Abstract
This paper uses the unique social structure of Arab communities to examine the effect of social identity on voter turnout. We first show that voters are more likely to vote for a candidate who shares their social group (signified by last name) as compared to other candidates. Using last name as a measure of group affiliation, an inverted U-shaped relationship between group size and voter turnout has been found (borderline significant) which is consistent with theoretical models that reconcile the paradox of voting by incorporating group behavior.

Key words: voter turnout, paradox of voting, social identity, local elections
1. Introduction

Introducing the role of group membership in determining the decision to vote seems to be one of the more promising routes to reconcile the voting paradox. The pure self-interest approach fails to account for actual political participation because the probability that a single vote would affect election results is very small in large populations. In contrast, acting as part of a particular group, as suggested by social identity theory, may fundamentally change the probability of affecting an election outcome or the benefits from the act of voting, and therefore the incentive to vote.

Both economists and political scientists have attempted to explain the relatively high political participation in the real world by taking into consideration the importance of groups. In the next section, a short review of the main group-based theories of political participation is presented.

However there is scarcely any empirical evidence to date on the importance of groups for voter turnout. Based on three congressional elections, Uhlaner (1989) presented indicative evidence that is in line with the group membership hypothesis by showing that individuals who are associated with a particular group – union households – tend to vote more than non-union households.1

In a more systematic empirical examination, Filer et al. (1993) found that turnout first declines and then increases along with increases in relative income, concluding that this

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1 In contrast, Lapp (1999), based on an investigation of three Canadian elections, has concluded that incorporating social groups suggested by Uhlaner (1989) “does a poor job of predicting voter turnout.”
finding is consistent with a rational model of voting that incorporates group behavior.\textsuperscript{2} Coate and Conlin (2004) reach the same conclusion based on a structural estimation of a group-utilitarian model using voter turnout in liquor referendums in Texas. While these last two empirical works are suggestive, the effect of group membership on actual political participation has not yet been tested directly.

Laboratory experimentation methods also have been used to explore the effect of social groups on voter turnout. Schram and Sonnemans (1996) and more recently Großer and Schram (2006) and Fowler and Kam (2007) all found evidence supportive of the importance of group identification. However, the possibility of generalizing the conclusions based on laboratory experiments to the real world is an open question.

The goal of this paper is to examine directly the effect of social affiliation on actual voter turnout in local elections in Israel. The unique social grouping of Arab communities, unlike the Western structure of Jewish society, offers an almost ideal “experiment” to directly test the effect of group affiliation on political participation.

The social structure of a typical Arab village or town in the Middle East, including the Arab population of Israel, is commonly composed of several distinct groups called hamulas (plural of hamula). A hamula is defined by anthropologists as a group of a large number of families that share a common great-grandfather and separate lineage.\textsuperscript{3} The hamula has a long history of rich relations among its members, such as intra-marriage and an alternative arrangement for capital and insurance markets (Cohen, 1965).

\textsuperscript{2} See also Shamir and Arian (1999) who have shown that social cleavages are important in structuring the vote in Israel.

\textsuperscript{3} See Cohen (1965), Rosenfeld (1974) and Al-Haj (1988) for more detailed definition of a hamula.
Frequently, an Arab community consists of two to four hamulas, where each hamula lives in a different geographical quarter. The unique social structure in Arab communities should be expected to have a noteworthy effect on voting patterns and voter turnout in local elections if the hamula is an influential social group. There is suggestive evidence that a hamula constitutes an important component of self-concept for many Arab individuals, consistent with Tajfel’s (1981) definition of social identity.4

In the first part of our empirical investigation we test whether voters with a particular last name, which serves as a proxy for hamula affiliation, are more likely to vote for a candidate with the same last name as compared to other candidates. We find strong empirical support for hamula-based-voting behavior. Hamula-based candidates receive significantly more votes from their affiliated hamula members. This suggests that a hamula is indeed a meaningful social group in the political arena.

The second main prediction of social identity theory with regard to political behavior is that individuals who feel part of a group are more likely to participate in elections (Fowler and Kam, 2007). The implication in our context is that voter turnout in Arab municipalities should be higher than that in Jewish municipalities, which have social structures typical of Western communities. This study shows that actual voter turnout in Arab municipalities is significantly higher than in Jewish municipalities, even after controlling for the standard factors influencing political participation.

The use of surnames as indicators of hamula affiliation also has been adopted to construct the distribution of social group shares in all Arab localities in Israel. It allows

4 Tajfel (1981: 255) defines social identity as, "that part of an individual's self-concept which derives from his knowledge of his membership in a social group together with the value and emotional significance attached to the membership".

5
us to test the more subtle prediction of group membership models with regard to the
effect of group share on voter turnout. We find an inverted U-shaped empirical
relationship between voter turnout and the relative size of the *hamula*.

In the next section we present various group-based models of voter turnout to guide our
empirical investigation and in Section 3 we present the statistical models to be
estimated. In Section 4 we test the three main hypotheses that stem from social identity
theory and Section 5 concludes the paper.

2. Group-based models of voter turnout

This short review is intended to guide our empirical investigation by highlighting
various aspects of a group that may be important in explaining political participation in
large elections. It allows us to see more clearly the similarities and differences in terms
of empirical predictions regarding the effects of group membership on voting behavior.
This review also draws clear lines on what could and what could not be done using our
data set.

2.1 Instrumental motive

Uhlaner (1989) and Morton (1991) were among the first to incorporate groups in a
rational choice theoretical framework. The act of voting in these models is instrumental
in the sense that individuals are joined with others having shared interests (including
monetary benefits). In particular, Filer et al. (1993) have assumed that the members of a
group vote when it is economically optimal for them to do so. However, those models
assume that somehow the free rider problem within the group can be neglected. To cope

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5 Voter turnout has attracted considerable academic attention. See Aldrich (1993), Grossman and
Helpman (2001) and more recently Geys (2006) for overviews and discussion of this literature.
with this problem Uhlaner (1989) has introduced *selective incentives* such as group identity or loyalty. Morton (1991) also admits that the model assumes that groups invest resources (financial and otherwise) which provide group members with the *individualized incentives* necessary to vote. Those models that stress the importance of instrumental voting at the group level have to add a factor such as social identity to internalize externalities.

### 2.2 Group-rule-utilitarian approach

Building on Harsani (1980) and Feddersen and Sandroni (2006), Coate and Conlin (2004) resolve the paradox of voting by using the *group*-rule-utilitarian version of “doing their part”– the voting rule that, if followed by everyone else in their *group*, would maximize the welfare of their group. Unlike previous models that stress instrumental voting at the group level, the desire of a group member to help his group to win an election in the *group*-rule-utilitarian approach is not because he expects to receive a monetary transfer from other members in his group.

