# All (Mayoral) Politics is Local?

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**Abstract**

American politics in the contemporary era has become highly "nationalized" – focused on national issues instead of local issues. Previous research has estimated nationalization via electoral vote shares and found significant state-level nationalization. We challenge the existing nationalization narrative by examining an alternative source of data – the political rhetoric used by mayors, state governors, and Members of Congress on Twitter. We analyze rhetoric in terms of partisanship and topic similarity. We find that gubernatorial rhetoric – but not mayoral rhetoric – closely matches that of Members of Congress. There are substantial differences in the topics and partisan content of mayoral speech. Our core finding is that the emphasis of mayoral speech is local; the office of the mayor has been more immune to the trends of nationalized politics.

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# 1 Introduction

At the heart of the republican ideal in the United States is the notion that elected officials properly represent those to whom they are electorally accountable. That is, elected officials in a well-functioning democratic setting are expected to articulate the preferences and desires of the governed. Numerous studies of democratic representation compare some measure of aggregate constituency preferences with some measure of elite behavior or outcomes (see, e.g., Esaiasson and Wlezien, 2016). Given the nature of American federalism, this implies that local officials should be concerned with representing and articulating the preferences of citizens at the local level while federal officials should be comparatively more concerned with national-level policies.

However, recent scholarship suggests that all levels of American politics have become increasingly nationalized. Thus, rather than being contested over local issues that are of importance to each respective constituency, all political campaigns are largely focused on national issues (Hopkins, 2018). What are the stakes of nationalized local politics? This focus on national politics often comes at the expense of local issues that are typically of greater importance to citizens; the nationalization of American elections has the potential to weaken the degree to which citizens are effectively represented by their governing officials. Evidence for such a nationalization effect has been found in U.S. House, Senate, and gubernatorial elections (Carson and Sievert, 2018; Sievert and McKee, 2018; Aleman and Kellam, 2008).

In this study, we examine the extent to which the nationalization of American politics has affected mayoral and gubernatorial representation. Presiding over the most local forms of government within the federal system and managing the government services with which citizens interact most frequently, both mayors and governors have substantial influence over the daily lives of their citizens. Accordingly, understanding whether these elected officials have shifted their focus toward national issues and away from the needs of their local con-

stituencies is of tremendous importance. To address this question, we depart from typical studies of nationalization by analyzing patterns of elite speech with respect to partisanship and topic similarity via the Twitter social media platform rather than election results. Adopting this measurement strategy allows us to both validate existing findings from the literature on the nationalization of American politics as well as to introduce new metrics that capture differences in the behavior of political elites themselves.

We collect a unique dataset of 404,049 tweets from U.S. mayors, 102,670 tweets from governors, and approximately 964,810 tweets from Members of Congress. To establish a baseline from which to compare the rhetoric of political actors, we also collect a corpus of tweets sent from an apolitical set of Twitter users: soccer players. We analyze this data both in terms of partisanship as well as topic similarity. In order to do so, we need to carefully construct measures of nationalization and partisanship, and also consider the problem of how to measure similarity across groups. Using these measures, we show that mayors are not completely immune to the trend of using more nationalized rhetoric, doing so more than apolitical Twitter users. However, we further show that the degree of nationalization in their communication is relatively small; mayors – regardless of party – talk about qualitatively different subjects than their co-partisans in Congress. Governors, by contrast, are more rhetorically in line with Members of Congress. Mayoral offices focus on predominantly local issues. Such a finding complements work suggesting that the polarization and partisan antipathy that is pervasive within the context of national politics is largely absent at the most local levels of government (Jensen et al., 2019). We also present results that indicate that the degree to which mayors discuss national issues rather than local issues is dependent upon the size of the city over which they govern (consistent with their exposure to national trends) and the number of years they have been in office (consistent with their ability to ignore national pressures). As the population size of a city increases, mayors are more likely to engage in nationalized political rhetoric. More time spent in office, on the other hand,

is associated with lower amounts of nationalized rhetoric. These results are robust to the inclusion of individual mayoral traits and political preferences.

This paper proceeds as follows. First, we characterize recent work on the nationalization of American elections and develop a theory linking governors and mayors to nationalized behavior manifested through elite speech. Next, we present a novel series of results based on tweet analyses suggesting that while gubernatorial rhetoric resembles the type of speech typically found among national politicians, American mayors are less partisan and less nationalized than their Congressional counterparts. We proceed to show how mayors' comparatively lower levels of nationalized rhetoric vary as a function of individual mayor- and city-level covariates. Finally, we conclude with a discussion about the implications of our results for democratic governance.

## 2 Elections, Accountability, and Nationalization

While canonical models suggest that voters make rational decisions about candidates within each electoral context (see, e.g., Downs, 1957), recent evidence suggests that American political behavior has become increasingly nationalized (Hopkins, 2018; Abramowitz and Webster, 2016). Nationalization, as typically conceptualized by the literature, conventionally refers to one of two things. In one case, nationalization refers to the process whereby voters judge politicians – regardless of the electoral level – by their evaluations of the national parties. In the second case, nationalization occurs when state and local elections are largely fought over national (largely symbolic) issues. Among other causes, these two different forms of nationalization are thought to occur when parties offer similar candidates across electoral levels or the media market changes in a way that prioritizes national over local news (Hopkins, 2018; Martin and McCrain, 2019). To the extent that this nationalization phenomenon causes state and local officials to prioritize national interests and the concerns of ideologically-motivated

donor bases to the exclusion of the local citizenry's needs, as Hopkins (2018) suggests, the nationalization of American politics has the potential to drastically alter the relationship between citizens and their elected officials at the local level.

The existing literature on the growing nationalization of American politics has largely focused on U.S. House and Senate elections (see, e.g., Carson and Sievert, 2018; Aleman and Kellam, 2008).[1] Jacobson (2015), for instance, notes that the incumbency advantage in American politics, long seen as the source of high re-election rates across the country, has been declining over time, and the explanatory power of partisanship in predicting election outcomes for House elections has increased tremendously. Such a shift indicates that Americans today care less about the specific person who represents them and more about the partisan balance of power in Congress. This implies that, unlike in earlier eras, it is increasingly difficult for politicians to court the "personal vote" in their districts (Mayhew, 1974; Fenno, 1978).

Outside of federal elections, scholars have focused almost entirely on how the nationalization of American politics has affected gubernatorial elections.[2] Hopkins (2018) shows that the state-level correlation between voting for the Democratic presidential candidate and the Democratic gubernatorial candidate has increased considerably over time. Nearly thirty years ago, the correlation between voting patterns at these two electoral levels was a moderately strong .61. By 2010, the correlation had strengthened to just under .9. A similar relationship exists between the percentage of the two-party vote accruing to the Democratic presidential candidate and the percentage of the votes received by the Democratic guberna-

[1] Two notable examples are Hopkins and Schickler (2016) and Hopkins (2008). The former analysis focuses on the nationalization of state party platforms, while the latter examines the nature of urban policy agendas.

