Estimating Grievances in the Israeli-Palestinian Conflict*

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Abstract

How can political scientists measure ethnic grievances and their evolution over time? Examining the Arab-Israeli conflict, this paper attempts to estimate Palestinian grievances using public opinion data and a latent measurement model. From repeated questions in rolling cross section surveys, I create a new data set describing Palestinian views toward conflict and peace at the monthly level between 1994–2016. I fit a dynamic factor model to the data and measure grievances over time. Preliminary results suggest that grievances overwhelmingly correlate with opinions about the Arab-Israeli conflict in expected directions and with measures of government repression and Palestinian mobilization.

1 Introduction

Do ethnic or minority grievances cause civil violence? Grievances have a prominent place in the theoretical and qualitative analyses of conflict. Yet large cross-country analyses generally indicate that the greed or rebel opportunism, rather than ethnic grievances, drive civil conflict (Blattman and Miguel, 2010; Collier and Hoeffler, 2004; Fearon and Laitin, 2003). A key, yet unresolved, component of these debates concerns how to best measure grievances. The relationship between grievances and civil conflict appears to be ambiguous as scholars consider new measures of grievances, (Cederman, Weidmann and Gleditsch, 2011; Wimmer, Cederman and Min, 2009).

In this paper, I contribute to this debate by estimating grievances using public opinion data and a latent measurement model. Given its salience and the wide array of publicly available data, I analyze the dynamics of the Israeli-Palestinian conflict. Specifically, I collect public opinion polls at the monthly level between 1994–2016 and record aggregate measures of Palestinian views on conflict and peace. I estimate grievances as a latent variable in a dynamic factor analysis. To illustrate the usefulness of the measure, I examine

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how it correlates with (a) opinions from Arab Israelis, (b) Israeli government policies, and (c) incidents of Palestinian terrorism.

Three preliminary results emerge. First, the public opinion measures overwhelming load onto the latent variable in expected directions, indicating that the variable is a viable proxy for grievances. For example, as grievances increase, the percentage of Palestinians that trust Hamas, support suicide bombings, or oppose the peace process increase as well. As grievances decrease, Palestinian support for the two state solution, trust in Fatah, and opposition to Intifadas increase. Second, the measure of grievances using Palestinian respondents *negatively correlates* with views on the peace process from Arab Israelis. Thus, the analysis indicates that important differences exist between Palestinians who are Israeli citizens and those living in the West Bank and the Gaza strip. Third, grievances positively correlate with observed repressive action from the Israeli government and the number of Palestinian terrorist attacks over time. Likewise, they negatively correlate with conciliatory actions from the government.

A major motivation for this data collection project is to test the results from a formal model in Gibilisco (2017). In that paper, I construct a dynamic game of center-periphery relations. A key feature of the game is that the periphery's grievances are modeled as a fully endogneous state variable with two important properties. First, they evolve according to past actions of the center. When the center uses repression, grievances increase tomorrow, but when the center abstains from repression, grievances depreciate tomorrow. Second, grievances enable to the periphery to engage in successful collective action. That is, if the peripheral elites choose to mobilize, then they more likely succeed when the population has larger grievances. The goal of this data collection and measurement exercise is to potentially calibrate or structurally estimate the game theoretic model in Gibilisco (2017).[1] To do so, I need measures of the model's three main endogenous variables: center repression of the periphery, periphery mobilization, and the periphery's grievances. By examining the Israeli Palestinian conflict, the goal is to construct adequate measures of the three variables for future analysis. This paper reports my efforts at estimating Palestinian grievances.

In this context, past measures of political grievances may actually be capturing actions taken by the government, rather than the visceral reactions from ethnic minorities.[2] For example Collier and Hoeffler (2004) include Polity's measure of state repression as a measure of grievance. Likewise, other political grievance measures include variables aggregated at the country level such as ethnic diversity, ethnic polarization and the presence of dominant majority/minority groups (Collier and Hoeffler, 2004; Fearon and Laitin, 2003; Jakobsen and De Soysa, 2009). These measures proxy for the ability or the incentives of a majority

[1] For recent examples of this approach in international relations, see Crisman-Cox and Gibilisco (2017) and Kurizaki and Whang (2015).

[2] Of course, others focus on economic grievances, which are captured with household level measures of inequality, such as the Gini coefficient of income and land ownership. Cederman, Weidmann and Gleditsch (2011) examine the degree to which ethnic group GDP varies from country level GDP.

group to repress a minority group, rather than the internal reaction of the minority group after such repression.

This approach appears to be standard in the literature. Hegre and Sambanis (2006) examine their ability to predict civil war under a variety of model specifications. Cunningham and Weidmann (2010) disaggregate political grievances to the local level by examining the presence of moderate ethnic majorities. Cederman, Weidmann and Gleditsch (2011) advance this early work by measuring grievances at the group level, i.e., horizontal inequalities between ethnic groups. They proxy political grievances using an indicator variable denoting whether or not an ethnic group is excluded from power. In a similar vein, Lacina (2014) examines ethnic group violence during India's federal reogranization and uses representation in the dominat political party to measure political grievances.

2 The Data

I collect polling data from two sources. The first is the Jerusalem Media and Communication Centre (JMCC). According to their website, the JMCC is the first Palestinian organization to carry out public opinion polling, and they regularly release summaries of almost quarterly polls between January 1993 and April 2016. In total, there are 98 JMCC polls, of which 77 enter the data set and 11 were excluded due to relevancy reasons described below. I use the summaries when coding my measures of public opinion, and the summaries generally contain three sections. The first describes the main substantive findings in a press release format, the second details the poll's methodology and sample demographics, and the third lists the specific questions and summary statistics. Most JMCC polls have a sample size of $1,200$ respondents who are 18 or older and live in the Gaza Strip or the West Bank, which includes East Jerusalem. Respondents are interviewed face-to-face. The JMCC reports the following:

> *The interviews were conducted in randomly selected homes, and the subjects inside each home were also selected randomly according to Kish tables. The interviews were conducted in* 130 *sampling points* [which varies from poll to poll] *chosen randomly according to population.*

On average this means that 60% of respondents live in the West Bank and 40% in the Gaza Strip. Although previous scholarly work cites individual JMCC polls (e.g., Dajani, 2003; Grant and Tessler, 2002; Niblock, 1998), little to no research investigates their time-series trends. Bloom (2004) uses multiple JMCC polls when explaining support for suicide bombings and trust in Hamas, and Jaeger et al. (2012) examine individual level surveys. Nonetheless, both time frames consists of the Second Intifada.

The second source is the Peace Index from the Guttman Center for Surveys, which is run by the non-profit Israel Democracy Institute. The Peace Index is a monthly poll aimed at gauging Israeli public opinion regarding the politics and conflict with Palestine.

In total, 109 Peace Index polls enter the the data set. Most importantly, more recent polls (2000 and onward) include a sample of Arab Israeli respondents, which is approximately 17% of their 600 person samples. By definition, an Arab Israeli is a non-Jewish citizen of Israel with an Arabic linguistic heritage, but as I elaborate below, the population is overwhelmingly Palestinian Muslim. Respondents are interviewed by telephone, and the sample is constructed to be representative of the adult population. Unlike the JMCC polls, the Peace Index publishes data files containing the individual level observations. Currently, the data only includes polls from 2006–2016, because these are publicly available while the earlier years require a subscription. Several studies cite individual Peace Index Polls or press releases (e.g., Avigur-Eshel, 2013; Inbar and Shamir, 2014; Kydd and Walter, 2002), but the only analysis is conducted by Yuchtman-Yaar and Hermann (1998). The authors investigate the effects of Prime Minister Yitzhak Rabin's assassination on the attitudes of Israeli Jews toward antigovernment demonstrations.

Within each set of polls, I track questions that are repeated over time. Three major difficulties arise in this process. First, neither source publishes an index of questions, and I therefore manually construct such indices. Second, the bulk of the questions are never asked more than once. Among those that are asked more than once, even fewer appear on a regular basis. Both polls often write one time questions with regards to the latest news. For example, in the Fall of 2011, there was a major prisoner exchange between Israel and Hamas involving the IDF soldier Gilad Shalit. Accordingly, the November JMCC poll asks "A prisoner's swap deal was implemented recently between Israel and Hamas Movement. What is you opinion on this deal?" Likewise the October Peace Index poll asks, "Do you now think it was right or not right to carry out the Gilad Shalit deal?" I exclude these questions from the data set because their single usage does not provide information on a factor that changes over time. Third, the polls repeatedly ask questions that are most likely irrelevant for the subsequent analysis. For example, the Peace Index asks respondents about their feelings toward Syria and Lebanon and whether they approve of the current government. The JMCC repeatedly asks respondents about their feelings toward corruption in the Palestinian Authority, their religious beliefs, and their choice in news outlets. I also exclude these types of questions from the data set.

Using the repeated questions concerning the Israeli-Palestinian conflict, I code multiple variables per question, usually between two and four, at the monthly level. For example, in 66 surveys, the JMCC asks the open ended, "Which Political or religious faction do you trust the most?" In the code book, this question defines the **trust** *variable group*, which contains the following variables:

trust_1 Records the percent of respondents who say Fatah.

trust_2 Records the percent of respondents who say Hamas.

trust_3 Records the percent of respondents who say the Popular Front for the Libera-

tion of Palestine.

trust_4 Records the percent of respondents who say other Islamic factions.

trust_5 Records the percent of respondents who say that they trust no political or religious faction.

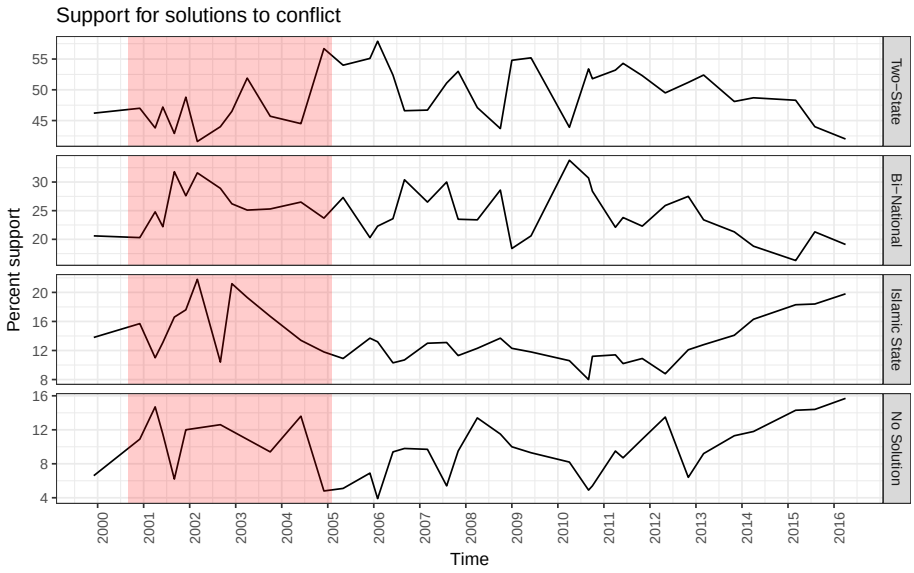
As the excluded category, I do not record the percentage of respondents who do not know or refuse to answer the question. The code book details the remaining variables in a similar fashion. For most of the analysis, I exclude the Peace Index polls, i.e., those focusing on Israeli citizens. In an application, I show that data on Arab Israelis in the Peace Index Polls negatively correlates with similar measures from those in the JMCC polls, i.e., those with Palestinian respondents.

3 Descriptive Time Trends

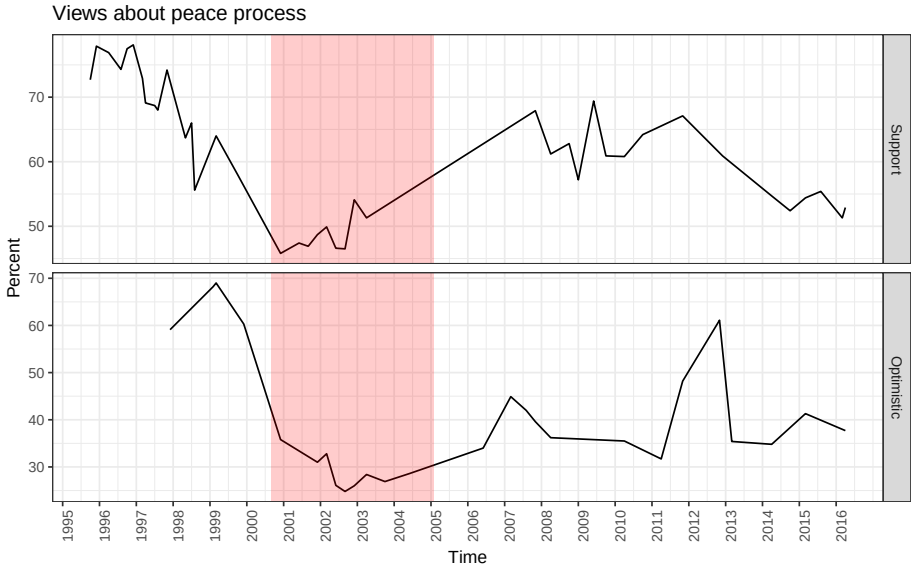
In this section, I present descriptive statistics about Palestinian views toward the peace process. Accordingly, I only use polls from the JMCC. The goal is to illustrate the types of questions in the data set. Furthermore, a preliminary examination indicates that several opinion measures correlate with each other and share similar peaks and valleys.

First, consider Palestinians' preferred solutions to the conflict. Here, the **bination** question records the percent of Palestinians who prefer a two-state solution, a bi-national state solution, an Islamic or Palestinian state solution, and also who believe there is no solution to the conflict. Surprisingly, the polls do not provide an "Islamic" or "Palestinian" answer. However, the publisher records the percentage of respondents who refuse to choose the pre-specified answers and instead say an Islamic or Palestinian state. It also records the percentage of respondents who say some other solution, but I do not use this in the subsequent analysis. The question first appears in December 1999 and has 39 entries throughout. The figure immediately below graphs support for each solution over time. The red box covers represents the Second Intifada. Notice that support for an Islamic state peaks at two points. The first is during the Second Intifada, and the second is during the present period. Coincidentally, some reports label July 2014 as the beginning of the Third, or Silent, Intifada.[3]

[3]See for example, Carlstrom, Gregg. 2014. "The 'silent intifada' in Jerusalem grows louder by the day" *USA Today.*

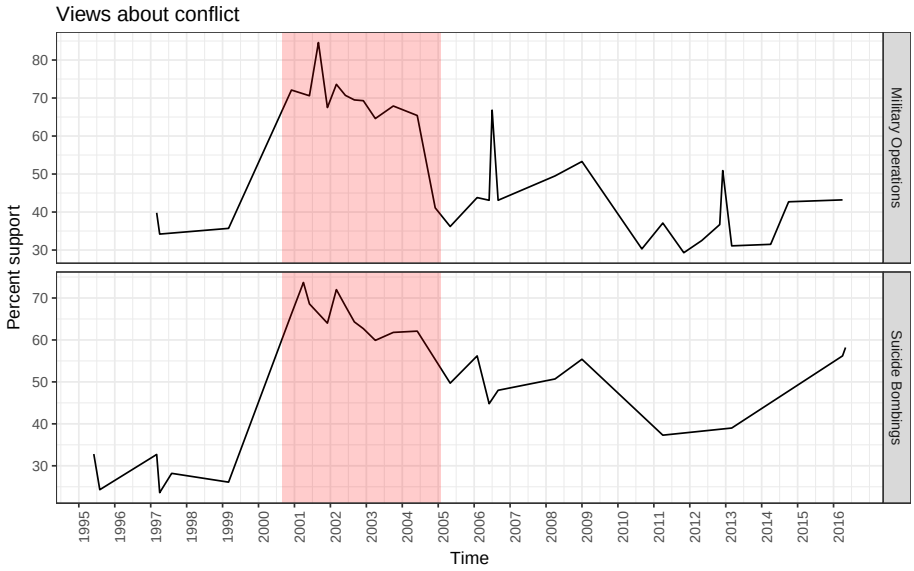


Next, I consider Palestinian views toward the peace process in general. The variable groups **supp** and **optp** measure support for and optimism about the peace process. They appear in October 1995 and December 1997 and have 41 and 26 total entries, respectively The graph below plots these over time. As before, support and optimism fall to their lowest values during the Second Intifada. In addition, optimism is rarely above 50%, and general support for the peace process seems to be comparatively low in the present time period.



Relatedly, I consider Palestinian views toward conflict. The variable groups **milit** and **bomb** measure the degree to which Palestinians support military operations against Israel and suicide bombings targeting Israeli citizens, respectively. The former appears in March 1997 and has 33 entries, and the latter appears in June 1995 with 27 entries. I graph these below. Support for conflict is highest during the Second Intifada, where 70% of respondents support military operations against Israelis and 60%–70% support suicide bombings. In

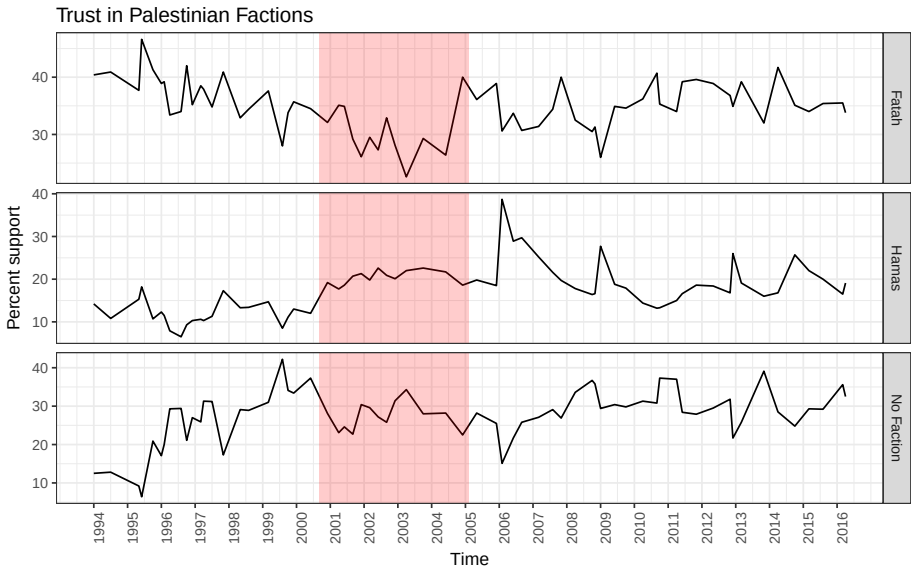
addition, support for suicide bombings appears to be on the rise.



Notice that, in July 2006, there is a sharp jump in the support of military operations. On June 25, 2006, the IDF soldier Gilad Shalit was captured by Hamas militants during a military operation in the Gaza Strip. Hamas demanded that Israel release all Palestinian prisoners who were either female or under the age of 18. The Israeli government initially refused to negotiate. However,there is some evidence that the public generally supported Hamas' terms for release.[4] Several comparisons were made to IDF navigator Ron Arad who was taken prisoner by Hezbollah in Oct. 1986, and the Israeli government failed to secure his release. According to the July 2006 JMCC poll, 71% of Palestinians supported the abduction of Shalit. It is likely that this spike in military support follows these sentiments.

Finally, I consider the rise and fall of Hamas. The variable group **trust** records the percent of respondents who find certain political or religious factions the most trustworthy. Of particular importance is trust in Fatah and Hamas. This question first appeared in January 1994 and has 66 entries. I graph the trust measures below and also include the percent of respondents that trust no political or religious faction. It appears that trust in Hamas increases quickly at the beginning of the Second Intifada. Furthermore, trust in Fatah depreciates until the end of the Second Intifada. This is likely due to the growing realization that the Oslo II Accords (1993-1994) were a failure.

[4]In 2009, Hamas demanded the release of 1,000 prisoners for the return of Shalit. The Jerusalem Post reports that "a survey by the Dahaf Polling Institute found that 69% of Israelis favored a deal to get back Shalit even if it would include the release 'of hundreds of terrorist-murderers' and the deportation of some of them outside the territory of the Palestinian Authority. Only 22 percent said they were against such an agreement." In 2011, the Israeli government released 1,027 Palestinian prisoners, several of which were serving life sentences.



Above, notice the positive (negative) spike in Hamas (Fatah) support at the beginning of 2006. This corresponds to the Palestinian parliamentary elections on Jan. 25, 2006. Polls predicted that Hamas would take a third of the seats, but Hamas performed better than expected, winning 74 of the 132 seats with 78% turnout. The consequences were serious. The Israeli government immediately withheld 60$ million in funds for the Palestinian police service and resumed targeted killings of suspected terrorists. These elections also mark the quick drop off in support for a two-state solution and a rise in feelings that the conflict has no solution.

4 Estimation

Using the collected data, my goal is to estimate Palestinian grievances as a latent variable. I do this using a variation on factor analysis. Due to the potential for grievances to be "sticky" or persistent, I allow for latent grievances in period t to depend on those in period $t-1$. Most generally, the models that I estimate take the following form:

$$\begin{aligned} \boldsymbol{f}_t &= \boldsymbol{B}\boldsymbol{f}_{t-1} + \boldsymbol{\mu}_t, \text{ where } \boldsymbol{\mu}_t \sim \text{MVN}(0, \bar{\sigma}^2 \mathbb{I}_P) \\ \boldsymbol{y}_t &= \boldsymbol{Z}\boldsymbol{f}_t + \boldsymbol{\nu}_t, \text{ where } \boldsymbol{\nu}_t \sim \text{MVN}(0, \tilde{\sigma}^2 \mathbb{I}_k) \\ \boldsymbol{f}_0 &\sim \text{MVN}(0, 5\mathbb{I}_p) \end{aligned} \tag{1}$$

Here $\boldsymbol{f}_t$ is a column-vector of P factors, and $\boldsymbol{y}_t$ is a column-vector of K measures proxying for Palestinian grievances, which are detailed in the previous section. The coefficient matrices $\boldsymbol{B}$ and $\boldsymbol{Z}$ are to be estimated. Coefficients in $\boldsymbol{B}$ describe the latent factors' autoregressive processes. In static factor analyses, $\boldsymbol{B} = 0$. In the dynamic analysis, I assume $\boldsymbol{B}$ is a

diagonal matrix. When $p = 2$ for example, this implies that

$$\boldsymbol{B} = \begin{bmatrix} b_1 & 0 \\ 0 & b_2 \end{bmatrix}.$$

In other words, a factor in period t autocorrelates with its previous value in $t-1$, but is not affected by the values of other factors in period $t-1$. Coefficients in $\boldsymbol{Z}$ are factor loadings that describe how the measures of public opinion load on the latent dimensions. The parameters $\tilde{\sigma}^2$ and $\tilde{\sigma}$ are the standard errors of the model's stochastic components. Finally, I specify a diffuse prior over the initial states, where the initial state f_0 is drawn from a normal distribution with a large variance.

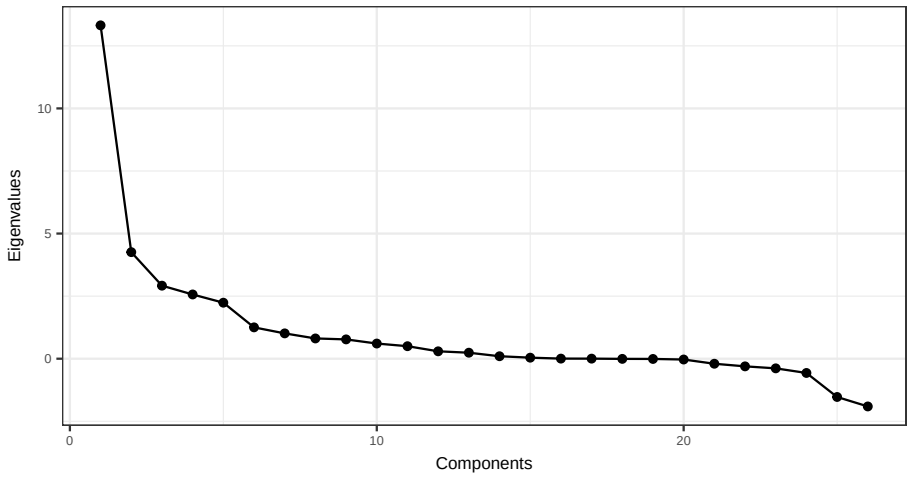
I estimate the model using `MARSS` in `R`. The software maximizes a likelihood derived from Equation 1 using the EM algorithm. This is particularly important because missing data can be accommodated seamlessly within the estimation procedure. Using a multiple imputation approach is not ideal. The sign and absolute magnitude of the latent factors cannot be identified. Thus, repeatedly rerunning the procedure across imputed data sets may introduce noise into the final analysis if the estimation "flips" the direction of the factor or rescales the magnitude across imputed data sets. Confidence intervals and standard errors are computed via parametric bootstrap.

To estimate latent grievances, I examine variables that measure Palestinian opinions regarding the peace process and conflict with Israel. I include all of those described in Section 3. Besides these, I include the percent of respondents who support and oppose the Oslo II Accords. Likewise, I do the same for the Second Intifada. Finally, the JMCC asks respondents whether they think the peace process is dead, alive, or going through difficult and uncertain times, and I include the percent of respondents that fall into each of these categories. In addition, I exclude some variables that either were asked too infrequently, e.g. views about rockets (**rockets**), or measure the same concepts as those included already. For example, intention to vote for Fatah (Hamas) in legislative elections (**legis**) correlates with trust in Fatah (Hamas) with a coefficient of 0.92. The code book contains more detailed information on these variables.

Following Bueno de Mesquita (2005), I include the percent of unemployed respondents in the JMCC polls, which may proxy for grievances. While this is not a true estimate of Palestinian unemployment, its peaks emerge in years that match those reported by the Palestinian Central Bureau of Statistics, i.e., 2002 and 2008. For the time being, I have not included data from the bureau, and I restrict attention to those from public opinions.

How many factors should be included? Figure 1 is an intial scree plot. It graphs the eigenvalues from the correlation matrix produced using the data described above. Some values are negative because missing data requires me to compute correlation parameters using pairwise complete observations. The plateau after the first eigenvalue suggests to include only one factor. As such, the acceleration factor also indicates that including one

Figure 1: Scree plot of eigenvalues



factor is sufficient to describe the variation in the data. The optimal factor suggests four factors and the parallel analysis approach suggests 7. I include only one factor and report the results of a model with two factors in the Appendix as a robustness check.

5 Results

This section reports the results of the dynamic factor analysis with one latent variable. Table 1 presents the coefficient estimates and their associated 90% confidence intervals. As expected from Section 3, several variables map on to the latent factor in similar directions. For example, measures such as unemployment, support of an Islamic state, trust in Hamas, support for conflict, etc. positively correlate with the latent factor. In contrast, measures such as support for a two-state solution, trust in Fatah, opposition to conflict, etc. negatively correlate with the latent factor. Finally, there is substantial persistence in the latent factor; the autoregression parameter b_1 is very close to one.

Because of these results, I interpret the latent dimension as Palestinian grievances. Then grievances appear to positively correlate with opinions that support conflict and are opposed to peace. For example, grievances increase the support for Hamas and demands for an Islamic state. With this interpretation in mind, the most surprising estimate is the factor loading on the support for a bi-national state. The analysis indicates this measure increases with larger grievances, i.e., the latent factor. Although the magnitude of the loading is substantively smaller than the more expected ones, this is a little perplexing.

Figure 2 graphs the estimated grievances and their 90% confidence intervals. Notice that grievances rapidly increase during the two years before the Second Intifada, and they reach a peak around 2002 during *Operation Defensive Shield* and *Operation Determined Path*. The former was the largest military operation in the West Bank since the 1967 Six-Day war

Table 1: Factor loadings and 90% CIs

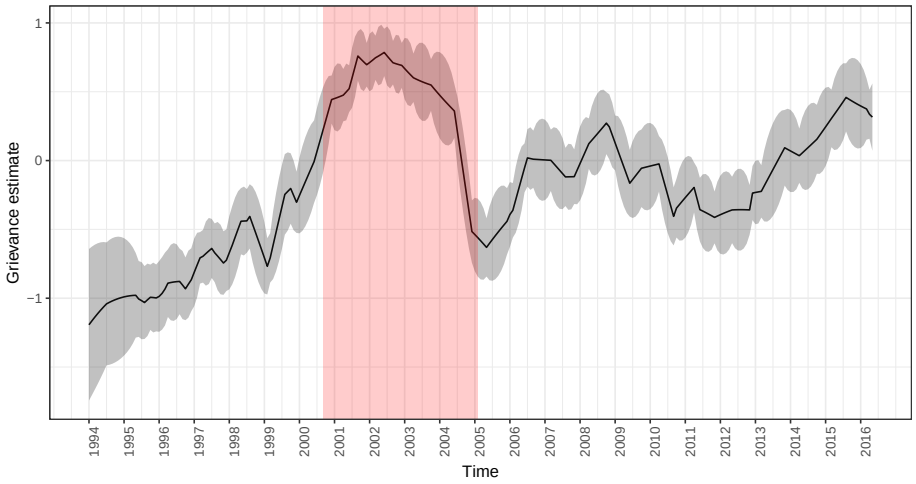
	loadings	lo	hi
unemployment	0.70	0.57	0.83
pro two-state	-1.56	-1.72	-1.40
pro bi-national	0.27	0.14	0.39
pro Islamic state	1.45	1.30	1.60
no solution	1.41	1.26	1.56
trust Fatah	-1.10	-1.24	-0.96
trust Hamas	0.81	0.67	0.95
trust no faction	0.70	0.56	0.83
peace: sup.	-1.47	-1.62	-1.32
peace: opp.	1.48	1.32	1.63
military: sup.	1.63	1.47	1.79
military: opp.	-1.62	-1.77	-1.48
suicide bomb: sup.	1.48	1.33	1.63
suicide bomb: opp.	-1.42	-1.56	-1.28
peace: very optim.	-1.55	-1.70	-1.40
peace: somehwat optim.	-1.59	-1.74	-1.45
peace: somewhat pessim.	1.32	1.17	1.46
peace: very pessim.	1.62	1.46	1.77
Oslo II: strong sup.	-0.93	-1.08	-0.79
Oslo II: sup.	-0.93	-1.06	-0.79
Oslo II: opp.	1.23	1.08	1.39
Intifada: sup.	0.79	0.66	0.92
Intifada: opp.	-0.74	-0.88	-0.60
peace is dead	0.98	0.83	1.13
peace is difficult	-0.44	-0.57	-0.30
peace is alive	-1.31	-1.45	-1.17
b_1	0.97	0.94	0.99
$\tilde{\sigma}^2$	0.54	0.53	0.55
$\bar{\sigma}^2$	0.01	0.01	0.02

and was the beginning the Ramallah siege (March 29, 2002), where Israeli forces surrounded Arafat's compound. In addition, there is a very sharp drop-off in grievances in 2004, the year of Arafat's death and the election of Mahmoud Abbas.

After 2012, there is a sharp rise in grievances. In this year, the IDF launched two military operations in the Gaza strip: Operation Returning Echo (March 9–14) and Operation Pillar of Defense (Nov. 14–21). The latter was particularly gruesome as Human Rights Watch and the United Nations accused both Israel and Hamas of several war crimes. Likewise, the operation was particularly polarizing where a majority of Jewish Israelis believed the military operation was justified, but a majority of Arab Israelis believed it was unjustified.[5] The spike at the end of 2008 and beginning 2009 corresponds to the Gaza War.

[5]See the Peace Index in November 2012.

Figure 2: Grievance scores and 90% CIs.



6 Application 1: Arab Israelis

Arab Israelis are non-Jewish citizens of Israel whose linguistic heritage is primarily Arabic. In 2008, 83% of the Arab Israeli population were Muslim. Of the remaining 17%, half were Christian and half were Druze, an Arabic-speaking sect of Shia Islam. Furthermore, a majority of Arab Israelis identify as Palestinian.[6] The Israeli Central Bureau of Statistics expects that Muslims will constitute 86% of Arab Israelis by 2030. In comparison to Jewish citizens, the Arab population is younger, has a shorter life expectancy, and is less educated.[7]

While the Israeli Supreme Court asserts that Arab Israelis have rights equal to their Jewish counterparts, being designated an Arab Israeli is important. Arab Israelis are not obligated to serve in the military, and "this omission is highly symbolic of the Arabs' exclusion from attending to the common good" (Peled, 1992, p. 436). Due to their emotional status, Arab Israelis have had higher rates of acute stress disorder during the Second Lebanon War (Yahav and Cohen, 2007). In addition, while the vast majority of Arab Israelis recognize Israel's right to exist, they do not support Israel as an ethnically Jewish state (Smooha, 1990). A recent poll indicates that, while a majority of Arab Israelis are proud citizens of Israel, approximately three in four reject the definition of Israel as Jewish State.[8] The Follow-Up Committee for Arab Citizens of Israel—the leading interest group for this population—recently released a report stating that "Israel should refrain from adopting policies and schemes in favor of the majority. Israel must remove all forms of ethnic superi-

[6]Marcus Jonathan (2005) "Israeli Arabs: 'Unequal citizens'" *BBC*. In August 2008, the Guttman Center for Surveys writes that "When asked about their closeness to one of three cultures [Jewish, Western, and Arab] that were mentioned, an overwhelming majority of 88% said they felt especially close to the Arab culture, 7% to the Jewish culture, and 4% to the Western culture."

[7]See "The Arab Population in Israel 2008," which is published on the Central Bureau of Statistics' website.

[8]Newman, Marissa. Dec. 2016. "55% of Israeli Arabs are 'proud citizens' of Israel, but 76% reject its definition as a Jewish state" *The Times of Israel*.

ority, be that executive, structural, legal or symbolic." Furthermore, Knesset election laws bar political parties that do not support Israel as a Jewish state with a single ethnicity.

In this section, I consider the degree to which Arab Israelis public opinion measures match those of the Palestinian respondents. To do this, I make use of the Peace Index polls. These contain monthly observations concerning the degree to which Israelis support peace and are optimistic about peace, both of which are almost identical questions as those in the Palestinian sample. For reference, I compare the responses to these questions across the two samples. Most surprisingly, *Arab Israeli support for the peace process is negatively correlated with Palestinian support.*[9] Likewise, optimism about peace is negatively correlated across the two groups.[10] Due to small sample sizes, 15 and 11, respectively, neither correlation is significant at the $p < 0.1$.

Furthermore, I rerun the previous analysis using the Arab Israeli public opinion data. Table 2 reports the results and should be compared to Table 1. Notice that the signs of the factor loadings are identical to those in the analysis with Palestinian respondents. The one exception is that somewhat support for peace is negatively correlated with the latent factor. In addition, both latent factors appear to be fairly persistent, where b_1 is estimated closed to 1.

Table 2: Arab Israelis: Factor loadings and 90% CIs

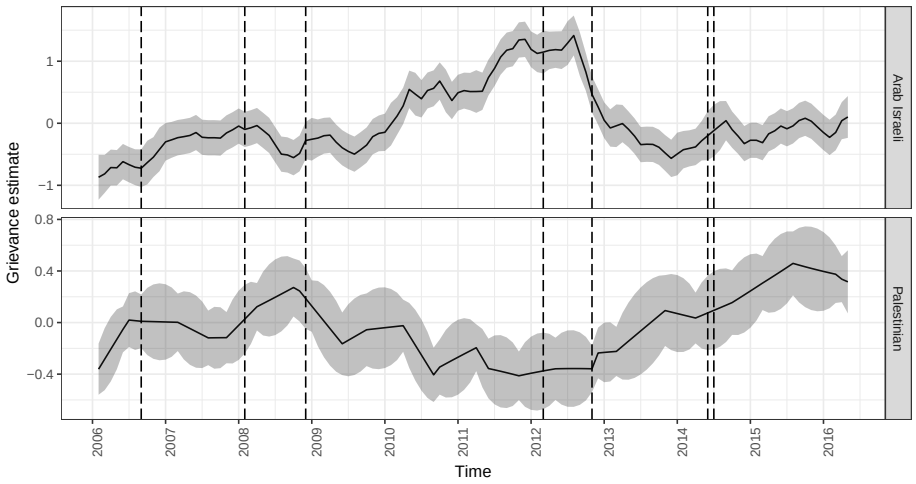
	loadings	lo	hi
peace: strong sup.	-1.33	-1.73	-0.92
peace: somehwat sup.	0.48	0.25	0.72
peace: somewhat opp.	1.31	0.90	1.72
peace: strony opp.	1.03	0.67	1.39
peace: very optim.	-0.33	-0.53	-0.12
peace: somehwat optim.	-1.09	-1.46	-0.71
peace: somewhat pessim.	0.37	0.16	0.57
peace: very pessim.	1.10	0.75	1.45
b_1	0.93	0.85	1.01
$\tilde{\sigma}^2$	0.69	0.64	0.75
$\bar{\sigma}^2$	0.04	0.01	0.07

Across the two groups, i.e., Arab Israelis and Palestinians, similar public opinion measures load on a latent dimension in identical directions. Because of this, I call these latent dimensions "grievance." Arab Israeli and Palestinian estimated grievances negatively correlate with each other. The correlation coefficient is -0.67, which is statistically significant at the $p < 0.01$ level. Figure 3 plots the measures over time. The two measures show different trends. Specifically, Palestinian grievances decrease between 2009-2012 and then rise, but Arab Israeli grievances move in the opposite direction. This suggests that these public opinion measures are not comparable across the two groups. This could be for several

[9]The correlation coefficient is -0.32, $p = 0.24$.
[10]The correlation coefficient is -0.33, $p = 0.31$.

reasons. Most prominently, Arab Israelis may not be as attached to Palestinian nationalism as non-citizens living the West Bank and Gaza Strip. In addition, there may be bias in how Arab Israelis respond to public opinion polls due to desirability and security reasons.

Figure 3: Comparison of Palestinians with Arab Israelis.



7 Application 2: Correlates of Grievances

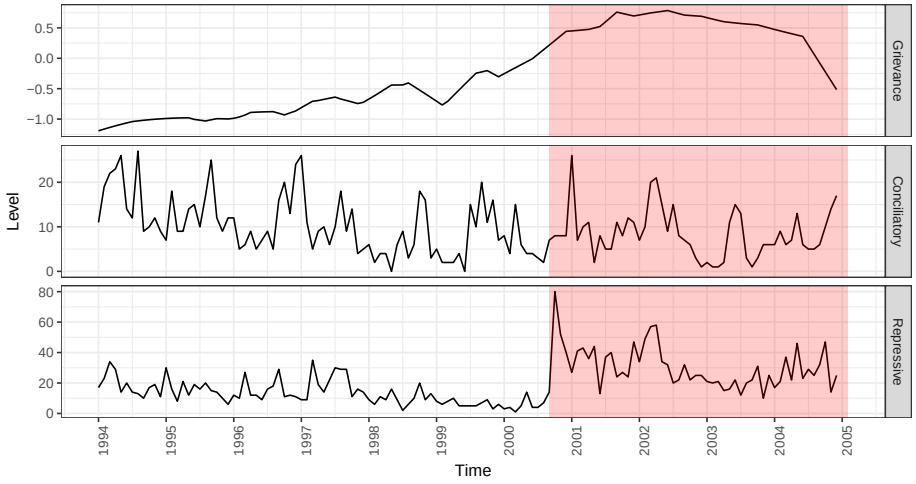
In this section, I analyze how the estimated grievances correlate with observed measures of conflict. I first consider repressive/conciliatory actions from the Israeli government and then analyze Palestinian terrorist attacks.

Dugan and Chenoweth (2012) publish data detailing the Israeli government's response toward the Arab conflict between June 1987 and December 2004 at the monthly level. Their paper should be consulted for more information. The data were coded using Reuters articles during the time frame and include *counts* of two types of actions. The first is "repressive actions" which entail "physical or violent actions" or "[maintaining] the status quo during conflict" (p. 608). Specific news events in this category contain phrases such as "shot dead," "helicopter attacks" and "arrested." The second is "conciliatory actions" which include "making full concessions to opponent's demand" and "expressing intention to cooperate" (p. 608). News stories in this category contain "withdrew from town," "lifted curfew" and "investigated abuse."

Figure 4 graphs the measures of grievance, repression, and conciliation over time. Counts of repressive incidences seem to be comparatively larger during the Second Intifada, when grievances are large. More specifically, during the Second Intifada, the government averages 26.9 repressive actions per month, but it only averages 14.2 during the prior period, where grievances are smaller. A t-test reveals that this difference is significant at the $p < .01$ level. Similarly, the government averages 10.8 conciliatory actions in the years prior to the

Intifada, but only averages 8.1 actions during the conflict. Although smaller, this difference is also significant at the same level.

Figure 4: Grievances and state actions over time



Caption: The red box denotes the months during the Second Intifada. The top figure is the estimated grievance level. The bottom two figures use data on state repression and concessions from Dugan and Chenoweth (2012).

Table 3 shows two regression analyses, where the dependent variable is the grievance measure. As predictors, I include Dugan and Chenoweth's measures of repression and conciliation. The key takeaway is that grievances positively correlate with both previous and current levels of state repression but negatively correlate with state concessions. The former result still holds even when controlling for previous levels of grievance. In this sense, repression Granger causes grievances.

Next, I consider data from the Global Terrorism Database (GTD), which includes information on terrorists attacks from 1994–2015.[11] This is a standard data set in the transnational and domestic terrorism literature. The data codes open media sources in an event-like fashion. Importantly, it contains information on the group or individual responsible, *when identifiable*. I consider monthly counts of all terrorist attacks and monthly counts of terrorist attacks from perpetrators who can be associated with a Palestinian group.[12] Within the 1994–2015 time period, there are 1,211 recorded terrorist attacks, 47% of which were from Palestinian terrorist organizations. In addition, 43% had unknown perpetrators, but of the attacks with identifiable perpetrators, 83% originated from a Palestinian terrorist organization.

As a preliminary analysis, Figure 5 graphs the log of the attacks (plus one) over the time

[11] National Consortium for the Study of Terrorism and Responses to Terrorism (START). (2016). Global Terrorism Database [Data file]. Retrieved from `https://www.start.umd.edu/gtd`

[12] Specifically, I include attacks from Hamas, Popular Resistance Committees, *al-Aqsa* Martyrs' Brigades, and any group with the phrase "Palestin" in their GTD label. See the GTD Codebook and variable **gname** for more information.

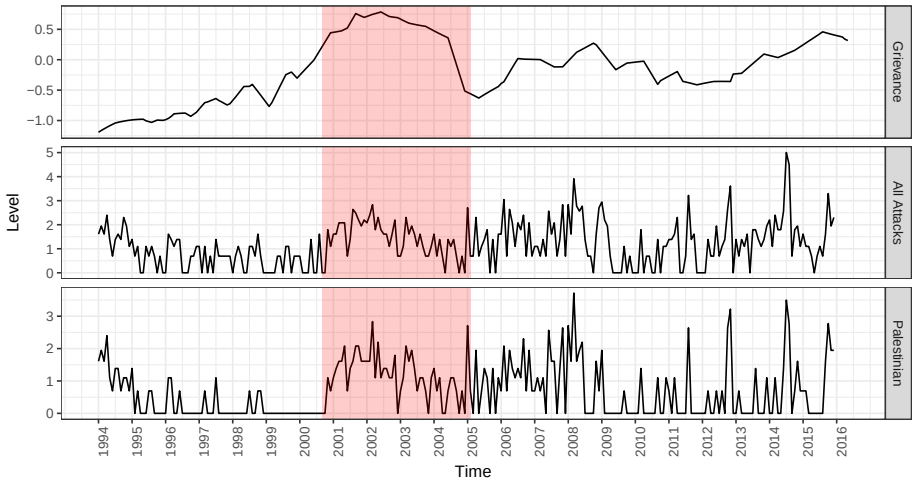
Table 3: Preliminary Regression Results

	Dependent variable:	
	grievance	
	(1)	(2)
repress	0.014^{***}	0.002^{*}
	(0.004)	(0.001)
concil	-0.029^{***}	0.002
	(0.008)	(0.003)
repress.lag	0.017^{***}	-0.001
	(0.004)	(0.001)
concil.lag	-0.022^{***}	-0.003
	(0.008)	(0.003)
griev.lag		0.948^{***}
		(0.027)
Constant	-0.363^{***}	-0.026
	(0.111)	(0.036)
Observations	132	131
R^2	0.425	0.945
Adjusted R^2	0.406	0.943
Residual Std. Error	0.512 (df = 127)	0.158 (df = 125)
F Statistic	23.422^{***} (df = 4; 127)	433.449^{***} (df = 5; 125)
Note:		*p<0.1; **p<0.05; ***p<0.01

Table 4: Preliminary Regression Results

	Dependent variable:	
	Palestinian Terrorist Attacks, log	
	(1)	(2)
Grievance	0.325***	0.495***
	(0.095)	(0.114)
Grievance, sq.		0.452***
		(0.169)
Log Attacks, lag	0.364***	0.325***
	(0.058)	(0.059)
Constant	0.495***	0.423***
	(0.066)	(0.070)
Observations	263	263
R^2	0.212	0.233
Adjusted R^2	0.206	0.224
Residual Std. Error	0.746 (df = 260)	0.737 (df = 259)
F Statistic	34.938*** (df = 2; 260)	26.227*** (df = 3; 259)
Note:		*p<0.1; **p<0.05; ***p<0.01

Figure 5: Grievances and terrorist attacks over time



Caption: The red box denotes the months during the Second Intifada. The top figure is the estimated grievance level. The bottom two figures use counts of terrorist attacks from the GTD.

frame. The beginning of the Intifada does correspond to an increase in terrorist attacks. In addition, there appears to be a rising number of attacks in the recent period, which seems to follow a growth in grievances. Table 4 confirms this cursory inspection. Grievances are positively correlated with terrorist attacks. Indeed, there may be an exponential relationship between grievances and the number of terrorist incidences. The minimum of the estimated quadratic equation is a grievance level of approximately –0.6, and only 10% of estimated grievances fall below this threshold. Similar results hold when looking at all terrorist attacks, instead of those from Palestinian groups. Although, the coefficient estimates are attenuated toward zero in this case. This suggests that the grievance measure is capturing the motivations of Palestinian supporters.

8 Conclusion and Implications

This paper analyzes the dynamics of the Israeli-Palestinian conflict with the goal of measuring Palestinian grievances independently of government actions such as repression. To do this, I collected public opinion data from Palestinian polls between 1994–2016, and estimated Palestinian grievances using a dynamic latent variable model. Preliminary results suggest that the uncovered latent variable may be useful when measuring grievances. Not only do measures of public opinion correlate with the latent dimension in the expected direction, but the dimension also correlated with observed actions from the Israeli government and the Palestinian terrorist organizations.

A Additional Results

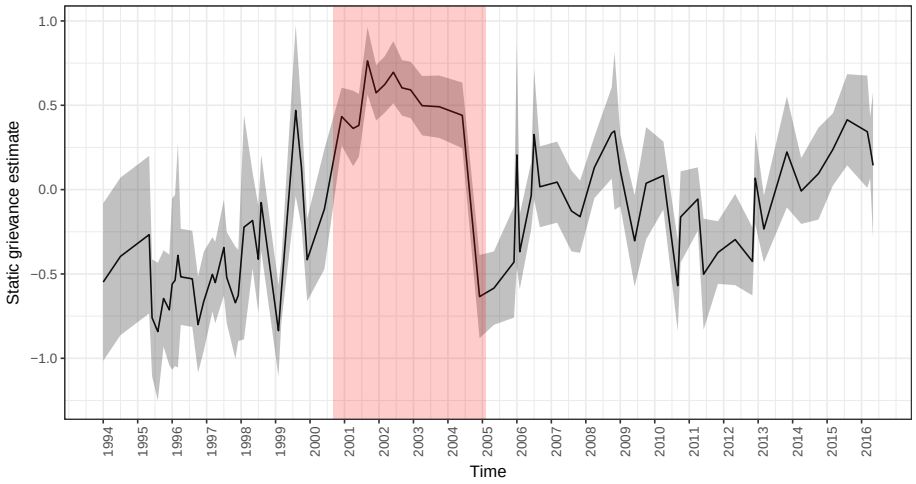
A.1 Static Analysis

I also ran a static factor analysis, i.e., $b_i = 0$. The results are reported in Table 5, and Figure 6 graphs the estimated dimension over time. Notice the directions of the factor loadings match those in Table 2. As such the general time trends in the estimated grievances are similar as well. However, grievances in the static analysis show more variance over short time periods, which reflects the omission of the autogressive term. The dynamic and static grievances share a correlation parameter of 0.53, which is statistically significant.

