variables, alongside background factors such as age, employment, education, geographic subdistrict, and ethnicity-religiosity-gender group. In estimations in which the number of children is the dependent variable, we used Ordinary Least Squares, while in the case of those predicting marriage, we employed the Probit model.

Limitations of the methodology and the effect on policy

Our methodology focuses on quantifying the correlation between different individuals with respect to family structure (while controlling for background factors so that a conditional correlation is obtained). This approach does not enable us to identify cause and effect in the described relationship, and therefore it can fit a number of different causal mechanisms. Manski (1993) classified these mechanisms into three categories, each of which has different implications:[9]

1. Endogenous effects: The behavior of individuals is directly influenced by the behavior of other individuals in their group. This effect (also called social interaction in the literature) is manifested in the context of family structure in Israel if, for example, individuals choose their desired family size based on the family structure of neighbors, friends, or family members of similar age.
2. Exogenous effects: Predetermined factors influence the behavior of different individuals in the group simultaneously. This effect (also called normative influence in the literature) is manifested in the context of family structure in Israel if, for example, individuals choose their desired family

8 We also conducted a number of estimations in which that proportion was interacted with the sociocultural or spatial network; however, no statistically significant effect was found for this interaction.

9 For further details on parallel issues in economic and sociological research, see Manski, 2000.

size based on the family size they themselves grew up with, and this family size tends to be similar to that of neighbors, friends, or family members of similar age.

3. Correlated effects: Various background factors — usually those shared across the group — influence the behavior of individuals in the group simultaneously. This effect manifests in the context of family structure in Israel if, for example, individuals choose their desired family size based on economic status, and this economic status tends to be similar to that of neighbors, friends, or family members of similar age.

While controlling for background variables is intended to eliminate some of the possible correlated effects, there are potential background factors not included in the data (such as health status or the employment background of non-working individuals). Even should we assume that most of the measured correlation does not represent correlated effects, our methodology does not enable us to distinguish between endogenous and exogenous effects. Therefore, it is not possible to determine the causal mechanisms behind the estimated correlations.

Despite this limitation, our method is still relevant to the policy issues we wish to examine, namely demographic forecasting and planning according to growth in the population and its needs at the national and local levels. These are influenced by the collective decisions of individuals, and the factors that determine these decisions at the individual level are not expected to significantly affect the aggregate. For example, if Haredi families in mixed cities are expected to be slightly smaller on average than those in Haredi cities, it does not matter (for urban planning purposes) whether this expectation is due to the influence of their non-Haredi neighbors or the inherent differences (in terms of desired family size) between them and Haredi families that choose to live in Haredi cities. It is also possible, at least theoretically, that the correlation we estimated using data from the previous decade will change with the overall demography of the country and will diminish the policy benefit that can be derived from our estimates; however, this has no connection to causal identification.[10]

10 This possibility can also be addressed by means of a re-examination of the normative influences when new data are collected.

Therefore, we argue that our methodology, despite its statistical limitations, facilitates making practical policy recommendations with respect to national and local demography and the mapping of the processes it is composed of — even if the mechanisms driving these processes are not fully identified. We will now present the findings of the empirical estimation (which, as stated, is meant to estimate a conditional correlation rather than a causal relationship), and then summarize and discuss the policy implications.

Empirical estimation results

Table 1. Average marginal effect of spatial and sociocultural network, overall population

Explanatory variable	Number of children under age 10 in household	Likelihood of being married (percentage points)
Spatial network	0.25	40.4
Sociocultural network	0.90	50.7

Note: Average marginal effect is a technical term, and the estimates represent correlation rather than causation. The displayed values are point estimates of the average marginal effect based on the estimates fully detailed in Appendix Table 1a, and represent the effect of the spatial and sociocultural networks on marriage and parenting, given the background variables. All presented estimates are statistically significant at the 99% level. In the case of the number of children in the household, the effects can be interpreted as the expected change in the individual's number of children as a result of an increase of one child in the group average of the respective network. In the case of the probability of being married, the effects can be interpreted as the expected change in an individual's probability of being married as a result of a 100-percentage-point increase in the group marriage rate of the respective network.

Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS

The model's results — for the population at large and for the population sectors that compose it — are presented in Appendix Tables 1a and 1b, respectively. The results demonstrate that both spatial and sociocultural networks are significantly correlated with individuals' family structures. Table 1 shows the average marginal effect of these variables for the entire population, as derived from the multivariate analysis. With respect to marriage, an increase of 1 percentage point in the marriage rate in the individual's spatial network corresponds to an increase of about 0.4 percentage points in the probability of an individual being married, while an increase of 1 percentage point in the marriage rate in the sociocultural network corresponds to an increase of about

half a percentage point. Similar results were found for parenting: an additional child on average in the spatial or sociocultural network corresponds to 0.25 and 0.90 more children in the household, respectively.

A possible weakness of the analysis is the reciprocity of social influence: if the decisions of each individual are influenced by the decisions of those around her, then the decisions of those around the individual are also influenced by her decision (since each individual is part of the networks of the other individuals who are part of her networks). Therefore, our estimates might be biased since the individual's decision also shapes social norms while being shaped by them. However, this bias is expected to decline as the number of individuals in the social network increases and the individual's own weight within it decreases. We conducted robustness tests in which we increased or decreased the number of individuals in the social networks by changing the age range defining the network from ±5 years from the individual's age to ±3 or ±7 (thus also testing our arbitrary choice in defining the baseline age range). Appendix Table 2a presents the full results of these estimations alongside the original estimates, and Appendix Table 2b presents the average marginal effects (similar to Table 1). Despite the change in the number of individuals in the different social networks (Appendix Table 2c) and in the age range, the findings remain almost identical, and the relative sizes of the spatial and sociocultural network effects remain almost identical for both marriage and parenting. This result provides reassurance regarding any potential bias in estimating the correlation between norms and individuals' decisions.

It is also interesting to examine whether the explanatory power of the background factors changes when adding normative influences to the estimation (Table 2). For example, the correlation between employment and education on the one hand and marriage on the other decreases slightly on average given the normative influences. However, the confidence intervals do not allow us to reject the hypothesis that the relationship between employment or education and marriage remains the same with and without controlling for normative relationships and that the effect of these background factors is fairly resilient to norms. We also found that controlling for normative influences slightly increases the correlation between employment and parenting (though this increase is not statistically significant) and decreases the correlation between education and parenting (a decrease which is statistically significant).

Table 2. Average marginal effects of other background variables, with and without controlling for normative relationships

Explanatory variable	Number of children under age 10 in household		Likelihood of being married (percentage points)	
Controlling for normative relationships	**Without controls**	**With controls**	**Without controls**	**With controls**
Age	0.029***	-0.001	0.051***	-0.001
Age squared	0.000***	0.000***	0.000***	0.000**
Employed	0.027**	0.040***	-0.046***	-0.030***
Education *(Reference category: No high school education)*				
High school without bagrut	-0.079***	-0.018	0.035***	0.036***
Bagrut certificate	-0.264***	-0.037**	0.007	0.038***
Post-secondary non-academic degree	-0.001	-0.032**	0.082***	0.077***
Bachelor's degree	0.156***	0.013	0.116***	0.089***
Master's degree	0.149***	0.045***	0.112***	0.092***
Doctorate	0.085***	0.024	0.135***	0.100***
Other degree	0.077*	0.002	0.080***	0.069***

Note: The values are the point estimates of the average marginal effect based on the detailed estimates in Appendix Table 1a, and they represent the effect of the spatial and sociocultural networks on marriage and parenting, given the background variables. In the case of number of children in the household, the effects can be interpreted as the expected change in the individual's number of children as a result of an increase of one child in the group average of the respective network. In the case of the probability of being married, the effects can be interpreted as the expected change in an individual's probability of being married as a result of a 100-percentage-point increase in the group marriage rate of the respective network.