[2] One notable exception is Fouirnaies and Hall (2018), who study the electoral incentives of state legislators. They find that state legislators are responsive to their constituencies – a finding which runs counter to the phenomenon of the nationalization of American elections.

torial candidate (see also, Sievert and McKee, 2018).[3]

Mayors may be somewhat immune from these national trends: voters cast ballots in mayoral elections based upon retrospective local economic conditions, such as local unemployment, and this effect typically dwarfs the effect of national economic conditions (Hopkins and Pettingill, 2017). That voters are casting ballots for mayors in a way that does not necessarily channel national political trends suggests that mayoral representation may be based on local, not national, politics. Relevant for this project, moreover, they find that "[i]n cities with their own TV stations and newspapers, there is a robust relationship between city-level unemployment and the [electoral] performance of the incumbent mayor" (Hopkins and Pettingill, 2017). That information about local economic conditions changes political behavior, particularly relative to national economic conditions, suggests that mayoral politics remains more focused on local issues.

That the existing literature measures nationalization by examining the correlation between partisan vote shares at various levels of the federal electoral system is sensible as elections allow citizens to hold elected officials accountable for their actions in office (Ferejohn, 1986; Fearon, 1999; Fiorina, 1981), ensure proper representation (Verba, Schlozmann and Brady, 1995), and provide an avenue for expressive political participation (Hamlin and Jennings, 2011). Yet while this approach has been useful in establishing the rise of nationalized political competition, it necessarily focuses on *voter* behavior just as much – if not more – than *elite* behavior. Because we are interested here in the nationalized behavior of political elites, we need a measure that is less dependent upon the actions of the mass public. For this reason, we measure nationalization by examining the similarity in mayoral and gubernatorial speech with Members of Congress, captured via Twitter.

Why might politicians use social media? Using social media may provide policy benefits

[3]This relationship holds whether one examines gubernatorial elections that occur during midterm elections or concurrently with presidential elections.

to constituents (through sharing of information) as well as personal benefits to politicians (through self-promotion). We anticipate that governors and mayors will use social media when the benefits outweigh the costs – that social media usage is associated with a governor or mayor's electoral incentives and that governors and mayors will be strategic with their social media usage. A politician's social media content is a component of their strategic communication plan to engage with constituents as well as a broader audience. Importantly for our purposes, social media provides us with an opportunity to capture and record a component of this strategic communication plan.

That communication is a key component of strategic elite-level communication in modern politics has been shown by numerous scholars. One study, for instance, found that Republican officials tend to use veiled religious language that appeals to white evangelical Protestants. This "GOP Code" is designed to both signify a politician's in-group partisan membership and solidify the support of sympathetic voters (Calfano and Djupe, 2009). Additionally, research has shown that politicians are increasingly and deliberately engaging in speech that seeks to outrage and belittle the opposing political party and its supporters. This verbal strategy, which Grimmer (2013) refers to as "partisan taunting," is yet another way that political elites seek to signal their in-group membership to their supporters in the electorate. Speech, then, has been shown to be an important aspect of politicians' presentational style. We extend this logic by arguing that, if they are experiencing the forces of nationalization, mayors and governors should be using rhetoric and patterns of speech that are similar to their congressional counterparts. Moreover, if these more locally-focused offices are nationalized, mayors and governors should be discussing the same topics as their co-partisans in Congress.

While analyzing nationalization via elite speech on Twitter seems appealing, one potential problem with this approach is that citizens are not uniformly on Twitter. In fact, most citizens are not active on the social networking platform. Accordingly, it is possible

that mayors and governors are engaging in nationalized rhetoric but no one observes this. However, such a concern appears to be unfounded. Studies have shown that those individuals who are not on Twitter are nevertheless exposed to politicians' tweets via journalists' coverage of political affairs. Indeed, because journalists view tweets as newsworthy they oftentimes quote from politicians' tweets – or link directly to the tweet itself – when writing their articles (McGregor and Molyneux, 2018; Lawrence et al., 2014). Accordingly, it is possible for citizens who are not themselves users of Twitter to still come across tweets from their political representatives.

We expect governors to be engaging in rhetoric – and discussing topics – similar to their co-partisans in Congress. Such an expectation comports with the existing literature, which argues that governors have become nationalized along both of the dimensions described above. Indeed, governors are often evaluated by the electorate through the lens of national politics and gubernatorial elections are increasingly fought over national issues. In addition to changes in the media landscape, one potential reason to expect governors to engage in nationalized rhetoric is that governors often have ambitions for higher office. Governors frequently are candidates for President of the United States, and 17 presidents have previously held a state's governorship (Shapiro and Lawrence, 2015). Engaging in nationalized rhetoric, then, is a potential way for governors to engage with issues of broad importance and build their national brand in preparation for a presidential bid.

In addition to their tendency to harbor ambitions for higher office, we expect governors to use nationalized rhetoric due to the nature of intraparty federalism. As Hopkins (2018) notes, the demise of the patronage era made state political parties increasingly dependent upon national party organizations for money and support. Such a top-down organizational structure changes the incentive structure for both state parties and state-level politicians, forcing a more national focus over more a regional approach. Such a shift has been exacerbated by the end of the solidly Democratic south and the polarization of state legislatures,

two trends which have made state politics more similar to national political competition (Shor and McCarty, 2011; Hopkins, 2018).

There is less of an *ex ante* reason to assume that mayors engage in nationalized rhetoric. In fact, mayors may be qualitatively different than statewide and, in particular, national politicians. Mayoral partisanship may be associated with different issues than partisanship at a national level, and mayoral offices may be sufficiently local such that national partisanship does not affect voting nor decision-making (Adrian, 1952). Mayoral governments are focused on evaluating what can be built where, on public goods such as streets and sanitation, and on public safety (Oliver, 2012). Further, according to Gerber and Hopkins (2011), "the presence of Republican mayors in overwhelmingly Democratic cities – consider Rudolph Giuliani in New York or Richard Riordan in Los Angeles – provides a hint that partisanship may function differently at the local level." Additionally, mayoral elections do not necessarily occur at the same time as national campaigns, and thus may not benefit from the media market trends that align gubernatorial campaigns with national issues.