### 2.3 Social pressure

Schram (1991), Schram and Van Winden (1991), Bufacchi (2001) and Grossman and Helpman (2001) highlight the role of social pressure in the decision to vote. Individuals exert social pressure to enforce a social norm but, unlike with Riker and Ordeshook (1968) the enforcement of a social norm is at the *group* level instead of society as a whole. A social norm is defined by Grossman and Helpman (2001) as an action that an individual undertakes for the good of his own group. In that respect, the main motive is
very similar to group-rule-utilitarian and social identity arguments (see below) as to why people are divided into different groups.\(^6\)

Yet here the emphasis is on the importance of social sanctions that may be imposed on those who deviate from the social norm. Voter participation becomes related positively to the frequency and intensity of interaction between group members. In addition, groups that can easily observe the actions of their members should have higher turnout rates than those who need to invest great effort to detect the true behavior of their members.

2.4 Social identity
According to social identity theory, individuals derive benefits from affiliating with social groups (Tajfel, 1981). In this view, the benefits are of a symbolic nature, such as respect and perceived status (Huddy, 2003). Social identity theory is very close in nature to group-rule-utilitarian and social pressures theories. In all three types of models, individuals care about the welfare of others and their political behavior is not driven by monetary benefits. But unlike the general notion of group-rule-utilitarian or social pressure (social norm), the underlying motive for political action associated with social identity theory refers specifically to attributes such as honor and social prestige.

3. The estimated models
By construction, our empirical design leaves out the first motive (instrumental/economic interests) of individuals to act as a group. Individuals are grouped in Arab communities along social lines (hamulas) which should not be

\(^6\) Grossman and Helpman (2001) do not exclude grouping along economic lines, which is discussed at length in other chapters of their book. In that regard, their argument is exposed to the same problems associated with instrumental group-based models where the monetary incentive is the central motive.
correlated with economic ranking. *Hamula* members could reap economic gains from being affiliated with the *hamula* but that would not be the primary motive for the observed social structure. Thus, voting behavior in our context should be related to social group affiliation.

However, the empirical setting we employ here could not be used to test directly between social identity, group-rule utilitarian and social pressure models. We nevertheless formulate empirical predictions under the umbrella of social identity theory because of the external evidence provided in the empirical section that is in line with the social identity argument and that contests other motives.

There are three empirical implications of social identity theory that will be presented in the form of hypotheses and examined in the empirical section. First, some people act politically for the benefit of their groups by voting for candidates who are associated with their social group (the *hamula*-based-voting-hypothesis).

Second, people with a sense of attachment to a certain social group are expected to participate in elections more than those individuals who are mainly self-interested (social attachment hypothesis). Again, it is almost impossible to disentangle directly the effect of social identity from social pressure on political participation. For example, a high rate of intra-marriage within a social group works both to enhance social identity and the benefits of yielding to social pressure. Nevertheless, suggestive evidence in favor of social identity theory is discussed below.

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7 Fowler and Kam (2007) present a very neat framework where altruism and social identity motives are separated to show that people who care about the welfare of a particular group of individuals in a society (social identifiers) are more likely to vote. Altruism has been previously incorporated into the calculus of political participation by Edlin, Gelman and Kaplan (2007) and Jankowski (2002, 2007).
Third, political participation should be affected by the relative size of a social group (the group size hypothesis). While the underlying motives in group-based-models are different, they share a similar prediction regarding the effect of group size on political participation. The groups must be large enough relative to the total population to generate realistic voter turnout. Voter turnout tends to zero as the number of groups approaches the number of individuals.

More specifically, Feddersen and Sandroni (2006) show that group size has an inverted U-shape impact on voter turnout in a two-party system. Voter turnout tends to zero if one group is close to 100%. In that case, political participation of a small fraction of the large group is enough to win an election. In contrast, political participation is expected to be relatively high if the two groups are of identical size (50%). This prediction is based on the assumption that there are two groups (each group consists of both ethical and selfish individuals) that differ in their favorite candidate.

However, the relationship between group share and voter turnout becomes more complicated in multi-party elections. In fact, Coate and Conlin (2004) show that even in a two-party system, the link between group size and voter turnout is unclear but their simulation nevertheless generates an inverted U-shape. It would be easy to demonstrate that using social identifiers instead of ethical agents a la Feddersen and Sandroni (2006) also generates inverted U-shape relations between political participation and group size in a two-party system.
3.1 Hypothesis I: *hamula*-based-voting hypothesis

Throughout its history, a key feature of the *hamula*, which dates back to the period of Ottoman Empire, has been marriage between paternal cousins. This has constituted the basic channel by which different branches of the *hamula* link themselves and form a descent group. For example, Al-Haj (1988) found that in the town of Sefaram the majority of (large) *hamula* members marry within the *hamula*. The rate of intra-marriage in *hamulas* of 500 members or more is 57%.

In the last century, the economic role played by the *hamula* has been transformed as more and more Arab communities became urbanized. In the agrarian economy period, the *hamula* provided to some extent a substitute for capital and insurance markets (Cohen, 1965). However, in recent decades monetary transfers between *hamula* members play a negligible role (Al-Haj, 1988).

As Arab communities became more urbanized, and in particular after democratic local elections were introduced in Israeli Arab villages/towns in the late 1950s, *hamula* economics became in those years more linked to local elections. The winning *hamula*-based-party could gain not only reputation and honor but also the opportunity of channeling municipal resources. They may have provided a better infrastructure to their *hamula* district and lower effective local taxes to some of its members. In recent years, using municipal resources to benefit *hamula* members seems to be more limited due to effective monitoring by the Ministry of the Interior (Stacklov, 2008).

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8 It is commonly hypothesized that the high political participation rate in Arab municipalities is related to the unique social structure of Arab communities [Cohen (1965), Al-Haj (1988), Landau (1993), Goldberg (2001) and Ozechki-Lazar (2005)]. Most of this literature is of a descriptive nature. Two exceptions are the studies by Cohen (1965) and Al-Haj (1988).
In such a social environment it would be natural to expect the emergence of *hamula*-based-candidates, and the obvious prediction of social identity theory is that *hamula* members would be more likely to vote for *hamula*-based-candidates in local elections. This can be summarized in the following econometric model to be estimated for ballot boxes in Arab municipalities only:

\[
y_{ijm} = \alpha + \beta_m + \gamma D_{ijm} + \nu_{ijm}
\]

where \(y_{ijm}\) represents the votes (in percentage points) for a candidate with a certain last name \(i\) in ballot box \(j\) in municipality \(m\) and \(\beta_m\) denotes a fixed effect for a municipality. \(D_{ijm}\) gets a value of one if the last name of a candidate \(i\) matches the last name of some or all of the residents who are assigned to vote in ballot box \(j\) (in municipality \(m\)), and zero otherwise.