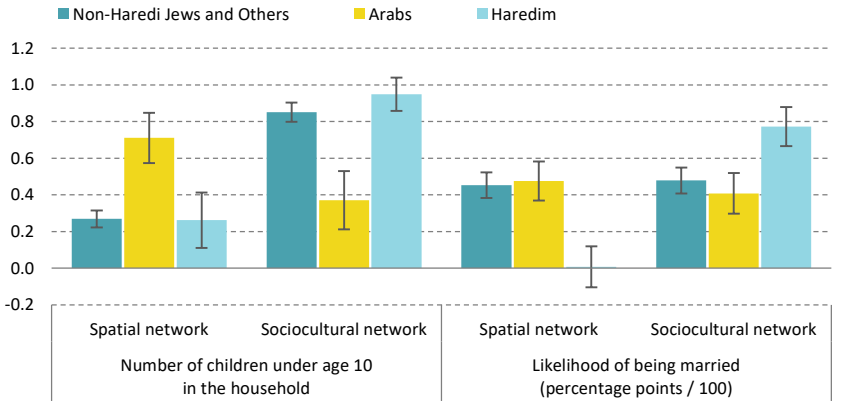
Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS

It seems that even accounting for normative relationships, employment is a relatively rigid factor related to parenting and marriage. It also appears that education contributes to the probability of getting married without any significant mediation by sociocultural connections; however, its contribution is negligible in predicting the number of children when normative influences are accounted for.

Apart from the average for Israel as a whole, it is worth examining to what extent network norms are reflected in the family structure across the different population groups in the country. Figures 1 and 2 present the average effects by population group. In terms of fertility, it can be seen that Arabs are more sensitive to the spatial network and less to the sociocultural network than Jews and Others, and on average non-Haredi Jews and Others are less sensitive to the sociocultural network than Haredi Jews (the hypothesis that

the effect is similar in magnitude between Haredi and non-Haredi Jews cannot be rejected). With respect to marriage, it appears that the effect of the spatial network among non-Haredi Jews is similar in size to that of the sociocultural network, while among Haredi Jews there is no effect of the spatial network at all (the gap between the cumulative effects documented in Table 1 likely arises from the absence of the local effect among the Haredi respondents).[11]

Figure 1. Average marginal effects of spatial and sociocultural networks, by population group



Note: The values are the estimates for the average marginal effect based on the detailed estimates in Appendix Table 1b, and they represent the effect of the spatial and sociocultural networks on marriage and parenting, given the background variables. The height of each column represents the point estimate while the vertical line intersecting the column's head represents the 95% confidence interval.

Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS

It is noteworthy that individuals belonging to the Haredi or Arab populations — sometimes perceived as more insular, even within mixed localities — are influenced by their neighbors no less than non-Haredi Jews, even by those

11 There are only a small number of unmarried Haredi Jews in the sample and, therefore, the estimates presented regarding Haredi marriages should be treated with caution.

neighbors that belong to different sectors.[12] This finding aligns with the notion that as the trend of mixing and spatial integration between the sectors continues, the average family size of Haredi Jews — and, to an even greater extent, Arabs moving to mixed communities — will converge to some extent to that of the local population. This notion is also supported by the empirical findings of Weinreb and Shraberman (2022) and Weinreb (2023) regarding recent fertility trends in mixed cities.

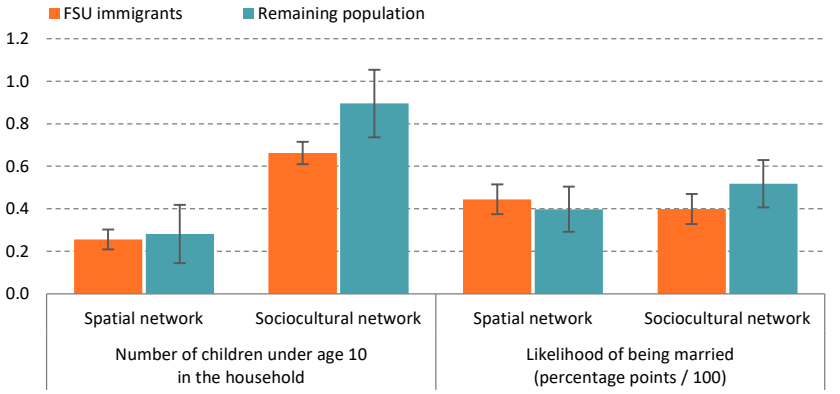
Immigrants from the former Soviet Union (FSU) are another population worth noting. In previous decades, this group — which has unique cultural characteristics — also differed demographically from the rest of the Jewish population in Israel. Their integration process led to a convergence to the marriage and birth rates of the rest of the Jewish population (Konstantinov, 2015).[13] We compared the effect of normative relationships on this group to their effect on the rest of the population and the results are presented Figure 2.