Nevertheless, there are compelling pieces of evidence to indicate that mayoral representation can and does align with national political agendas. Indeed, mayoral fiscal preferences are known to align with their partisan labels (Einstein and Glick, 2018), and partisan control of local government is predictive of local government spending at both the county level (Percival, Johnson and Neiman, 2009; Choi et al., 2010; de Benedictis-Kessner and Warshaw, 2018; Ybarra and Krebs, 2010) and the mayoral level (Tausanovitch and Warshaw, 2014; Einstein and Kogan, 2015; de Benedictis-Kessner and Warshaw, 2016, 2018).[4]

Accordingly, understanding whether mayors engage in nationalized rhetoric and the situations under which they do so are important – and unanswered – questions. We theorize that mayors' representational style is distinct from congressional representation, and more-

[4]Earlier work did not necessarily support this finding (Ferreira and Gyourko, 2009; Gerber and Hopkins, 2011).

over that we will be able to evaluate these differences in representational style via elite speech on Twitter.[5] However, we also expect that a mayor's likelihood of engaging in nationalized rhetoric will vary based off of certain mayoral and city-level covariates. It is possible that mayors who represent cities with a strong partisan tilt will be more likely to use nationalized political rhetoric, which is in accordance with Grimmer's (2013) theory of polarized elite rhetoric. Moreover, in line with the approach in de Benedictis-Kessner and Warshaw (2018), we also expect that mayors' use of nationalized rhetoric will depend upon the institutional and population features of their city. We expect mayors to be more nationalized in their rhetoric when their city employs a city manager, as city managers engage in more of the apolitical day-to-day activities of running a city. Freed from the requirements of such activities, mayors whose city employs a city manager should have more time to engage in nationalized political rhetoric. Finally, we expect the degree to which mayors engage in nationalized rhetoric to be increasing in the size of their city's population. As a city's population increases each individual becomes less likely to have any form of personal engagement with the mayor's office. As a result, mayors will have less of an incentive to discuss local and personal issues and will have a greater opportunity to focus on national issues.

# 3 Twitter Data

We collected Twitter data for mayors, governors, members of the House of Representatives, and English Premier League Soccer Players to examine the extent to which the nationaliza-

[5]It is now well-established that text analytics can contribute to quantifying and measuring some important characteristics of political speech, for example partisanship (Lin, Xing and Hauptmann, 2008; Grimmer and Stewart, 2013; Gentzkow and Shapiro, 2010; Ahmed and Xing, 2010; Iyyer et al., 2014; Yan et al., 2019). These methods are often used to generate substantive conclusions. For example, Gentzkow, Shapiro and Taddy (2019) report that partisanship in Congress, measured as the ease of telling which party a speaker is from based on a fragment of text they generated, has been increasing in recent years.

tion of American politics has affected gubernatorial and mayoral behavior.

We collected the official Twitter handle for every mayor who is a member in the United States Conference of Mayors as of May 2018.[6] Though mayors are not uniformly on Twitter, we obtained Twitter handles for 587 mayors (42% of the mayors eligible for inclusion in our study).[7] We excluded all mayors who posted less than 100 tweets from our data, which left us with a sample of 372 mayors, 27% of all mayors in the National Council of Mayors. In late December 2018, we scraped the previous 3,200 tweets for each of these Twitter handles.[8] Our focus is on tweets that were posted by the user, so we excluded all re-tweets. This generated a total of 404,049 tweets from mayors. Full summary statistics of our mayoral data are shown in Table 1. Our aim is to compare mayoral rhetoric with more nationalized speech, so using an identical collection protocol we collected 102,670 tweets from 49 governors and 964,810 tweets from 475 Members of Congress.[9] Finally, to ensure we can compare this data to an apolitical group, we collect Twitter data from the English Premier League soccer players.

For mayors, we also collected individual-level attributes. This includes mayors' gender, racial identification, length of term in office, the percentage of the vote share they received in their most recent election, and each mayor's partisan affiliation.[10] In instances where

[6]The United States Conference of Mayors is the official non-partisan organization of cities with populations of at least 30,000. We chose this sample because we anticipated that mayors of medium to large-sized cities have access to Facebook and Twitter and possibly even staff to help monitor these accounts.

[7]We first collected official accounts, and if an official account was not available, we then used a campaign account.

[8]This is the maximum number of tweets we were allowed to get due to Twitter's API limit. We were able to get 200 tweets in each request. For each of our targeted politicians, we continued sending requests until we reached the 3,200 limit or their total tweet limit.

[9]The Governor of Alaska, Mike Dunleavy, has a private Twitter account which we were unable to scrape – we are otherwise able to collect all gubernatorial Twitter data.

[10]This data was obtained from a combination of mayors' campaign websites, newspaper biographies of the mayors or of the mayoral election, or it was inferred from the mayor's collection of endorsements or source of campaign funds. For example, mayors who received endorsements from prominent national Democrats

mayoral elections are conducted without party labels, mayors are classified as non-partisan. We also collected information on the institutional features of each city in our dataset.[11] To these individual- and institutional-level variables we added information on the demographic composition of each city.[12] A summary of the mayoral data can be seen in Table 1.

# 4 Quantifying text data

We consider two distinct strategies for text representation in this paper – first, to focus on words/phrases and second, to focus on topics. We rely on topic differences between the different sets of actors in our data – mayors, governors, Members of Congress, soccer players – to not only illuminate the different foci of these groups but also to illustrate the differences

were classified as a Democrat. On the other hand, mayors who received funding from conservative political action groups were classified as a Republican.

[11]This includes indicators for whether the city government operates with a mayor-council system or a council-manager system, as well as whether the city employs a city manager. In mayor-council systems, a city's mayor is elected separately from the city council and oftentimes acts as the city's chief executive officer. Council-manager systems, by contrast, select the city's mayor from within the city council. Under the council-manager system of local government, the mayor is comparatively weak and the day-to-day operations of the city are overseen by an appointed or elected city manager. Though all city-manager forms of government contain a city manager, city managers are also occasionally used in mayor-council systems.

[12]Using data from the most recent American Community Survey (ACS) estimates, we collected the mean age of residents of each city, as well as the percentage of male and female residents. We also collected information on the percentage of Black and Hispanic residents, as well as the percentage of individuals who own or rent their homes. We added to this data proxy measures of each city's election results for the 2016 presidential election. These estimates are constructed by using county-level presidential election returns that are weighted by the percentage of the city that is in each county. For example, because 93.3% of Atlanta, GA, is in Fulton County and 6.7% is in DeKalb County, the presidential vote share for Atlanta is a weighted average where the Fulton County vote shares receive a weight of .933 and the DeKalb County vote shares receive a weight of .067. For cities that are contained within only one county, the city's estimated presidential election results are the county-level results.

| Statistic | N | Mean | St. Dev. | Min | Max |
|---|---|---|---|---|---|
| White | 372 | 0.798 | 0.402 | 0 | 1 |
| Black | 372 | 0.118 | 0.323 | 0 | 1 |
| Hispanic | 372 | 0.059 | 0.236 | 0 | 1 |
| Male | 372 | 0.769 | 0.422 | 0 | 1 |
| Female | 372 | 0.231 | 0.422 | 0 | 1 |
| Republican | 372 | 0.390 | 0.488 | 0 | 1 |
| Democrat | 372 | 0.608 | 0.489 | 0 | 1 |
| Nonpartisan | 372 | 0.003 | 0.052 | 0 | 1 |
| Council-Manager | 372 | 0.470 | 0.500 | 0 | 1 |
| Mayor-Council | 372 | 0.546 | 0.499 | 0 | 1 |
| City Manager | 372 | 0.546 | 0.499 | 0 | 1 |
| Avg. Trump Vote Share | 372 | 43.041 | 14.551 | 8.706 | 82.514 |

Table 1: *Summary Statistics of Mayoral Data.* This table shows summary data for our mayoral data, conditional upon having an active Twitter handle.

within and between them. Our findings show that mayors are less similar to congressional representatives, for example, than governors.