Table 5: Static Factor loadings and 90% CIs

	loadings	lo	hi
unemployment	1.01	0.86	1.17
pro two-state	-1.65	-1.81	-1.50
pro bi-national	0.34	0.18	0.50
pro Islamic state	1.41	1.25	1.57
no solution	1.39	1.24	1.54
trust Fatah	-1.48	-1.64	-1.33
trust Hamas	0.76	0.61	0.91
trust no faction	0.77	0.62	0.92
peace: sup.	-1.81	-1.95	-1.66
peace: opp.	1.79	1.65	1.93
military: sup.	1.81	1.65	1.96
military: opp.	-1.79	-1.94	-1.64
suicide bomb: sup.	1.67	1.52	1.82
suicide bomb: opp.	-1.62	-1.77	-1.47
peace: very optim.	-1.76	-1.91	-1.62
peace: somehwat optim.	-1.79	-1.94	-1.65
peace: somewhat pessim.	1.51	1.37	1.66
peace: very pessim.	1.79	1.63	1.94
Oslo II: strong sup.	-1.09	-1.24	-0.94
Oslo II: sup.	-1.18	-1.34	-1.03
Oslo II: opp.	1.48	1.33	1.64
Intifada: sup.	0.86	0.71	1.01
Intifada: opp.	-0.80	-0.95	-0.65
peace is dead	1.18	1.04	1.33
peace is difficult	-0.57	-0.72	-0.43
peace is alive	-1.52	-1.68	-1.36
$\tilde{\sigma}^2$	0.54	0.52	0.55
$\bar{\sigma}^2$	0.24	0.21	0.27

Figure 6: Static grievance scores and 90% CIs.



A.2 Dynamic Analysis with Two Factors

I also ran a dynamic factor analysis with two latent dimensions. The results are reported in Table 6, and Figure 7 graphs both estimated dimension over time. Notice the directions of the factor loadings *on the second factor* almost match those in Table 2. The one difference is support for the Second Intifada, which is negatively correlated with the estimated dimension. If we interpret this second dimension as grievances, then two new conclusions follow. First, grievances are decreasing and then quickly increasing during the period between the Oslo II Accords and the beginning of the Intifada. Second, grievances are generally more moderate in the present period.

Figure 7: Dynamic grievances with two factors and 90% CIs.

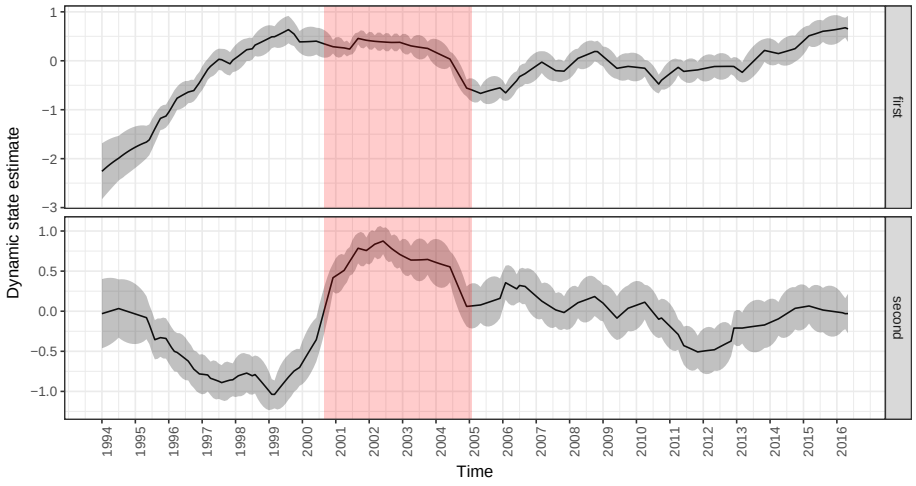


Table 6: Static Factor loadings and 90% CIs

	f1.loadings	f1.lo	f1.hi	f2.loadings	f2.lo	f2.hi
unemployment	-0.23	-0.49	0.04	1.26	1.03	1.48
pro two-state	-1.82	-2.10	-1.54	-0.35	-0.64	-0.07
pro bi-national	-0.68	-0.92	-0.45	0.86	0.66	1.05
pro Islamic state	1.58	1.31	1.85	0.53	0.24	0.82
no solution	1.76	1.49	2.03	0.02	-0.25	0.29
trust Fatah	-0.72	-0.94	-0.50	-0.79	-1.01	-0.57
trust Hamas	0.14	-0.11	0.38	1.11	0.90	1.32
trust no faction	1.11	0.89	1.33	-0.37	-0.56	-0.18
peace: sup.	-1.27	-1.54	-1.00	-0.89	-1.16	-0.62
peace: opp.	1.37	1.10	1.64	0.83	0.54	1.11
military: sup.	0.88	0.59	1.18	1.24	0.96	1.51
military: opp.	-1.07	-1.35	-0.80	-1.11	-1.39	-0.84
suicide bomb: sup.	0.59	0.32	0.87	1.29	1.04	1.53
suicide bomb: opp.	-0.54	-0.82	-0.26	-1.24	-1.48	-0.99
peace: very optim.	0.38	0.07	0.69	-1.43	-1.67	-1.19
peace: somehwat optim.	0.52	0.20	0.83	-1.50	-1.74	-1.25
peace: somewhat pessim.	-0.96	-1.28	-0.64	1.39	1.14	1.65
peace: very pessim.	-0.14	-0.45	0.17	1.42	1.18	1.66
Oslo II: strong sup.	-1.53	-1.78	-1.28	-0.27	-0.52	-0.01
Oslo II: sup.	0.33	0.06	0.60	-1.18	-1.39	-0.96
Oslo II: opp.	1.04	0.79	1.29	0.84	0.61	1.07
Intifada: sup.	3.31	2.78	3.84	-1.10	-1.57	-0.63
Intifada: opp.	-3.49	-4.06	-2.91	1.24	0.76	1.72
peace is dead	2.11	1.76	2.45	-0.42	-0.74	-0.10
peace is difficult	-1.64	-1.95	-1.33	0.68	0.42	0.94
peace is alive	-2.29	-2.64	-1.95	0.21	-0.14	0.55
b_i	0.96	0.95	0.98	0.97	0.94	1.01
$\tilde{\sigma}^2$	0.39	0.04	0.74			
$\bar{\sigma}^2$	0.01	0.01	0.02			

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