12 We also tested whether the correlation between an individual's decisions and those of his neighbors belonging to the same ethno-religious group significantly differs from that in the case of neighbors belonging to other social groups. This was done using an estimation similar to the previous ones except that spatial network was divided into two: one based on individuals belonging to the same social group as the individual and one based on individuals belonging to the rest of the groups. It cannot be ruled out that there is no difference between the correlation with the culturally similar spatial network and the correlation with the culturally different spatial network in the general population (especially among non-Haredi Jews and others), but it can be said that there is a statistically significant difference between the correlations for Arabs and Haredi Jews (for these two groups, there is a positive and statistically significant correlation with the norms of neighbors different from them culturally, though it is of significantly different magnitude relative to the correlation among themselves). In the case of marriage, more significant differences were found between the sectors. Due to the sample size, these estimates (especially those by sector) should be treated with caution, since some are based on normative networks consisting of only a few individuals.

In addition to this exercise, we tried to test whether the size of the local effect changes with the proportion of the population belonging to the same population in the individual's subdistrict. The examination showed that there is no such relationship and the effect of the local norm does not change significantly when the social group constitutes a different share of the local population.

13 Marriage rates among immigrants from the FSU converged to those of the rest of Israeli Jews by 2012, but it is unclear whether their birth rates fully converged. Konstantinov (2015) also notes that in 2011 there was a significant fertility gap between immigrants from the FSU who were defined as Jewish and those who were not. Therefore, we differentiate the social network based on the definition of ethnicity, such that immigrants from the FSU who are not defined as Jews are influenced by ***others*** (mainly immigrants from the FSU who are not defined as Jews) while the Jews among them are influenced by other Jews with a similar level of religiosity (usually secular).

Figure 2. Average marginal effects of spatial and sociocultural networks among FSU immigrants



Note: The values are the estimates for the average marginal effect based on the detailed estimates in Appendix Table 1b, and they represent the effect of the spatial and sociocultural networks on marriage and parenting, given the background variables. The height of each column represents the point estimate while the vertical line intersecting the column's head represents the 95% confidence interval.

Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS

With respect to fertility, the effect among this population is smaller on average than among the rest of the population, in the context of both the sociocultural and spatial networks. However, we cannot reject the hypothesis that the correlation between individuals and their spatial networks is the same within this group and among the rest of the population, while we can reject the parallel hypothesis for the sociocultural network, which is lower for FSU immigrants (with statistical significance). With respect to marriage, there is no significant difference between the effect of normative relationships on FSU immigrants and the effects on the rest of the population. Nonetheless, the existence of a large sociocultural effect (alongside a smaller spatial effect) suggests that in recent decades, social norms have played a role in the increase of the birth rate among immigrants from the FSU.

Conclusion

In this paper, we showed that norms regarding family structure in both the local-spatial and the sociocultural networks are consistent with the individual's observed characteristics. These normative relationships explain a significant portion of the variation in individuals' marital status and number of children, thus serving as a primary mechanism for mediating the correlation between various background variables and those dependent variables. Generally, it appears that the sociocultural network predicts the individual's status more than the spatial network does: the influence of the sociocultural network is three and a half times greater than that of the spatial network in predicting the individual's number of children and about 25% greater in predicting marriage.

We also showed that if normative influences are not controlled for, then background factors are correlated with the individual's marital status and number of children. However, the picture changes when they are controlled for. Education loses some of its significance in predicting the number of children, while the estimated effects of employment are robust to controlling for the examined normative influences, although it is possible and even likely that they embody the influence of another network, i.e., the workplace, which we could not observe. Education maintains its predictive power in the case of marriage even when including the effects of normative influences, although it is possible that, in this case as well, there are hidden effects of the schooling network or the individual's educational group.