**Word/phrase vector representation** Research over the last two decades in machine learning has established that simple representations of documents in terms of either presence or absence, or adjusted frequency, of terms in a given vocabulary can be coupled with regularized linear models to produce powerful out-of-sample predictions in both classification and regression settings. For our models, we first establish the vocabulary by splitting text into bigrams after stopword removal, tokenization, and lemmatization, and then using all bigrams[13] that appear at least in three different documents in the data. Once this is done, each document is represented by the TF-IDF (*term frequency inverse document frequency*) reweighting of how many times each bigram appears (the number of times that bigram appears in the document divided by the number of documents in which that bigram appears

[13]Bag-of-words feature only utilizes the frequency of words in documents. But it ignores the relative position information between adjacent words, which will be preserved in bag-of-bigrams features. Actually, Wang and Manning (2012) demonstrated that bag-of-bigrams feature improves the performance of classification models in multiple sentiment analysis tasks.

at least once). We use the generic term *document* to refer to a single instance depending on the unit of analysis (typically an individual's entire set of tweets).

**Topic representation** Topic models are typically generative models, where the text generating process is assumed to be that each document has a particular distribution over topics, and each topic has a distribution over words (note that the language of documents and words is again generic; in our case, documents are typically aggregated Twitter feeds and words are single words as opposed to bigrams, as in the word vector representation above). A document is generated by repeatedly first sampling a topic from its topic distribution, and then sampling a word from that topic's word distribution (note that this loses sequence information, but is consistent with the "bag of words" style of document modeling). We use latent Dirichlet allocation (LDA)[14] to learn topic models.[15] The LDA algorithm itself specifies and uses sparse Dirichlet priors over the topic and word distributions, and then learns the distributions, typically using either variational methods or Markov chain Monte

[14]Structural topic models (Roberts et al., 2013) have been widely applied in social science research problems. They incorporate covariates (e.g. time or author) of the source text data in topic models. However, we are using the representation in the topic space to create a useful measure of distance. In this case we do not want to allow the model to condition on these covariates since they may contribute to the distances. Therefore we use a standard LDA model, which only uses text data for training.

[15]There has been some debate in the literature about the appropriateness of training LDA for short texts, such as those found on Twitter. Some researchers have proposed different models that could be more appropriate in certain settings; for example, Zhao et al. (2011) propose a Twitter-LDA model based on the assumption that each tweet only belongs to exactly one topic. However, models like that require many topics in order to infer useful topic distributions. Since our main task is to use topic models to infer distances between individuals, we require a smaller number of topics, and preliminary analysis of tweets shows that they often cover multiple topics when the topic space is constrained to be smaller (e.g. veterans affairs and healthcare). Further, LDA has successfully been applied in numerous Twitter content and topic analysis tasks (Kang and Lerman, 2012; Vosecky, Leung and Ng, 2014; Kling and Pozdnoukhov, 2012). Therefore, we employ a standard LDA approach.

Carlo sampling techniques.

For both types of representations of our text, when using them for prediction, we use regularized logistic regression as our learning algorithm; while simple, this method (sometimes called "maximum entropy") has had tremendous success in text analytics. So, for example, we can view the machine learning problem of partisanship or ideological lean prediction as follows. Given a set of $n$ instances of the form $(\mathbf{x}_i, y_i)$, where $\mathbf{x}_i$ is the word vector or topic vector representation of the document, and $y_i$ is either the partisan label (0 for Democrat and 1 for Republican) or a real-valued variable (the first dimension of the DW-Nominate score), return a function $h(\mathbf{x})$. For the classification problem, we require $h$ to return a real number between 0 and 1 that can be interpreted as the probability of being a Republican. We use L2 regularized logistic regression in this case (thus $h$ is the maximizer of the sum of the log likelihood and an L2 penalty on the weights). Letting $\mathbf{w}$ be the weight vector representation of $h$, the objective function that is maximized is then $\ln \Pi_i \Pr(y_i|\mathbf{x}_i, \mathbf{w}) - \lambda \|\mathbf{w}\|_2^2$.

# 5 Empirical Analyses

Our main empirical strategy is to use quantifications of the text produced by different types of political actors in order to analyze how similar they are to reach other in terms of their Twitter rhetoric. Our first set of analyses focuses on measuring differences between these actors in topic space, while the second set leverages the ease or difficulty of predicting individual membership in a particular group as a measure of how similar two groups are.

## 5.1 Topic differences: Mayors, Governors, and Members of Congress

To understand the degree to which mayors engage in nationalized rhetoric, we analyze content differences between three different groups of politicians: mayors, governors, and Members of Congress. If mayors and Members of Congress post similar content, this suggests that

mayoral Twitter speech is more nationalized – that is, mayoral content is more addressed to issues of the United States as a whole and less specific to their constituents.

We start with a simple validity check on the plausibility of our hypotheses. We separately infer topic models using latent Dirichlet allocation (Blei, Ng and Jordan, 2003) on Members of Congress' tweets, governors' tweets, and mayors' tweets and visually inspect the words associated with all topics. We list some of these for illustration in Table 2.[16] We can see that, at least to a quick human inspection, the congressional twitter topics are more "national" than mayors'. Mayoral topics include terms such as "community, family, city, fire" and congressional topics include terms such as "bipartisan, american, economy, health." Gubernatorial topics more closely resemble those of Members of Congress.[17]

We now turn to a more systematic investigation of topic differences. In order to establish distances in topic space, we use the following methodology. We train 100 different topic models (seeded with different random numbers) to account for the instability (Koltcov, Koltsova and Nikolenko, 2014) of the LDA training process. Since some users post tweets with a higher frequency than others, training the LDA model on our dataset directly will bias the model towards active users.[18] Therefore, in each round, we first randomly sub-sample 100 tweets from each of the individual Members of Congress, governors, and mayors. We concatenate these 100 tweets into a single document for each individual and then train an LDA model and use it to calculate a topic distribution vector for each mayor, governor, and Member of Congress.[19] Next, we calculate the Jensen-Shannon divergence (Fuglede and Topsoe, 2004) between every pair of topic distribution vectors in our sample, representing

[16] Using 25 topics.