If indeed the *hamula* is an important social group, a member of a particular *hamula* represented by a certain last name is expected to vote for a candidate that is affiliated with that particular *hamula*. Thus, the coefficient \(\gamma\) is expected to be positive and quantitatively meaningful.

3.2 Hypothesis II: the social attachment hypothesis

The second unambiguous prediction of social identity theory is that social identifiers are more likely to participate in elections. The estimated model (using all municipalities) is:

\[
Y_m = \alpha_0 + \alpha_1 X_m + \alpha_2 D_m + \varepsilon_m,
\]
where $Y_m$ is the natural logarithm of the ratio of voter turnout in municipality $m$ over $1$ minus voter turnout, as is often presented in the voter turnout literature. $X_m$ reflects a vector of explanatory variables at the municipality level that are frequently used to explain voter turnout in local elections. $D_m$ is a dummy variable that gets a value of one for an Arab municipality, which is hypothesized to contain more social identifiers and is assigned a value of zero for a Jewish municipality, where social groups of the type existing in Arab communities play a less pervasive role.

A multi-level regression may seem an appropriate tool here but it is not employed here because we have disaggregated data (at the ballot box level) on the intensity of *hamula*-based voting only for a quarter of our sample (35 Arab municipalities out of 186 municipalities). Moreover, the focus of this section is to explore whether Arab municipalities exhibit different turnout behavior due to their unique social structure as compared to Jewish municipalities, controlling for the standard list of correlates. We do not have disaggregated data for Jewish municipalities since eligible voters are assigned according to their place of residence in these municipalities.

A related issue is the possible false interpretation of this ecological analysis. In theory, the interpretation of the estimated coefficients in equation 2 might be subject to the ecological fallacy. The coefficient of the Arab dummy variable may not reflect the true effect of the particular hamula-structure but rather some other omitted variable that is correlated with Arab municipalities. Nevertheless, the structure of our empirical investigation starts with showing that hamula-based voting indeed is quantitatively important and ends with examining the effect of hamula size (as a proxy for social
structure) on voter turnout.\textsuperscript{9} These two complementary tests should reduce significantly the risk of false inference due to the use aggregated data.

The main factors, in addition to social attachment, that are likely to explain voter turnout in local elections include the number of eligible voters, income per capita, the extent of political competition and voter turnout in general elections. These variables are measured at the municipality level. In earlier stages of this work several other variables (such as demographic composition, population density and income inequality) were included, but none of them appears to generate a robust effect on voter turnout.

Municipality population size and political competitiveness both represent indicators of the probability of casting a decisive vote and should have a negative effect on voter turnout in light of the instrumental view of voting. Income level often reflects the potential benefits of voting in individual-based research. However, in our context the average resident in a wealthy municipality should not necessarily benefit more or less than the average resident in a poor municipality. Residents in municipalities with higher levels of income may vote at higher rates to the extent that wealthier residents are also better informed. Income per capita may also capture the value of time to participate in local elections, which would have a negative effect on voter turnout.

Political competition is measured here as the difference between votes for the winner and those for the candidate next in line, divided by the total number of votes in mayoral elections. In a similar fashion, a political competition index is computed for the previous two election campaigns to deal with the risk of endogeneity. Candidates may wish to invest more resources to attract more voters if they expect the race to be very

\textsuperscript{9} In addition, we find a positive correlation between the extent of hamula-based voting and voter turnout in 35 Arab localities on which we have disaggregated data (see discussion below).
close (Shachar and Nalebuff, 1999). Thus, voter turnout might be higher in a close race not only because of the perceived likelihood of casting a decisive vote (supply side effect), but also due to more funds spent by candidates (demand side effect).

In this paper, the average national voter turnout in each municipality represents an indicator for a sense of civic duty of the average municipality resident. A municipality with a high voter turnout in general elections may indicate a higher benefit from the act of voting for citizens in that locality according to the expressive view of voting. However, the variance in national voter turnout across municipalities may also capture differences in omitted variables. That risk is limited here, given that our list of explanatory variables includes two important municipality characteristics: population and per capita income.

3.3 Hypothesis III: the group size hypothesis

The estimated inverted U-shape prediction regarding the effect of group size on voter turnout completes our investigation. As with the previous econometric model, group size, or in our context hamula size, is not the only factor affecting voter turnout and other variables should be included in our analysis. We would estimate the following model for Arab municipalities only:

(3)  \[ Y_m = \beta_0 + \beta_1 X_m + \beta_3 S_m + \beta_4 S_m^2 + \epsilon_m \]

where \( Y_m \) and \( X_m \) are exactly the same as before (Equation 2) and \( S_m \) denotes a measure of a hamula's relative size in municipality \( m \). The inverted U-shape relation between group share and voter turnout implies that \( \beta_3 \) should be positive and \( \beta_4 \) negative. The intuition for that result is that if one social group is large enough it would be more
efficient for a small share of that group to show up to win the elections in contrast to the case where the two social groups are of an equal size.

We would use various measures to explore the effect of group share on voter turnout. Our main measure is the relative size of the largest *hamula* in a particular municipality. For a robustness check we use also the largest two, three and four *hamulas* as alternative measures of group share. These simple measures of group shares have the advantage of being not sensitive to the municipality's population size. However, these measures do not summarize the whole distribution of group shares. For this reason, we also employ a Herfindhal-Hirschman index (normalized) of *hamula* concentration as a measure of relative group size.

### 4. The empirical analysis

#### 4.1 Local elections in Israel

Voting in local or national elections is not legally required in Israel. In local elections the voter may cast two votes (in two different colors), one for a mayor and one for a municipality council. Elections for mayor and council member are held on the same day. Local and national elections took place on the same day in the first three decades of the State of Israel. Since 1978, however, local elections have been held every five years and are separate from national elections.

In 1978, direct and personal elections for mayor were inaugurated while elections for council members continue to take place according to proportional representation rules. To win the mayoral election a candidate must receive at least 40% of the vote. Otherwise a second round between the two candidates who received the largest number
of votes will take place, and the winning candidate is the one receiving the majority of votes in the runoff.

Voter turnout in local elections in Israel is lower than in national elections, as in most developed countries. Voter turnout in the Israeli national elections held in 2003 was approximately 68%, as compared to 51% in local elections in the same year (but not the same day). In the last three election campaigns the gap in favor of voter turnout in national elections is around 20 percentage points, similar to the case in English-speaking countries (Blais, 2000).10

However, average voter turnout in local elections hides substantial differences in political participation between Arab and Jewish municipalities: Arab citizens tend to vote at much higher rates in local elections than in national elections. In the last local elections (2003) voter turnout in Arab municipalities stood at close to 90%, while the average participation in national elections in those same municipalities was 63% only (Table 1a). The high voter turnout of Arab municipalities is not unique to 2003; in fact it has been incredibly high since the first local elections were held in the country (Figure 1).

4.2 The data

We developed two different data sets to test each of the three hypotheses described above. The unit of observation in the first data set is a ballot box, and in the second it is a municipality. The first data set comprises local election results in 354 ballot boxes in 35 Arab municipalities. Almost half (49%) of the Arab population in Israel lives in

10 The greater importance of national elections is the common explanation for its higher voter turnout (Morlan, 1984).
these 35 municipalities and the average voter turnout in each of them is similar to that of the general Arab population (Tables 1a and 1b).

In these municipalities, eligible residents are allocated by the Ministry of Interior to ballot boxes according to the first letter of their last name, unlike all other Arab and Jewish municipalities where residents are assigned by place of residence. In a particular ballot box a few letters are assigned and thus more than one surname is included in that ballot box. The average number of eligible residents assigned to a ballot box is more than 700 (Table 1b). This assignment of residents has a long history and is done solely by the Ministry of the Interior.

Our data set also includes the last name of each candidate in these 35 municipalities. For each ballot box we have the actual number of votes that each candidate receives. The unique way in which residents of these municipalities are assigned to ballot boxes allows us to test directly the first hypothesis of whether these residents vote for hamula-based candidates.

The raw data must be adjusted to account for differences between Arab and Hebrew transcription since Arab surnames are registered in Hebrew transcription in the Interior Ministry's files. Therefore, the same Arab last name could appear in several different spellings in Hebrew, which may introduce biases in both matching the last names of candidates and eligible voters and in constructing hamula/group size that is based on last name. We have worked extensively to merge all individuals with different last names in Hebrew transcription into a particular hamula if they share the same last names in Arab transcription.

11 In some municipalities, residents are assigned to ballot boxes according to the first two letters of their last name or a combination of the first letter in their first and last names.
The full dataset covers 394 ballot boxes in 44 municipalities. In five municipalities the first letters of two different last names of two (or more) candidates both appear in the same ballot box. In those cases, it would not be possible to use our identification strategy to estimate the importance of hamula-base voting. Our identification strategy would also not be useful if there are exactly two candidates and both of their last names starts with the same letter. There are four such municipalities in our data. Therefore, we exclude these nine municipalities and the regression analysis is based on 354 ballot boxes in 35 municipalities.

The other 31 Arab municipalities, where residents are assigned by a geographical criterion, could not be used due to lack of information on the joint distribution of voters' last names and place of residence (within municipality).

The second data set that is employed here covers 186 municipalities consisting of 111 Jewish localities and 75 Arab localities. Some municipalities consist of both Jews and Arabs. A municipality is defined here as Jewish if more than a half of its population is of Jewish origin; likewise, a municipality is defined as Arab if more than a half of its population is of Arab origin.

This paper uses voter turnout in the first round of the mayoral elections that took place in 2003. Employing panel data is not an option given that the Interior Ministry provided us with data on the key variables (such as the distribution of last names) for only one year (2003). As can be seen from Figure 2, voter turnout is fairly stable over time. In contrast, the variation in voter turnout across municipalities is relatively large.

12 There are 210 regular municipalities and 54 regional municipalities (a collection of several villages, mainly agricultural) in Israel, but due to data limitations our research covers 186 (election results are missing for ten municipalities and income per capita data does not exist for the other 14 municipalities).
13 We also include those municipalities that for various reasons held elections one and two years before or after 2003.
In addition, focusing on cross-sectional variation opens the possibility of using lagged variables to deal with the risk of endogeneity in estimating the effect of political competition on voter turnout.

A histogram of voter turnout in local elections separately for Jewish and Arab municipalities is presented in Figure 3. While there is great variation in voter turnout in the general population, this is not the case when the population is divided into two sub-groups. In particular, the variation in voter turnout is relatively low across Arab municipalities and that might indicate that a common and important factor plays a role in shaping voter behavior in the Arab population.

As can be seen from Table 1a, Arab municipalities are less populated, characterized by a higher degree of political competition and much poorer in terms of income per capita as compared to Jewish municipalities. At the outset, those three characteristics should generate higher voter turnout in Arab than Jewish municipalities. However, voter turnout in general elections in Jewish municipalities is higher than Arab ones, which is expected to work in the opposite direction in case voter turnout in general elections is a reasonable proxy for the intensity of civic duty.

4.3 The results

4.3.1 Hamula-based-voting

The first stage of our empirical investigation is to explore the voting patterns of Arab communities in Israel. People who go out to vote on an Election Day are seeking to increase the chances that their favorite candidate will win the race. Thus, examining whether voting behavior is influenced by hamulas is a prerequisite for testing that social groups are important in determining political participation.
We use the last name of candidates and eligible voters as our proxy for social affiliation. Given that candidates' last names are public knowledge, it is possible to explore the linkage between voters and candidate group affiliation in those Arab municipalities where the Ministry of Interior allocates eligible voters to ballot boxes according to their last names.

The dependent variable is the share of votes that a certain candidate in a specific ballot box receives relative to the total number of votes in that same ballot box. In the standard race between two candidates each ballot box would have appeared once in our data set. However, each ballot box appears in the current empirical analysis more than once according to the number of candidates in that particular municipality given that more than two candidates could run for mayor. In general, the number of observations is the product of the number of ballot boxes and number of candidates. For example, the number of observations in a municipality that has three candidates and three ballot boxes equals nine.

Table 2 presents regressions that test the *hamula*-based-voting hypothesis. As can be seen, a candidate with a certain last name receives around 13.5 percentage points more votes in a specific ballot box if the eligible voters who are assigned to that particular ballot box share that same last name. The coefficient of the last name variable is not very sensitive to the inclusion of fixed effects dummies for municipalities. This implies a quantitatively large effect, given that the actual gap in terms of votes between the winner and the next candidate in line is 11.4 percentage points on average.