We also examined differences in the manifestation of norms among different population groups in the country. We found that in terms of family size, the largest spatial effect was observed in the Arab population and that local norms are in line with the family structure of Haredi Jews no less than in the case of other Jews. It is possible that these norms may serve as a mechanism for demographic change among these groups as sectoral heterogeneity increases in different parts of the country. We also showed that social norms play a key role among immigrants from the FSU and that the convergence of birth rates between them and the rest of the Jews in Israel over the years is driven by this mechanism. These findings demonstrate the practical demographic significance of analyzing social norms as a tool for both interpreting the past and predicting the future.

Our study has several limitations of note. The definition of normative networks for individuals is quite crude, based on a general division by ethnicity, religiosity, and subdistrict. Therefore, we could not precisely detect the influences of specific localities or sociocultural relationships of different ethnicities and groups in a way that would capture the social interactions of Israelis more accurately. Additionally, we were not able to examine normative relationships dynamically in order to understand how the correlations change over time, nor were we able to distinguish the mechanisms driving those relationships, and therefore we cannot know whether they reflect the direct influence of others on the individual or the simultaneous influence of predetermined factors on other individuals and the individual in question.

Even given these reservations, our research empirically documents the expression of sociocultural and spatial norms in determining family structure in Israel. It also affirms that Israel is similar to other countries in this respect, despite its unique circumstances in terms of economic development, marriage, and fertility. We have provided evidence supporting the assumption that these normative relationships represent social processes that determine fertility rates across the various population groups and regions, as hypothesized by Manski and Mayshar (2003). A deeper examination of the relationship between norms and fertility rates and the duration of the effect is a potential subject for future research, as noted above.

Our findings have potential implications for how local and national authorities should approach demographic forecasting, especially in the context of urban planning, in light of family structure in the future. Our research suggests that in predicting the future needs of families, local authorities should consider both the predicted weights of the various sociocultural groups in the population (and national trends among those groups) and their possible influence on each other in the local space. For example, an expected increase in the proportion of Haredi families in a particular locality may affect the average family size in two ways: a direct effect of those families (whose structure and size are correlated with national-level norms within the Haredi public on one hand with their non-Haredi neighbors on the other hand), and an indirect effect, according to which the size of non-Haredi families in the same locality is expected to grow in correlation with the changing local network. Taking these mechanisms into account is vital for demographic forecasting, urban planning, and the approval of building and housing plans, as well as the provision of public services, such as education, health, and open spaces.

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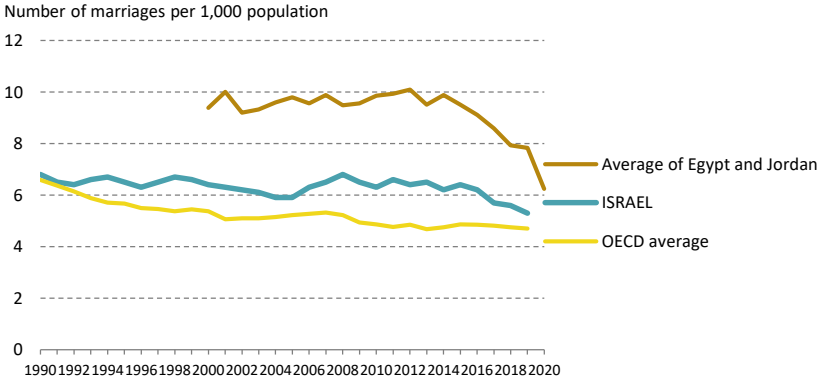
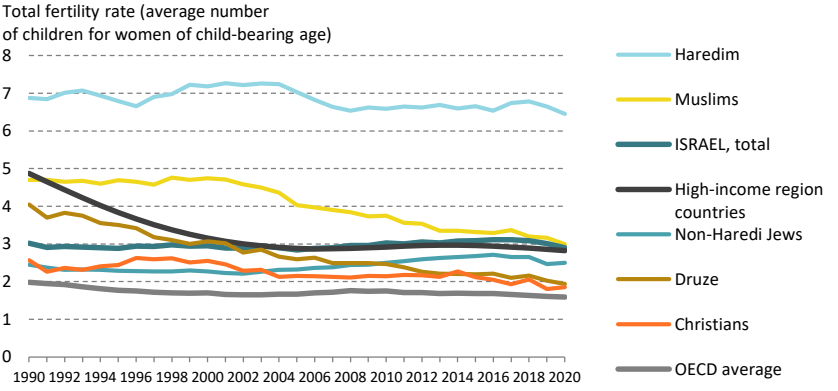
Appendix