[17] Full word lists by topic are available in Table **??**, Table **??**, Table **??**, Table **??**, Table **??**, and Table **??**.

[18] Directly comparing documents of different lengths is still an evolving area of research (Hongyu Gong and Xiong, 2018).

[19] We use the *gensim* package for our LDA implementation (Řehůřek and Sojka, 2010). We use 25 topics (based on optimizing the cross-validated coherence score – see the appendix for more details). Each model is trained for 45 epochs. All other settings are the package defaults.

Table 2: Congress vs. Governor vs. Mayor tweet topics

| | Congress | Governor | Mayor |
|---|---|---|---|
| Rep | right, vote, health, senate, care, judge, democrat, court, voted, ... | thank, service, woman, veteran, men, honor, military, honored, grateful, ... | make, step, mile, fitbit, sure, better, community, job, help, ... |
| | spending, trade, federal, government, regulation, debt, role, rule, farmer, ... | tax, vote, cut, budget, property, get, income, illinois, just, ... | meeting, town, hall, fire, enjoyed, tonight, sterling, chamber, city, ... |
| | family, prayer, thought, victim, stand, attack, praying, lost, one, ... | state, flag, emergency, local, law, county, stay, storm, weather, ... | county, school, mayor, ribbon, student, cutting, center, today, state, ... |
| | business, small, honored, award, impact, receive, support, job, economic, ... | business, great, good, meeting, small, leader, news, economic, trade, ... | love, business, campaign, small, great, just, people, big, new, ... |
| | glad, opioid, drug, fight, combat, see, group, crisis, child, ... | texas, health, care, work, help, state, effort, role, human, ... | thanks, work, great, public, well, community, road, volunteer, congratulation, ... |
| Dem | work, make, gun, together, people, congress, get, can, need, ... | law, signed, bill, opioid, legislation, help, take, prevent, today, ... | new, park, opening, downtown, center, summer, grand, bike, project, ... |
| | health, care, access, million, affordable, american, insurance, coverage, healthcare, ... | new, stand, trump, president, fight, administration, woman, fighting, washington, ... | art, food, west, local, tree, festival, early, music, tell, ... |
| | bill, house, bipartisan, act, congress, senate, legislation, pas, floor, ... | health, care, access, education, insurance, get, coverage, early, affordable, ... | white, health, volunteer, care, plain, house, word, court, ticket, ... |
| | tax, cut, gop, american, republican, family, bill, middle, plan, ... | gun, violence, safety, domestic, must, delaware, letter, drilling, hand, ... | meeting, love, live, council, city, watch, power, talk, mayor, ... |
| | job, worker, american, economy, drug, company, cost, create, price, ... | justice, criminal, opening, full, show, reform, schedule, discussion, step, ... | police, family, fire, officer, friend, chief, life, thought, department, ... |

the differences in topics that show up in the content generated by two individuals in our sample. The Jensen-Shannon divergence is a symmetrized and smoothed version of the Kullback-Leibler divergence, and is commonly used to measure distances between probability distributions.

For each pair of individuals in our dataset, the mean value of these 100 different distances is then taken as the distance between their tweets in topic space. Figure 1 shows a histogram of these differences, within- and between- different groups (color-coded appropriately). We observe smaller differences within mayors (in green) and within Members of Congress (in

blue) than we do between mayors and Members of Congress (in red).[20] That the average distance is greatest between Members of Congress and mayors suggests that these groups are systematically focused on different topics. Importantly, we find that the distance between governors and Members of Congress is smaller than the distance between mayors and Members of Congress. Substantively, this indicates that governors are likely using more nationalized rhetoric than mayors.

While these results suggest that mayoral rhetoric is less nationalized than the rhetoric employed by governors and by Members of Congress, the distances in topic distributions between mayors, governors, and Members of Congress presented in Figure 1 do not allow us to claim that mayoral rhetoric is devoid of nationalized political rhetoric. It is useful to compare with a baseline group of Twitter users who could be considered generally apolitical. In order to do so, we compare the differences in topic distributions between English Premier League (EPL) soccer players and Members of Congress. [21] In order to verify that this group is actually apolitical, we collected all the hashtags in soccer players' tweets and checked the hashtags that occur more than 100 times in our dataset. None of them are directly related to any specific U.S. politicians or political events. The list of hashtags can be found in Appendix **??**.

The distance comparison between this apolitical group, mayors and Members of Congress is also shown in Figure 1. The soccer players are represented in the same topic space that is inferred without using them as part of the training data, allowing for an "apples to apples" comparison on the presumably political topic space. The topic distribution distance between

[20] Paired t-tests across each of these three pairs indicates these mean values are statistically distinguishable from each other using 95% confidence intervals. Two-sample Kolmogorov-Smirnov test results also indicate that these distributions are statistically distinguishable from each other using 95% confidence intervals.

[21] A recent report from Deloitte found that the English Premier League is the most lucrative and most watched soccer league in the world. The full report can be accessed here: https://www2.deloitte.com/uk/en/pages/sports-business-group/articles/annual-review-of-football-finance.html.

our apolitical group and Members of Congress (in purple) is the largest distance in topic distributions across all of our pairwise examinations. That the distance between soccer players and Members of Congress is greater than the distance between mayors and Members of Congress suggests that mayoral rhetoric does, in fact, exhibit a degree of nationalization – of course, as the mayoral group and the congressional group are both producing political speech. Yet again, note the ordering – the relative differences between the topic distances of our apolitical group and Members of Congress and mayors and Members of Congress suggests that mayoral rhetoric exhibits at most a modest amount of nationalization compared to governors and Members of Congress.