Table 2 also includes a test of whether the voting behavior of *hamula* members is influenced by the probability of winning the election. We use two proxies for that
probability: ex-post election results and *hamula* size. The coefficient of group affiliation, as measured by voters' last name, is somewhat lower when an interaction between (ex-post) winners and voters’ last name is used. While voters are sensitive to the probability of winning (to the extent that ex-post results are correlated with ex-ante probability) the coefficient of the dummy variable for last name is still quantitatively significant and positive. This result is another indication for the importance of the social structure in shaping voting behavior.

We also use *hamula* size to test whether people with a sense of social identity would be likely to vote for *hamula*-based-candidates regardless of the probability of winning. Table 2 shows that the coefficient of the interaction between *hamula* size and last name is positive and quantitatively non-negligible. Voters are more likely to vote for “their candidates” if they are members of a large *hamula* rather than a small *hamula*, but even members of a small *hamulas* (with a lesser chance of winning) still tend to vote for their affiliated candidate: the coefficient of the dummy variable for last name is still quantitatively significant and positive. This finding suggests that a significant share of the votes cast is not motivated instrumentally, and this supports the social identity argument.

In 31 out of 75 municipalities, the mayoral race is between two (or more) candidates that have the same last name (i.e., the same *hamula*). The estimated coefficients of last name in Table 2 capture that competition within the *hamula*. This indicates that while the social structure of several *hamulas* plays an important role in local elections, a *hamula* is not always united.

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14 The way *hamula* size has been constructed is explained in the next section.
15 Members of a certain *hamula* have to split their votes in case two or more candidates come from that same hamula. Consequently, the share of votes for each of the two (or more) candidates with a certain last name in a ballot box where voters share the same last name should be lower (relative to other ballot boxes) than the case of one candidate from each *hamula*. 
One more indication that local elections are affected by factors other than hamula affiliation is the fact that not all hamulas are represented in the mayoral race. In particular, in 17 out of 75 municipalities, the largest hamula fielded no candidate in the mayoral race.

4.3.2 Interpretation of the results

An alternative interpretation of hamula-based voting could be that individuals support people with the same last name because they expect to receive material benefits as a consequence. While we could not exclude completely the suggestion that material benefits might be involved in the decisions of individuals to vote for hamula-based candidates, the evidence casts doubt on the significance of this assertion.

One possible channel of directing material benefits to hamula members might be by lowering the effective local tax collections. While there is anecdotal evidence published in the popular press that some members associated with the mayor's hamula receive illegal tax exemptions, the Interior Ministry imposes strict control on such behavior. A mayor who is caught favoring a particular group of people is removed from office. Furthermore, the existing evidence suggests that local tax collection in Arab municipalities that are characterized by stronger senses of hamula affiliation – indicated by the size of the largest hamula – is similar to other Arab municipalities, after controlling for the standard variables (Reingewertz, 2009).

Appointing relatives to various positions in a municipality might be another channel through which hamula members may expect to gain benefits from voting for hamula-
based candidates. However, Israeli law strictly forbids the hiring of a mayor's relatives, and this is defined very broadly (the long list of relatives includes even cousins, sons-in-law and grandchildren).

Moreover, if voting behavior is mainly affected by the expected material benefits, then individuals should have been organized along economic groups. The wealthier members of each hamula in a certain community might have more in common in terms of tax/expenditure policy than members of a particular hamula because, unlike a tribe, a hamula consists of independent property-owning families. The claim that hamula-based voting could be the result of self-interested material benefits leaves open the question of why individuals are grouped specifically along hamula lines to achieve monetary goals.

In contrast, our interpretation of social identity is consistent with additional external evidence. The close relationship between hamula members has important non-material dimensions, such as intra-marriage, which has been discussed above, and practices of blood vengeance. In Arab society blood revenge, which is culturally tolerable behavior, is not an individual matter. Killing a person from another hamula, the murderer makes each and every member of his own hamula a justified death target.

Several hundred court verdicts related to hamula conflicts were found in an online law library in Israel. These verdicts are commonly colored in words such as honor, respect, loyalty and identity. In a recent case of a violent hamula clash brought to court, Judge Aminof wrote in November 2005, “the violent struggle taking place in the village of Tuba, which is basically driven by the pursuit of honor and recognition by hamulas, introduced incitement and unrest also in young people”.
Voting along hamula lines could be also consistent with the social pressure argument. According to this argument, people might vote for a *hamula*-based candidate because of the expected social sanctions the *hamula* imposes on those who do not show up to vote. In our context, it is easier to verify participation given that eligible voters are assigned to ballot boxes according to their last names. Consequently, the social pressure argument might be even more important.

One more indication that might highlight the social pressure argument is the very active participation of Arab women, who are usually discouraged to be active in other areas of life such as labor force participation.\(^{16}\) There is high voter turnout among Arab women despite the fact that not even a single female is found among hundreds of mayoral candidates. Thus, the conditions cited by Grossman and Helpman (2001) as being those that raise social pressure exist in our context: participation is observable, relations between *hamula* members are frequent and the price of social isolation is high.

However, given the secrecy of the ballot, it is not possible to observe for whom an individual votes. Moreover, voters with a certain last name do vote for candidates with a different last name: the average share of votes to candidates in ballot boxes that do not contain their last name is about 18% (Table 1b).

While social pressure could account for showing up in the ballot booth, it should not be a major factor in explaining *hamula*-based voting. Once in the booth, a person is not expected to suffer social sanctions as a result of the ballot s/he casts. The finding that *hamula* members tend to vote for a *hamula*-affiliated candidate, although voting is

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\(^{16}\) The average labor force participation of Arab women in Israel is around 20%- much lower than that of Jewish women which is close to 60%.
unobservable, suggests that they care about the group/hamula as postulated by social identity theory.

4.3.3 Voter turnout and social attachment

Table 3 presents the benchmark regression for voter turnout in the 2003 local elections. It is comprised of the following explanatory variables: national voter turnout, political competition, the log of eligible population and the log of income per capita. All variables including voter turnout were measured for the year 2003.

As expected, the effect of national voter turnout on participation in local elections is positive and statistically significant. The coefficient of political competition is negative, which implies that a close race (lower difference in terms of votes between the winner and candidate next in line) tend to attract more voters to ballot boxes. A similar finding has been established by many (but not all) of those who have previously studied political participation (Matsusaka and Palda, 1993).

Table 3 also explores the possible bias in the political competition coefficient due to candidates' response to an expected close race. As can be seen from Table 3 the coefficient is negative, as before, when political competition for the previous two local elections (the average of 1993 and 1998) is employed instead of the current index of political competition. The use of a lagged variable, however, generates a smaller coefficient, as would be predicted. From column 2 onwards we use a lagged variable for political competition but it reduces the number of observations.
The political competition indicator that is often calculated in terms of the percentages of total votes might be misleading in large elections, as Schwartz (1987) suggested. In contrast, there are 22 municipalities in our database with a difference of less than 100 votes between the winner and the candidate next in line. In two of those municipalities there was a tie. We nevertheless use a variable for political competition in terms of percentages rather than absolute numbers of votes to allow the inclusion of population size. Otherwise, multicollinearity between political competition and population size is likely to occur.

The estimated coefficient of eligible population size is negative and significant, which is consistent with the instrumental view of voting. The size of that coefficient implies a large effect. For example, voter turnout in a municipality populated by 7,500 eligible voters, which replicates the average eligible population in Arab municipalities, exceeds by 12 percentage points turnout in a municipality with 37,000 eligible voters, which is the average eligible population in Jewish municipalities.

This regression also shows that the effect of (log) income per capita on voter turnout in local elections is negative and significant, which is somewhat surprising. A similar result with regard to the effect of income on voter turnout has been found for local elections in the United States (Filer et al., 1993) and Belgium (Ashworth et al., 2006). This coefficient implies a large effect, but as will be evident below its size is very sensitive to the inclusion of additional variables and especially to our measure of social group size.

Schwartz (1987: 118) has used a compelling metaphor: "Saying that closeness increases the probability of being pivotal is like saying that tall men are more likely to bump their head on the moon." These estimates are based on a regression where voter turnout is used as a dependent variable instead of a logistic transformation (not reported here). The results are similar using education level instead of income level (not reported here).
This standard list of four variables has impressive explanatory power in accounting for voter turnout in local elections in Israel according to the adjusted $R^2$ (Table 3).\textsuperscript{20} A dummy variable for Arab localities is introduced in addition to this standard list to test whether social attachment affects voter turnout.

Table 3 shows that voter turnout in Arab localities is significantly higher (the implied effect is around 17 percentage points) as compared to Jewish localities, controlling for the list of variables included in the basic regression.\textsuperscript{21} There is some variation among Arab municipalities, in that voter turnout among the Arab-Christian population is higher by “only” 13 percentage points compared to Jewish municipalities, while it is higher by 19 percentage points in Druze municipalities. This finding is in line with the notion that communities with a stronger sense of social attachment (Arab localities) are more likely to participate in elections.\textsuperscript{22}

Note that while all other coefficients remain highly significant and preserve their signs, the quantitative effects implied by most coefficients are sensitive to the inclusion of an Arab dummy variable. For example, the coefficient of income per capita is much smaller when a dummy for Arab municipality is added to the basic regression.

Figure 4 presents a positive correlation between the extent of *hamula*-based voting (measured as the average difference between the share of votes to a candidate with a

\textsuperscript{20} Table 3 shows an interesting result: unlike the general elections where two particular sectors (Orthodox Jews and Jewish settlers beyond the Green Line) tend to participate at higher rates (12.5 and nine percentage points above the national average, respectively) Orthodox and non-Orthodox Jewish municipalities have similar voter turnout in local elections and Jewish settlers have even lower voter turnout.

\textsuperscript{21} These estimates are based on a specification that uses voter turnout as a dependent variable, instead of logistic transformation (not presented in the tables).

\textsuperscript{22} Both researchers and popular commentators have suggested that the very high voter turnout of Arab voters in local elections is due to their relatively low turnout in general elections (the compensation hypothesis). However, this hypothesis has been strongly rejected (Ben-Bassat and Dahan, 2008).
certain last name in ballot boxes where eligible voters share the same last name and votes in all other ballot boxes) and voter turnout in those 35 Arab localities. This correlation might be interpreted as additional evidence that is supportive of the social attachment hypothesis to the extent that hamula-based voting reflects social attachment.

4.3.4 Voter turnout and group size

The highly significant coefficient of Arab municipalities found in the previous section justifies delving into the distinctive characteristics of the Arab population. Following our finding in Section 4.3.2 it would be natural to use the last name of an individual as our measure of social group affiliation. The Interior Ministry, with the help of the Central Bureau of Statistics, provided us with data on the distribution of last names of all individuals age 20 years or over in 75 Arab municipalities in the year 2003.

The size of the group/hamula is measured here by the ratio of the number of individuals in a particular locality who are 20 years of age or older that share a certain last name divided by the total number of people in that same age group in that particular locality. To a large extent, that age group overlaps with those individuals who are eligible to vote in local elections (a person aged 17 or older is entitled to vote in local elections). The constructed group size approximately reflects the upper boundary of the size of a hamula's constituency.\(^{23}\) Note that absolute hamula size could be relatively large. The average number of members of the largest hamula is 918, using our definition of hamula.

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\(^{23}\) Hamula size has been used in the past to explore the social and political roles of the hamula. Comprehensive research on the evolution of hamula strength between the years 1910 to 1983 in the town of Shfar'am has found that hamula size (self-reported) is positively correlated with the tendency to vote for hamula-based lists in elections held in Shfar'am in the year 1983 (Al-Haj, 1988). Shavit and Pierce (1991) show that educational achievements are associated with hamula size.
Table 4 presents results of regressions that include two measures of group size in addition to the standard control variables. Obviously, the analysis is restricted to Arab municipalities (75 observations) where we have information on the distribution of group size. Note, that the number of observations is smaller when using a lagged variable for the political competition index.

In Table 4 both a linear and a quadratic form of the size of the largest hamula is used as a measure of group size. The coefficient of this measure is positive and significant, whereas the coefficient of the square of that index is negative but insignificant at the standard level. A similar picture emerges if we use the Herfindhal-Hirschman index instead of the size of the largest hamula as a measure of group size.\(^{24}\) The F test for the quadratic form, however, is borderline significant when the lag political competition is excluded (see footnote to Table 4).\(^ {25}\) This result is moderately consistent with the inverted U-shape prediction suggested by recent theoretical models that grant social groups an important role in shaping individuals' voting behavior. According to the estimated coefficient, a rise of one standard deviation in the Herfindhal-Hirschman index would lead to an increase of one and a half percentage points in voter turnout. This estimated impact of social identity on voter turnout may seem relatively small, but recall that the variance of voter turnout in Arab municipalities is only around 5%.

\(^{24}\) In fact, our findings are the same using other measures of group size that have been employed such as the two, three and four largest hamulas (not reported here).
\(^{25}\) The result regarding the quadratic form of hamula size holds also in a specification that includes the current political competition index. Note that excluding the lag of political competition results in higher number of observations and with larger hamula size (on average). Thus, the borderline significance is mainly due to more variation in hamula size and not as a result of excluding the lag of political competition.
Three out of the standard four variables are still statistically significant and with the expected signs even when the empirical analysis is limited to Arab municipalities. While the income per capita coefficient keeps its sign, it is not always significant. Note that the coefficient of political competition implies a larger effect on voter turnout in Arab municipalities.