Appendix Figure 1a. Marriage rate in Israel, relatively high-income countries in the region, and the OECD



Appendix Figure 1b. Fertility rate in Israel (by religion), relatively high-income countries in the region, and the OECD



Note: World Bank data on the Middle East and North Africa (without high-income countries) include Algeria, Djibouti, Egypt, Iran, Iraq, Jordan, Lebanon, Libya, Morocco, Syria, Tunisia, Yemen, the West Bank and Gaza.

The figure presents the average number of children per woman of child-bearing age and registered marriages per 1,000 population — accepted measures of fertility and marriage — each year in Israel (by religion and overall national average), and the average in high-income countries in the region and the OECD average.

Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: OECD; World Bank; Department of Statistics (Jordan), Central Agency for Public Mobilization and Statistics (Egypt)

Appendix Table 1a. Results of the multivariate model, normative relationships

Model/Explanatory variable	Number of children under age 10 in the household, OLS		Likelihood of being married, Probit	
Spatial network	0.2475***		1.5205***	
	(0.0189)		(0.1082)	
Sociocultural network	0.9030***		1.9071***	
	(0.0193)		(0.1086)	
Population share	0.1542***		0.3764***	
	(0.0365)		(0.0653)	
Age	-0.0007	0.0290***	-0.0050	0.1760***
	(0.0009)	(0.0013)	(0.0039)	(0.0022)
Age squared	0.0000***	-0.0005***	0.0001*	-0.0015***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Employed	0.0395***	0.0269*	-0.1133***	-0.1580***
	(0.0093)	(0.0114)	(0.0171)	(0.0164)
Education *(Reference category: No high school education)*				
High school without bagrut	-0.0177	-0.0786***	0.1259***	0.1119***
	(0.0143)	(0.0172)	(0.0250)	(0.0238)
Bagrut certificate	-0.0366*	-0.2642***	0.1344***	0.0229
	(0.0144)	(0.0171)	(0.0253)	(0.0237)
Post-secondary non-academic degree	-0.320*	-0.2642***	0.1344***	0.0229
	(0.0144)	(0.0171)	(0.0253)	(0.0266)
Bachelor's degree	0.0128	0.1556***	0.3275***	0.3910***
	(0.0143)	(0.0172)	(0.0256)	(0.0248)
Master's degree	0.0453**	0.1490***	0.3374***	0.3764***
	(0.0150)	(0.0181)	(0.0285)	(0.0281)
Doctorate	0.0236	0.0851**	0.3704***	0.4608***
	(0.0258)	(0.0328)	(0.0581)	(0.0596)
Other degree	0.0020	0.0772	0.2494***	0.2652***
	(0.0341)	(0.0435)	(0.0590)	(0.0586)
Intercept	-0.2701***	0.3070***	-2.3024***	-4.3461***
	(0.0328)	(0.0403)	(0.0814)	(0.0614)
Additional variables: ethnicity-religion, geographic district	Yes	Yes	Yes	Yes
Number of observations	47,358	47,372	47,353	47,367
R^2	0.5014	0.2384	0.2686	0.2076
X^2/F	545.8	262.5	13,536.4	11,148.7
(p value)	(0.0000)	(0.0000)	(0.0000)	(0.0000)

Significance level: *p < 0.10; **p < 0.05; ***p < 0.01.

Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS

Appendix Table 1b. Results of the multivariate model, normative relationships

Model/Explanatory variable	Number of children under age 10 in the household, OLS		Likelihood of being married, Probit	
	Sector	FSU immigrants	Sector	FSU immigrants
Spatial network X Non-Haredi Jews and Others	0.2685***		1.6053***	
	(0.0237)		(0.1268)	
Spatial network X Arabs	0.7112***		1.9757***	
	(0.0700)		(0.2457)	
Spatial network X Haredim	0.2620***		0.0391	
	(0.0770		(0.2998)	
Sociocultural network X Non-Haredi Jews and Others	0.8515***		1.6978***	
	(0.0269)		(0.1311)	
Sociocultural network X Arabs	0.3712***		1.6931***	
	(0.0811)		(0.2189)	
Sociocultural network X Haredim	0.9492***		4.0554***	
	(0.0464)		(0.3737)	
Spatial network X FSU immigrant		0.2555***		1.4913***
		(0.0428)		(0.2036)
Spatial network X Non-FSU immigrant		0.2812***		1.5238***
		(0.0206)		(0.1146)
Sociocultural network X FSU immigrant		0.6625***		1.3384***
		(0.0572)		(0.2119)
Sociocultural network X Non-FSU immigrant		0.8953***		1.9799***
		(0.0204)		(0.1145)
Population share	0.1628***	0.1274***	0.4289***	0.3606***
	(0.0365)	(0.0363)	(0.0668)	(0.0655)
Age	-0.0005	-0.0001`	-0.0041	-0.0054
	(0.0009)	(0.0009)	(0.0039)	(0.0039)
Age squared	0.0000***	0.0000**	0.0001	0.0001*
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Employed	0.0357***	0.0401***	-0.1154***	-0.1130***
	(0.0092)	(0.0092)	(0.0172)	(0.0172)
Education *(Reference category: No high school education)*				
High school without bagrut	-0.0147	-0.0221	0.1328***	0.1254***
	(0.0143)	(0.0143)	`(0.0253)	(0.0251)
Bagrut certificate	-0.0343*	-0.0415**	0.1352***	0.1401***
	(0.0144)	(0.0144)	(0.0255)	(0.0254)
Post-secondary non-academic degree	-0.0289	-0.0258	0.2852***	0.2936***
	(0.0152)	(0.0152)	(0.0277)	(0.0276)
Bachelor's degree	0.0194	0.0082	0.3342***	0.3309***
	(0.0143)	(0.0143)	(0.0258)	(0.0256)
Master's degree	0.0526***	0.0409**	0.3475***	0.3509***
	(0.0150)	(0.0152)	(0.0287)	(0.0286)

Appendix Table 1b (continued). Results of the multivariate model, normative relationships

Model/Explanatory variable	Number of children under age 10 in the household, OLS		Likelihood of being married, Probit	
	Sector	FSU immigrants	Sector	FSU immigrants
Doctorate	0.0308	0.0228	0.3816***	0.3816***
	(0.0257)	(0.0258)	(0.0582)	(0.0582)
Other degree	0.0038	0.0004	0.2619***	0.2513***
	(0.0342)	(0.0338)	(0.0589)	(0.0592)
Intercept	-0.2925***	-0.2687***	-2.2771***	-1.9828***
	(0.0335)	(0.0337)	(0.0839)	(0.1085)
Additional variables: ethnicity-religion, geographic district	Yes	Yes	Yes	Yes
Number of observations	47,358	47,358	47,353	47,353
R^2	0.5030	0.5044	0.2696	0.2697
X^2/F	523.9	520.4	13,613.4	13,569.6
(p value)	(0.0000)	(0.0000)	(0.0000)	(0.0000)

Significance level: *p < 0.10; **p < 0.05; ***p < 0.01.

Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS

Appendix Table 2a. Results of the multivariate model, normative relationships

Model/ Explanatory variable	Number of children under age 10 in the household, OLS			Likelihood of being married, Probit		
Age range for probability calculation	± 3	± 5	± 7	± 3	± 5	± 7
Spatial network	0.2428***	0.2475***	0.3329***	1.4458***	1.5205***	1.6493***
	(0.0184)	(0.0189)	(0.0200)	(0.0953)	(0.1082)	(0.1168)
Sociocultural network	0.8174***	0.9030***	0.0457***	1.8006***	1.9071***	1.9100***
	(0.0188)	(0.0193)	(0.0203)	(0.0955)	(0.1086)	(0.1172)
Population share	0.1844***	0.1542***	0.1341***	0.3842***	0.3764***	0.3821***
	(0.0362)	(0.0364)	(0.0371)	(0.0657)	(0.0653)	(0.0649)
Age	-0.0012	-0.0007	0.0022*	-0.0027	-0.0050	0.0014
	(0.0009)	(0.0009)	(0.0009)	(0.0038)	(0.0039)	(0.0039)
Age squared	0.0000*	0.0000***	0).0000***	0.0001	0.0001*	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Employed	0.0405***	0.0395***	0.0377***	-0.1152***	-0.1133***	-0.1129***
	(0.0092)	(0.0093)	(0.0094)	(0.0172)	(0.0171)	(0.0170)
Education *(Reference category: No high school education)*						
High school without bagrut	-0.0190	-0.0177	-0.0147	0.1229***	0.1259***	0.1269***
	(0.0143)	(0.0143)	(0.0145)	(0.0251)	(0.0250)	(0.0252)
Bagrut certificate	-0.0424**	-0.0366*	-0.0338*	0.1386***	0.1344***	0.1193***
	(0.0143)	(0.0144)	(0.0145)	(0.0254)	(0.0253)	(0.0252)
Post-secondary non-academic degree	-0.0315*	-0.0320*	-0.0287	0.2753***	0.2789***	0.2844***
	(0.0151)	(0.0151)	(0.0153)	(0.0275)	(0.0275)	(0.0275)
Bachelor's degree	0.0110	0.0128	0.0200	0.3130***	0.3275***	0.3485***
	(0.0143)	(0.0143)	(0.0144)	(0.0256)	(0.0256)	(0.0256)
Master's degree	0.0470**	0.0453**	0.0480**	0.3328***	0.3374***	0.3453***
	(0.0150)	(0.0150)	(0.0151)	(0.0285)	(0.0285)	(0.0286)
Doctorate	0.0224	0.0236	0.0241	0.3720***	0.3704***	0.3730***
	(0.0258)	(0.0258)	(0.0259)	(0.0580)	(0.0581)	(0.0583)
Other degree	-0.0045	0.0020	0.0117	0.2386***	0.2494***	0.2621***
	(0.0341)	(0.0342)	(0.0344)	(0.0594)	(0.0590)	(0.0589)
Intercept	-0.1775***	-0.2701***	-0.4982***	-2.2557***	-2.3024***	-2.5339***
	(0.0324)	(0.0328)	(0.0341)	(0.0821)	(0.0814)	(0.0794)
Additional variables: ehtnicity-religion, geographic district	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	47,345	47, 358	47, 361	47,341	47,353	47,356
R2	0.05047	0.5014	0.4895	0.2707	0.2686	0.2639
X2/F	550.2	545.8	534.9	13,130.4	13,536.4	13,870.2
(p value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Significance level: *p < 0.10; **p < 0.05; ***p < 0.01.

Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS

Appendix Table 2b. Average marginal effect of the spatial network and the sociocultural network

Explanatory variable	Number of children under age 10 in the household			Likelihood of being married (percentage points)		
Age range for defining network	± 3	± 5	±7	± 3	± 5	± 7
Spatial network	0.24	0.25	0.33	38.3	40.4	44.1
Sociocultural network	0.83	0.90	0.95	47.7	50.7	51.1

Note: The values presented are estimates of the average marginal effect based on estimates detailed in Appendix Table 2a. They show the effect of spatial and sociocultural networks on marriage and parenthood given the background variables for the specified age ranges for defining the network. All the estimates are statistically significant at the 99% level.

Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS

Appendix Table 2c. Number of individuals in the sociocultural network, by the age range specified for the network

Explanatory variable	Number of children under age 10 in the household			Likelihood of being married (percentage points)		
Age range for defining network	± 3	± 5	±7	± 3	± 5	± 7
Smallest network	15	25	36	8	12	18
Median network	177	272	369	490	761	1,040
Average network	173	267	357	569	879	1,181
Largest network	440	634	793	1,402	2,147	2,865

Note: The table presents the distribution of the number of individuals in the sociocultural network according to the age range that defines the network.

Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS