Demolition and Discontent
Governing the Authoritarian City

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Abstract

Recent research has robustly demonstrated that the presence of large cities increases the probability of authoritarian breakdown, but has offered little empirical insight as to why cities are dangerous beyond noting the concentration of social movements and protest in urban areas. In this paper, I develop a theory of cities as complex socio-political spaces that are difficult to govern, particularly in the absence of democratic institutions. This complexity makes both cooptation and coercion difficult, meaning the very tactics that authoritarian cities use to control discontent may in fact become its proximate cause. Using a large, city-financed housing project in Moscow targeted at rewarding regime supporters, I demonstrate that even a spatially targeted patronage project was unable to avoid unintended side effects, resulting in a surprising defeat for the regime in a subsequent municipal election. My results suggest that treating cities as simple agglomerations distinct from rural areas obscures important dynamics in the development of opposition to authoritarian rule, particularly as resistance becomes a largely urban phenomenon.

A growing body of research suggests that authoritarian durability relies heavily on cooperation and control at lower levels of government. Local governments play a critical role in coopting citizens, targeting the opposition, turning out and coercing voters, and distributing patronage to regime elites.(Magaloni, 2006; Reuter and Robertson, 2014; Landry, 2008). For these reasons, establishing and maintaining the loyalty of effective subnational political machines is a critical part of authoritarian consolidation (Saikkonen, 2016b,a; Reuter et al., 2016).

In particular, urban contentious and electoral dynamics play an important part in authoritarian survival. Increasingly, the urban middle class drives protest and electoral opposition in authoritarian regimes. Opposition gains in local and municipal elections disrupt patronage networks, establish programmatic ties to voters, and create effective political bases for opposition to compete against authoritarian incumbents nationally (Lucardi, 2016; Magaloni, 2006). Urban contention forces incumbents to acknowledge electoral defeat, challenges electoral fraud, ties opposition actors to citizens, and creates effective mobilizing structures. In the more dramatic cases, urban mobilization even brings down the regime itself (Bunce and Wolchik, 2011). In cases as diverse as Tunisia and Serbia, urban protest, subnational and municipal electoral defeats, or both preceded the fall of seemingly durable authoritarian regimes (Bunce and Wolchik, 2011; Beissinger, Jamal and Mazur, 2015).

However, while it is evident that urban political dynamics pose serious risks to authoritarian rule, little is known about how these risks develop. While a substantial body of work focuses on the relationship between national-level political and economic factors and authoritarian durability, politics at the municipal level are largely ignored, with opposition at the ballot boxes or on the streets simply assumed to occur inevitably and organically within cities. While we know that large authoritarian cities are often hotbeds of opposition activity, we lack a clear theory as to how, when, and why they become dangerous (Wallace, 2013, 2014). Using data from a housing project and municipal elections in Moscow, I demonstrate that large cities are risky for authoritarian regimes because their socio-political

diversity and density leads to unanticipated responses to cooptation, turning the very tools authoritarians use to attempt to prevent urban dissent into a proximate cause of potentially dangerous mobilization.

I begin by arguing that while the literature on authoritarianism has established that controlling subnational threats is critical to authoritarian survival, it treats urban politics as a black box, obscuring the factors that drive citizens to oppose authoritarianism at the local level. I draw on insights in the urban sociology and political geography literature to argue that cities must be understood as complex political ecologies, where variations in the distribution of social groups and political stimuli create an illegible and complex social terrain. This makes authoritarian governance of urban space difficult, raising the potential for collective contentious or electoral action due to unexpected responses to even well-targeted cooptation or coercion. I will then discuss the appropriateness of my case selection, empirical strategy, and hypotheses. I will close with presentation of results, which confirm that the urban socio-political environment creates a high risk that authoritarians' attempts to maintain social peace can instead be the proximate cause of serious challenges to authoritarian control of urban space.