5. Conclusion

This paper exploits the unique social structure of the Arab population in Israel to test whether social identity has a noticeable effect on voter turnout. Voter turnout in Arab municipalities in Israel has been around 90% since the first local elections. It is commonly hypothesized that the high political participation rate in Arab municipalities is related to the unique social structure of Arab communities.

The social structure of a typical Arab locality in Israel is frequently composed of several hamulas, which is a group of large number of families that share a common great-grandfather. Hamula affiliation is measured in this paper by individuals' last names. All individuals that share the same last name form a social group or hamula. We find that hamula members tend to vote for hamula-based-candidates in local elections. In particular we show that voters are more likely to vote for a candidate who shares their last name than for other candidates. This finding suggests that the hamula is a meaningful social group in terms of political behavior.

This study shows that voter turnout in Arab localities is significantly higher than in Jewish localities, controlling for the standard list of explanatory variables. This result is in line with the notion that communities with stronger senses of social attachment (Arab localities) are more likely to participate in elections.
We also find empirical evidence of an inverted U-shaped relationship between *hamula* size and voter turnout, which is consistent with recent theoretical models that incorporate social groups in the decision to vote.

The results presented here suggest that the political behavior of individuals is affected by the degree of social attachment. While the way social identity is formed in the hamula might be different from that of other familiar social groups that are based on gender, race or work affiliation (labor unions) the direction of the effect of social identity on political participation should be similar. It is still likely to differ according to the degree of social attachment. It could be that a hamula, given the close relations between its members, may have a higher degree of social identity and therefore a larger effect on political participation than labor union membership, for example. The size of the effect might be different from that of other social groups but not the effect itself.

Our finding, which is based on actual voting behavior, lends empirical support to the recent direction taken in the voter turnout literature that attempts to explain the voting paradox by adding the benefits that an individual may gain by improving the welfare of his/her social group.
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References


### Table 1a: Descriptive Statistics – Municipality level, 2003

<table>
<thead>
<tr>
<th></th>
<th>All municipalities</th>
<th>Jewish municipalities</th>
<th>Arab municipalities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voter turnout in local elections</strong></td>
<td>72.4 (17.2)</td>
<td>61.0 (12.4)</td>
<td>89.2 (5.3)</td>
</tr>
<tr>
<td><strong>Voter turnout in national elections</strong></td>
<td>68.6 (10.4)</td>
<td>72.4 (7.5)</td>
<td>63.1 (12.3)</td>
</tr>
<tr>
<td><strong>Political competition index</strong></td>
<td>18.9 (19.2)</td>
<td>24.0 (21.4)</td>
<td>11.4 (12.1)</td>
</tr>
<tr>
<td><strong>Number of eligible voters</strong></td>
<td>24,064 (54,671)</td>
<td>36,937 (68,140)</td>
<td>7,493 (6,795)</td>
</tr>
<tr>
<td><strong>Income per capita</strong></td>
<td>2,490 (1,302)</td>
<td>3,262 (1,138)</td>
<td>1,347 (302)</td>
</tr>
<tr>
<td><strong>Herfindhal-Hirschman Index</strong></td>
<td>-</td>
<td>-</td>
<td>0.089 (0.096)</td>
</tr>
<tr>
<td><strong>Largest hamula</strong></td>
<td>-</td>
<td>-</td>
<td>19.1 (13.5)</td>
</tr>
<tr>
<td><strong>Number of municipalities</strong></td>
<td>186</td>
<td>111</td>
<td>75</td>
</tr>
</tbody>
</table>

Standard deviations are in parentheses.

### Table 1b: Descriptive Statistics – Ballot box level, 2003

(35 Arab municipalities)

<table>
<thead>
<tr>
<th></th>
<th>Average and standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of eligible residents per ballot box</strong></td>
<td>737 (77)</td>
</tr>
<tr>
<td><strong>Number of voters per ballot box</strong></td>
<td>652 (81)</td>
</tr>
<tr>
<td><strong>Voter turnout (%)</strong></td>
<td>88.5 (6.35)</td>
</tr>
<tr>
<td><strong>Number of candidates</strong></td>
<td>4.43 (2.16)</td>
</tr>
<tr>
<td><strong>Size of largest hamula (%)</strong></td>
<td>16.2 (10.16)</td>
</tr>
<tr>
<td><strong>Share of votes to candidates in ballot boxes that contain their last name</strong></td>
<td>31.5 (25.01)</td>
</tr>
<tr>
<td><strong>Share of votes to candidates in ballot boxes that do not contain their last name</strong></td>
<td>18.1 (18.21)</td>
</tr>
<tr>
<td><strong>Number of ballot boxes</strong></td>
<td>354</td>
</tr>
</tbody>
</table>

Standard deviations are in parentheses.
Table 2: Effect of voter's last name on elections outcome in Arab municipalities

Dependent variable: share of votes for candidates in 2003 local election

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td><strong>18.1</strong>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(30.96)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Last name of candidate i appears in ballot j</td>
<td><strong>13.5</strong>* (9.90)</td>
<td><strong>13.3</strong>* (10.57)</td>
<td><strong>10.7</strong>* (6.17)</td>
<td><strong>11.1</strong>* (9.31)</td>
</tr>
<tr>
<td>Hamula size</td>
<td></td>
<td></td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.49)</td>
<td></td>
</tr>
<tr>
<td>(Hamula size) X (Last name)</td>
<td></td>
<td></td>
<td><strong>0.23</strong> (2.38)</td>
<td></td>
</tr>
<tr>
<td>Winner</td>
<td></td>
<td></td>
<td></td>
<td><strong>19.9</strong>* (14.87)</td>
</tr>
<tr>
<td>(Winner) X (Last name)</td>
<td></td>
<td></td>
<td></td>
<td><strong>12.3</strong>* (4.78)</td>
</tr>
<tr>
<td>Fixed effects</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Observations</td>
<td>1612</td>
<td>1612</td>
<td>1612</td>
<td>1612</td>
</tr>
<tr>
<td>R²</td>
<td>0.078</td>
<td>0.294</td>
<td>0.297</td>
<td>0.495</td>
</tr>
</tbody>
</table>

t statistics are in parentheses. Standard errors are clustered at the ballot box level.