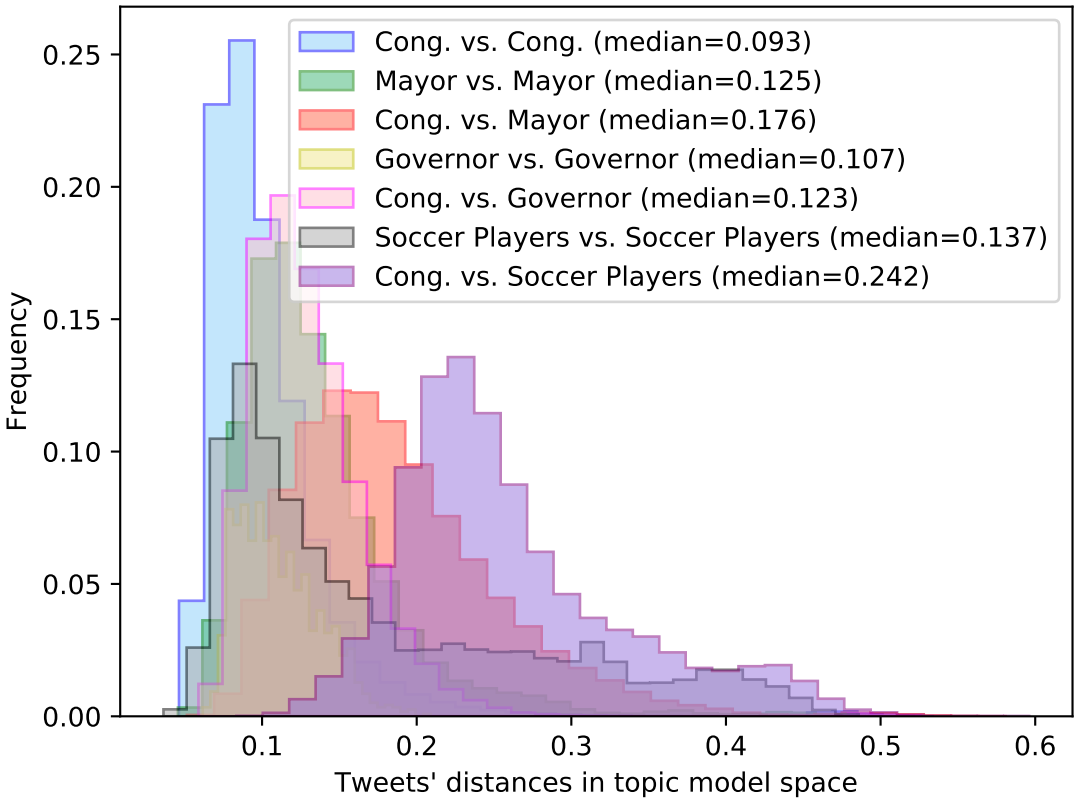


Figure 1: Histogram of topic distances.

To lend more credence to the idea that mayors and Members of Congress use different

rhetoric, we employ a test that asks whether we can reliably distinguish mayors from Members of Congress based on their choices of topics about which to tweet. For each of the 100 rounds of the above LDA analyses, we ran a 5-fold cross-validation test using logistic regression trained on the (joint) topic distribution vectors, with the classification task being to distinguish between mayors and Members of Congress (labeled 0 and 1, respectively). Cross-validation operates by randomly permuting the data, separating it into $k$ (in our case $k = 5$) "folds" and then repeatedly training a classifier on $k - 1$ of the folds and testing on the remaining one. We find that the average area under the ROC curve (AUC) over the 100 rounds of analyses is $0.9848 \pm 0.0004$.[22] Thus, the results of this analysis show that mayors and Members of Congress are easily distinguishable from each other based solely on the distribution of topics about which they choose to tweet.

## 5.2 Variation in Nationalized Mayoral Rhetoric

While the preceding analyses suggest that gubernatorial rhetoric closely matches that of Members of Congress, mayors appear to be using a different rhetorical style. However, these results do not indicate that *all* mayors are similarly focused on local issues. In fact, it is possible that some mayors use language more similar to congressional and gubernatorial rhetoric than others. Examining the sources of variation in nationalized mayoral rhetoric is the task to which we now turn.

To more thoroughly examine the sources of variation in mayoral rhetoric, we created two measures that compare mayors to Members of Congress. First we computed partisanship

[22] AUC is generally considered a more reliable way to evaluate classifiers than accuracy because of potential calibration issues. Through this paper, we apply Delong's method to compute the standard deviation of the AUC (DeLong, DeLong and Clarke-Pearson, 1988). We use the package provided by the Yandex School of Data Analysis, which implements a fast version of Delong's method proposed by Sun and Xu (2014). Documentation is available at https://github.com/yandexdataschool/roc_comparison.

scores for each mayor (which can itself be done in two different ways); and, second, we measured the similarity of mayors to Members of Congress. These two measures, which we used to examine variation in nationalized mayoral rhetoric, are described below. In each case, "individual" refers to a mayor or a Member of Congress, and "document" refers to the entire collected sample of an individual's tweets.

**1. Partisanship scores** We computed partisanship scores on top of the word vector representations of each document, one representing each individual.

- **Mayor-internal partisanship (MIP) score**. We used leave-one-out-cross validation on the dataset of partisan mayors and their tweets in order to predict the partisanship of an individual mayor. That is, to compute the MIP score of mayor $i$, we trained a logistic regression on the tweet documents of each mayor other than $i$, labeled by their partisanship. We then predicted the partisanship (probability of being a Republican) of mayor $i$ using the logistic regression model trained on the tweets of all other mayors.
- **Congress-to-Mayor partisanship (CMP) score**. In this case we trained a single regression model of partisanship solely on the tweet documents of each Member of Congress, labeled by the first dimension of their DW-Nominate score. We directly applied this model to each mayor $i$ to derive their CMP score.

**2. Congressional similarity (CS) score** The CS score is built on top of the topic vector representation. An LDA model is trained on the union of congressional and mayoral tweet documents, and each document is then represented by its distribution over topics. Each document is labeled as either "Member of Congress" or "Mayor" (rather than by partisanship). Then, for each mayor $i$, we trained a logistic regression classifier based on the documents corresponding to all other mayors (labeled as 0) and Members of Congress (labeled as 1). We then predicted the probability that mayor $i$ is a Member of Congress

using this leave-one-out model, and consider that prediction the CS score.[23]

## 5.3 Partisanship: Mayors vs Congress

To begin our examination of the variation of the degree to which mayors resemble Members of Congress we analyzed partisanship expression in mayoral tweets. First, we investigated whether it is possible to correctly predict (out-of-sample) the party of a mayor based on their tweets. Restricting ourselves to mayors, we ran a 5-fold cross-validation model on the word vector representation with party identification as the target. The AUC is $0.7330 \pm 0.0256$. To calibrate that number, we replicated this process using congressional tweets and found an AUC of $0.9938 \pm 0.0027$. Thus, it appears that mayors express substantially less partisanship in their tweets relative to Members of Congress. This is not to suggest that the expression of partisanship is completely absent from mayors. However, our results suggest that mayoral partisanship is significantly harder to distinguish based on language used on social media than congressional partisanship.