This work makes substantive, methodological, and theoretical contributions to the study of authoritarianism and urban politics. Theoretically, I provide evidence of a mechanism linking large cities to authoritarian failure, demonstrating that the typical tools of coercion and cooptation carry high risks when applied to the complex social environment of the city. Methodologically, I use a Bayesian semi-parametric model capable of identifying context-driven heterogeneity in effects without researcher specification searches, demonstrating the broader utility of Bayesian semi-parametrics to social scientists grappling with effect heterogeneity. Substantively, I explain a surprising defeat for Russia's seemingly powerful regime party in its largest city.

Subnational Authoritarian Politics and Regime Survival

While a robust literature exists on the role of subnational politics in maintaining national authoritarian rule, it largely treats dynamics at the urban level as a "black box", assuming that protest and opposition voting are simply endemic to cities rather then phenomena that themselves require explanation. In particular, cross-national statistical studies have established that large cities significantly reduce the duration of authoritarian regimes, but have not clearly established any mechanisms to explain this effect (Wallace, 2013, 2014). Little consideration is given to how and when cities become dangerous to authoritarian rule. Given that even weak regimes rarely fall without some actor providing the push, ignoring how challenges to authoritarian rule develop in urban environments significantly reduces our ability to understand why and when authoritarian regimes fail (Bunce and Wolchik, 2011).

In the urban threat literature, cities, particularly the large capital cities that are common in authoritarian regimes, are tinderboxes of potential collective action (Wallace, 2013). As cities get larger, discontent becomes more dangerous; densely-populated, large cities lower the barriers to collective action and have the potential to make contention more destabilizing and threatening to state actors. In addition, large protests in cities are more likely to create a national "tipping point" phenomenon in which citizens' public alignments rapidly and dramatically change in response to perceived decrease in the costs of public opposition (Kuran, 1991). As Wallace (2013) details, having a capital city of over 5 million residents is robustly associated with increased hazard of regime failure. Facing this potential threat, authoritarian regimes often choose to redistribute economic resources from the countryside to their large cities in an attempt to forestall the short-term threat of collective action, ultimately increasing the concentration of their population in a few urban centers and correspondingly increasing the threat of longer-run regime failure (Wallace, 2013; Ades and Glaeser, 1995; Bates, 2014). Wallace (2013) refers to this as the "Faustian bargain" - authoritarians' cooptation of the cities decreases immediate risk at the expense of future risk.

While this literature is generally assumed to apply to contentious politics, it also ra-

tionally applies to electoral threats in electoral authoritarian regimes. Bunce and Wolchik (2011)'s study of electoral authoritarianism in post-communist countries note that in all but one of their cases of authoritarian incumbent defeat, opposition victories in local elections preceded the critical national elections. The paradigmatic case is Serbia, in which the government's initial refusal to certify opposition victories in Belgrade's municipal elections created a large contentious surge. The organizational infrastructure of these protests later proved critical in defeating Milošević at the national level (Bunce and Wolchik, 2011; Levitsky and Way, 2010). Large cities can be expected to lower the cost of electoral campaigns in much the same way as they reduce the difficulty of solving the contentious collective action problem.

Failure to contain local electoral threats has played a significant role in the collapse of many other authoritarian regimes. Lucardi (2016) argues that opposition victories in local elections in Mexico hampered the operation of PRI patronage and electoral machines, lowered the perceived cost of defection from the PRI, and created programmatic ties to voters that could be later mobilized at the national level. Much as in Mexico, local electoral victories in Romania, Serbia, Georgia, Croatia, and Slovakia directly contributed to the collapse of national authoritarian regimes. Victory in local elections allowed opposition actors to coordinate, form cohesive fronts, and create mobilizing organizational structures in an otherwise hostile electoral environment (Bunce and Wolchik, 2011; Levitsky and Way, 2010). Simultaneously, it deprived authoritarian leaders of critical organizational resources for monitoring citizens, manipulating elections, and suppressing opposition. It is clear that failure to maintain local control presents a real danger to the survival of authoritarian rule, disrupting authoritarian power verticals and giving opposition actors critical electoral and physical resources. While these cases include losses in both rural and urban elections, the concentration of resources and citizens in cities makes electoral gains there more advantageous to the opposition and correspondingly more dangerous to authoritarian regimes.