*** Significance at 1%.
** Significance at 5%.
* Significance at 10%.
Table 3: Baseline regression (all municipalities)
Dependent variable: log [turnout/(1-turnout)] in 2003 local election

<table>
<thead>
<tr>
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<th>(1)</th>
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<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>4.625***</td>
<td>4.762***</td>
<td>2.395***</td>
<td>2.410***</td>
<td>2.361***</td>
<td>2.328***</td>
</tr>
<tr>
<td></td>
<td>(10.52)</td>
<td>(10.87)</td>
<td>(6.15)</td>
<td>(6.69)</td>
<td>(6.11)</td>
<td>(5.99)</td>
</tr>
<tr>
<td>Voter turnout in national elections</td>
<td>0.014***</td>
<td>0.020***</td>
<td>0.025***</td>
<td>0.024***</td>
<td>0.025***</td>
<td>0.025***</td>
</tr>
<tr>
<td></td>
<td>(3.38)</td>
<td>(4.71)</td>
<td>(7.67)</td>
<td>(8.21)</td>
<td>(7.76)</td>
<td>(7.79)</td>
</tr>
<tr>
<td>Political competition index</td>
<td>-0.008**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-3.82)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Political Competition-lag</td>
<td></td>
<td>-0.006***</td>
<td>-0.004**</td>
<td>-0.005***</td>
<td>-0.004***</td>
<td>-0.003*</td>
</tr>
<tr>
<td></td>
<td>(-2.85)</td>
<td>(-2.47)</td>
<td>(-3.43)</td>
<td>(-2.73)</td>
<td>(-1.87)</td>
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<tr>
<td>Eligible population (log)</td>
<td>-0.358**</td>
<td>-0.393***</td>
<td>-0.293***</td>
<td>-0.299***</td>
<td>-0.289***</td>
<td>-0.290***</td>
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<tr>
<td></td>
<td>(-10.72)</td>
<td>(-12.35)</td>
<td>(-11.55)</td>
<td>(-12.72)</td>
<td>(-11.57)</td>
<td>(-11.57)</td>
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<tr>
<td>Income per capita (log)</td>
<td>-1.219***</td>
<td>-1.468***</td>
<td>-0.694***</td>
<td>-0.584***</td>
<td>-0.657***</td>
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<td></td>
<td>(-13.67)</td>
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<td>(-6.73)</td>
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<tr>
<td>(Political Competition-lag) X (Arabs)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.003</td>
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<td>(-0.82)</td>
</tr>
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<td>Orthodox Jews</td>
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<td></td>
<td>(-0.177)</td>
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<tr>
<td>Settlers</td>
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<td></td>
</tr>
<tr>
<td>Arabs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.098***</td>
<td>1.132***</td>
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<td>(10.03)</td>
<td>(11.12)</td>
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<td>0.695***</td>
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<td>(4.97)</td>
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<td>1.183***</td>
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<td>(11.47)</td>
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<tr>
<td>Druze</td>
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<td>1.495***</td>
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<tr>
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<td>(10.95)</td>
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<tr>
<td>Observations</td>
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<td>146</td>
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<td>146</td>
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<td>146</td>
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<tr>
<td>Adjusted R²</td>
<td>0.762</td>
<td>0.836</td>
<td>0.912</td>
<td>0.924</td>
<td>0.912</td>
<td>0.912</td>
</tr>
</tbody>
</table>

t statistics are in parentheses.

*** Significance at 1%.
** Significance at 5%.
* Significance at 10%.
Table 4: Effect of social identity in Arab municipalities
Dependent variable: log [turnout/(1-turnout)] in 2003 local election

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
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<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>2.734*** (4.00)</td>
<td>3.694*** (4.72)</td>
<td>2.706*** (3.15)</td>
<td>2.827*** (3.30)</td>
<td>1.555* (1.97)</td>
<td>2.378** (2.64)</td>
<td>2.520*** (2.78)</td>
<td>1.304 (1.56)</td>
</tr>
<tr>
<td>Voter turnout in national elections</td>
<td>0.026*** (5.48)</td>
<td>0.026*** (5.43)</td>
<td>0.030*** (6.14)</td>
<td>0.029*** (5.95)</td>
<td>0.029*** (5.77)</td>
<td>0.032*** (6.29)</td>
<td>0.032*** (6.37)</td>
<td>0.030*** (5.76)</td>
</tr>
<tr>
<td>Political competition index</td>
<td>-0.014*** (-3.07)</td>
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<tr>
<td>Competition-lag</td>
<td></td>
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<tr>
<td>Eligible population (log)</td>
<td>-0.221*** (-3.13)</td>
<td>-0.311*** (-4.05)</td>
<td>-0.249*** (-3.19)</td>
<td>-0.240*** (-3.09)</td>
<td>-0.154** (-2.03)</td>
<td>-0.236*** (-3.02)</td>
<td>-0.232*** (-2.98)</td>
<td>-0.144* (-1.89)</td>
</tr>
<tr>
<td>Income per capita (log)</td>
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<tr>
<td>Herfindhal-Hirschman Index</td>
<td>1.732** (2.34)</td>
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</tr>
<tr>
<td>Herfindhal-Hirschman Index ^2</td>
<td></td>
<td>8.610 (1.38)</td>
<td></td>
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<tr>
<td>Largest hamula</td>
<td>0.014** (2.58)</td>
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<tr>
<td>Largest hamula ^2</td>
<td></td>
<td>0.000 (1.16)</td>
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<tr>
<td>Observations</td>
<td>75</td>
<td>54</td>
<td>54</td>
<td>54</td>
<td>75</td>
<td>54</td>
<td>54</td>
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<tr>
<td>Adjusted R²</td>
<td>0.367</td>
<td>0.473</td>
<td>0.517</td>
<td>0.526</td>
<td>0.325</td>
<td>0.528</td>
<td>0.531</td>
<td>0.328</td>
</tr>
</tbody>
</table>

t statistics are in parentheses.

*** Significance at 1%.
**  Significance at 5%.
*   Significance at 10%.

Column 5: F-test for Herfindhal-Hirschman Index and Herfindhal-Hirschman Index ^2 is F(2,69)= 2.76*  

Column 8: F-test for Largest hamula and Largest hamula ^2 is F(2,69)= 2.91*  

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Figure 1: Voter turnout in selected Arab towns/villages, 1959-2003

Source: Ministry of the Interior

Figure 2: Voter turnout in the last two elections

Source: Ministry of the Interior
Figure 3: Voter turnout distribution, 2003 local elections

Source: Ministry of the Interior

Figure 4: Voter turnout and hamula-based-voting in Arab municipalities

(The average difference between the share of votes to a candidate with a certain last name in a ballot boxes where eligible voters share the same last name and votes in all other ballot boxes)