It is possible that it is harder to distinguish language that is informative of partisanship from mayoral tweets in part because the identification and use of language is less disciplined and, hence, noisier. There is evidence that partisan language moves from Members of Congress to the media (Yan et al., 2019) and can be used to assess the bias of media sources (Gentzkow and Shapiro, 2010) as well as to quantify changes in polarization over

[23]The following mayoral twitter ids have topic distributions most similar to Members of Congress: patownhall, joshfryday, mayorcorymason, mike_spence, andrewgillum. Andrew Gillum was the mayor of Tallahassee, Florida, and was the Democratic candidate for Governor of Florida in 2018. As a candidate in a race that received significant national attention, Gillum's Twitter account frequently mentioned national issues and politicians including President Trump. Those who are most different include: clvhtsgov, mayorhoye, mayornoak, bethlehemmayor, votemike4mayor. This includes Smith Joseph, mayor of North Miami, Florida, and Manuel Lozano, mayor of Baldwin Park, California. These accounts largely focus on local issues and events, such as community back to school fairs and announcements about the retirement of city fire officials.

time (Gentzkow, Shapiro and Taddy, 2019). Similar phenomena might occur in social media, so we investigated the possibility of classifying mayoral partisanship using *congressional* language. We first trained a linear regression model on the Twitter records of Members of Congress, with the target being the first dimension of their DW-Nominate score. We then used this model to estimate mayors' partisanship using AUC (which relies only on relative ranking, another advantage over accuracy). The AUC on the mayoral data is $0.7796 \pm 0.0250$, which is better than the above 5-fold cross-validation experiment with mayors' tweets. We call these scores the Congress-to-Mayor partisanship (CMP) scores. This is suggestive that the nationalization of parties may be driving the increase in partisan speech.

We regressed mayors' partisanship scores based on the above cross domain analyses and leave-one-out cross-validation scores; this regression is shown graphically in Figure 2. While the scores are clearly associated with each other, we rely upon the CMP scores in our next analysis.

We theorize that the mayors who discuss more similar topics to Members of Congress are more likely to be classified as partisan via the CMP score (that is, when using the congressional partisan language). To test this expectation, we created a measure of each mayor's partisanship level. Suppose mayor $i$'s CMP partisanship score is $m_i$. Their partisanship level $pm_i$ based upon the $k$ co-partisan mayors is defined as:

$$pm_i = |m_i - \text{median}(m_k)|$$

After creating this partisanship level measure for each mayor in our dataset, we regressed $pm_i$ against our congressional similarity (CS) scores. The plot of this relationship is shown in Figure 3. For mayoral tweets, there is a significant correlation between the topic similarities with congressional tweets and partisanship level. The results of this section, taken together, indicate that there is a significant correlation between expressions of partisanship – measured

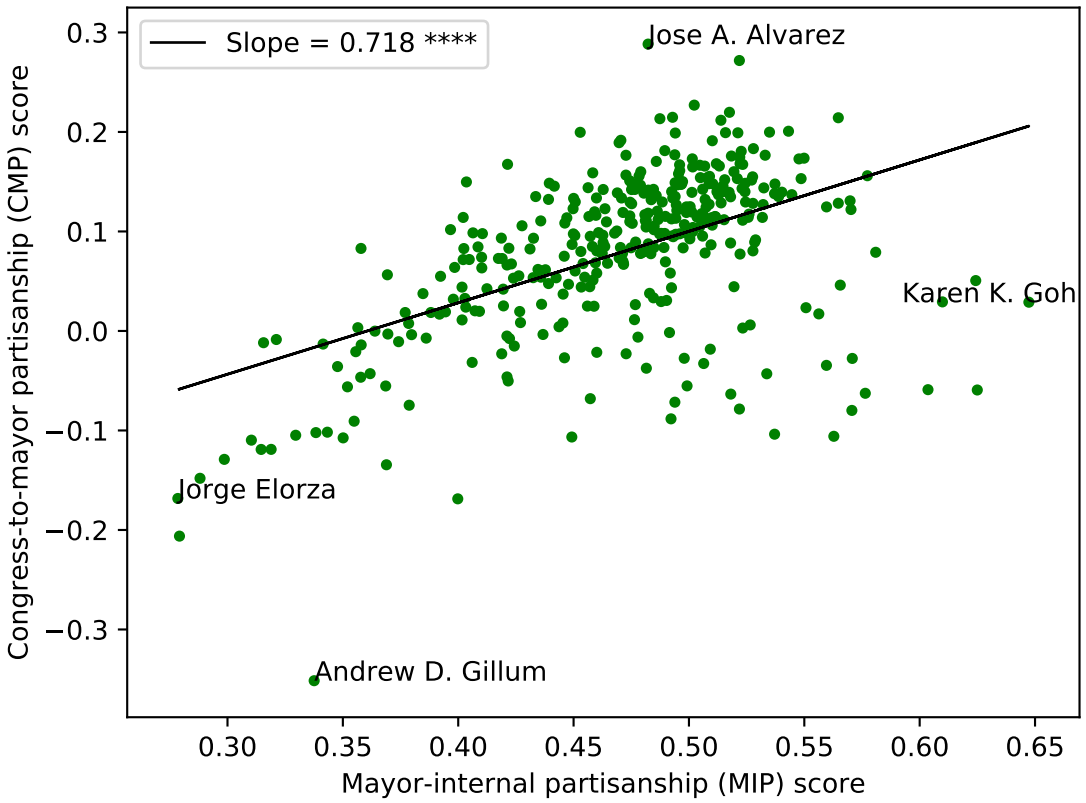


Figure 2: Congress-to-mayor partisanship (CMP) score vs Mayoral-internal partisanship (MIP) score.

by the ease of predicting, based on tweets, whether a mayor belongs to the Republican or Democratic Party – and the choice of topics or issues one focuses on. We next turn to an analysis of the factors that are associated with higher or lower levels of nationalized mayoral rhetoric.

## 5.4 Association between congressional similarity and covariates

The preceding analyses suggest that the nationalization of American politics has yet to reach the mayoral level. However, as we have just demonstrated, the absence of nationalized rhetoric at the mayoral level is not uniform. Indeed, based on our results, some mayors are

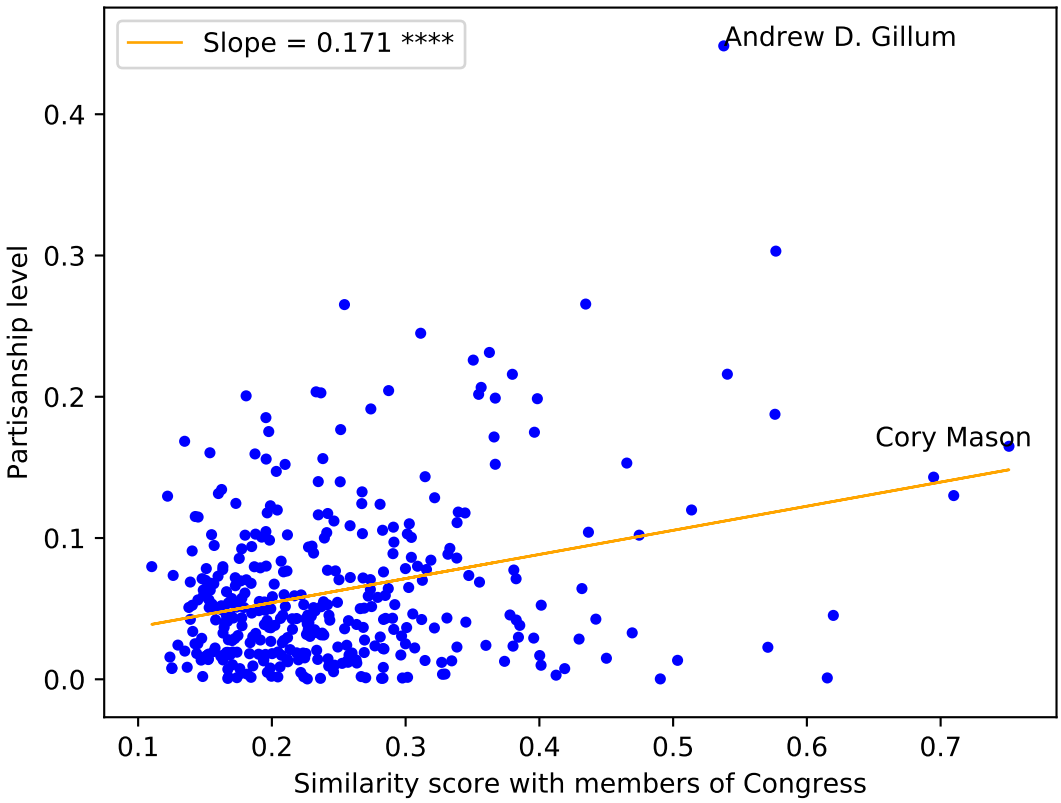


Figure 3: Mayoral congressional similarity scores vs. partisanship level.

likely engaged in nationalized rhetoric at the expense of a more locally-focused representational style. To begin to understand the sources of variation in mayoral rhetoric, we looked for associations between covariates collected about mayors, their institutions, and the constituents they represent and the classification of mayors vs Members of Congress using topic vectors (the congressional similarity score) or mayoral partisanship level (the difference from the mean congress-to-mayor partisanship score for co-partisans). Though these relationships are not necessarily causal in nature, they nevertheless will help us to better understand the sources of variation in nationalized mayoral rhetoric.

To reiterate our theory from Section 2, we expect more nationalized rhetoric from mayors who have had larger margins of victory or served longer terms in office. We also expect

more nationalized rhetoric from mayors who represent larger cities. Finally, we expect more nationalized rhetoric from mayors who are less-involved in the day-to-day operations of their municipality – those who serve under a council mayor system or have city managers.

We use our similarity to Congress as a metric of nationalized rhetoric. The greater the similarity to Congress, the greater the likelihood that the mayor has adopted nationalized political speech. We regressed this similarity measure on indicator variables for institutions (city manager, mayor-council system, etc.), the total number of years the mayor has served in office, the city population (re-scaled in units of 100,000), and the vote share won by the mayor in the previous election.[24] We present models with and without additional covariates – we can also control for mayoral race, gender, party, and Democratic vote share in the 2016 election – in Table 3.

Contrary to our theoretical expectation, we find that the number of years a mayor has served in office is negatively associated with nationalized rhetoric. This suggests that longer-serving mayors are more focused on their citizens' local needs than their counterparts who have less experience in office. Additionally, we find a positive relationship between our city population variable and nationalized rhetoric. This indicates that, as city population increases, the similarity of mayoral speech more closely mirrors that of a congressional representative. This lends support to our theoretical expectation that, because citizens of larger cities are less likely to experience any form of personal contact with their mayor, mayors can adopt a more nationalized representational style. We find no statistically significant relationships between employing a city manager or operating under a council-manager system and nationalized rhetoric.

While the results in this table should be interpreted with caution, as we are limited

[24]In cases where a city's mayor is appointed to the position by the city council, we treat the mayor's vote share in the previous election as the percentage of the vote they received in their most recent election to the city council.

to a small set of mayors, it is encouraging that we observe similar results when including additional controls for race, gender, party and Democratic vote share in the 2016 election in the second column of Table 3. Within this set of variables, the only meaningful associations are between gender, partisanship, and congressional similarity.

Table 3: Coefficients for Congressional Similarity

| Covariates | Coefficients | Coefficients |
|---|---|---|
| Years in office | -.003* | -.003* |
| | (.001) | (.001) |
| City population | .008* | .007* |
| | (.002) | (.002) |
| Previous vote share | -.00 | -.00 |
| | (.00) | (.00) |
| Council-Manager System | -.036 | -.029 |
| | (.019) | (.019) |
| City Manager | .026 | .027 |
| | (.019) | (.019) |
| Democratic Pres Share 2016 | | .00 |
| | | (.00) |
| White | | .006 |
| | | (.013) |
| Male | | .039* |
| | | (.012) |
| Republican | | -.024* |
| | | (.011) |
| Constant | .261* | .213* |
| | (.019) | (.031) |
| N | 361 | 360 |
| R2 | .081 | .126 |

# 6 Conclusion & Discussion

Among the deleterious consequences of the nationalization of American politics is the concern that elites' focus on national issues comes at the expense of attending to more pressing, locally-based problems. The results we have presented suggest that, while there is variation,

mayors have largely remained focused on local issues and use more apolitical speech than governors and Members of Congress. The degree to which citizens' preferences and needs are represented by their elected officials is an important barometer of the health of a democratic society. In the case of the United States, which has experienced a considerable amount of political nationalization over the past few decades (Hopkins, 2018), this metric has trended in a negative direction at the federal and gubernatorial levels. However, our analyses suggest that there is room for optimism about the vibrancy of representation provided by mayors. Unlike elected officials at other levels of government, the average American mayor currently appears to be unaffected by the nationalization of American politics. On the contrary, mayoral rhetoric tends to remain focused on the needs and concerns of the local citizenry. This finding persists even when controlling for a multitude of mayoral- and city-level covariates.

However, our results also suggest that mayors do not uniformly focus on local issues. Nationalized mayoral rhetoric is more likely to occur among mayors who govern cities with a large population. Such a finding likely arises because a large municipal population diminishes the likelihood that any citizen has a personal experience or point of contact with her mayor. As a result, mayors are freer to engage in national rhetoric and abjure local issues. Though plausible, such an explanation is only one potential reason that we observe a relationship between city size and nationalized mayoral rhetoric. Future work should more thoroughly examine the mechanism linking a city's population to mayoral representational style.

One final concern pertains to the durability of these results. The nationalization of American elections did not suddenly develop and alter congressional and gubernatorial behavior. In reality, the nationalization of American elections has been a secular process that has resulted from the complex interplay of ideological realignment, partisan sorting, and a changing media environment. Whether these trends in nationalization will eventually affect mayors, or whether Americans' most immediate chief executives will remain focused on their local mandate, is a question that can only be answered in time.

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