The existing literature makes it clear that firm control of subnational politics, and urban

politics in particular, is fundamental to authoritarian survival. However, very little of this literature considers urban politics specifically, instead focusing on the interaction of local and national politics (Rosenfeld, 2018; Reuter et al., 2016), the national consequences of specific urban movements (Levitsky and Way, 2010; Bunce and Wolchik, 2011), or the generalized threat large cities present to long-term authoritarian survival (Wallace, 2013). The literature lacks a theory of why and how cities are such fertile ground for destabilizing political events in authoritarian regimes, largely because it rarely considers cities as a social and political phenomena rather than a simple geographical category.

A Theory of Cities as Complex Spaces

To begin unpacking the urban threat, it is necessary to conceptualize cities as a specific political space. Leveraging work in urban sociology and political geography, I argue that the urban threat originates in the socio-spatial complexity of cities. The uneven distribution of heterogeneous populations throughout urban space makes authoritarian control and policy-making difficult, particularly in the absence of functioning democratic institutions capable of providing accurate information on preferences. The density, complexity, and heterogeneity of cities makes appropriately targeting the cooptation associated with urban bias difficult, making the very policy actions intended to buy peace in the cities potentially destabilizing. Unintended consequences, interacting with the complex socio-political terrain of the city, have the potential to create enduring mobilization, brokerage, and/or conflict, with potentially regime-destabilizing effects.

The idea of cities as complex social spaces has a long history in urban sociology, beginning with Wirth (1938)'s seminal work "Urbanism as a Way of Life." Wirth argues that three distinct characteristics of cities create patterns of social behavior via the structure they impose on human interaction: population size, population density, and heterogeneity.The heterogeneity and density of the city leads to more rarified, complex social interactions and

a corresponding system of social stratification. Labor within the city is generally highly-differentiated, and the number of people from different classes and ethnicities an urban-dweller comes into contact with is orders of magnitude higher than their rural counterparts. This more varied life leads to a proliferation of different voluntary associations, from social groups to political interest groups. This in turn makes urban governance more difficult than rural governance, with cities forced to grapple with a bewildering array of interests and groups.

While Wirth considers only one elementary spatial variable (population density), work in urban sociology and political geography has elaborated on Wirth's idea of socio-spatial patterning and the complex effects it has on political behavior. Sampson (2012), through an in-depth study of Chicago, identifies the contribution of the surrounding socio-political context to the complexity of urban governance. Sampson finds generation-spanning contextual effects across neighborhoods that pattern residents collective efficacy, electoral and contentious mobilization, ability to advocate for community needs and secure resources, ties to government elites, and a vast number of other social and political outcomes. These effects are not simply a function of the social profiles of neighborhood residents; even statistically similar neighborhoods demonstrate vastly different outcomes due to the mediating effect of the surrounding context. Individuals of a certain social profile are certainly more likely to organize, protest, and lobby than others, but the community appears to play a large role in their decisions and ability to actually do so. Since these contextual effects emerge from a dense network of largely invisible and difficult to quantify social ties and interactions, the city government of Chicago cannot simply read them off a map of socio-economic fundamentals and tailor their policies accordingly. The city government always faces the possibility that the complexity of the city will produce unpredictable responses to even carefully crafted policy.

These contextual effects have been particularly well demonstrated in the context of elections. The study of electoral neighborhood effects begins with Cox (1971), who argues that

urban voting must be understood as a complex "urban voting surface". It is well understood by political scientists and political geographers alike that certain social fundamentals pattern voting in predictable ways; gender, ethnicity, and class are all known to be potent predictors of vote choice. Cox further nuances this understanding by arguing that the spatial distribution of both social groups and political stimuli mediates the effects of these social fundamentals. Repeated research has robustly demonstrated the existence of these contextual effects on electoral behavior (Pattie and Johnston, 2000; Johnston et al., 2004).While contextual effects of course exist in rural as well as urban areas, it is no accident that Sampson (2012) and Cox (1971) focus on urban areas; the more varied spatial terrain of the city combined with its increased density bring people into closer contact with their neighbors, and those neighbors are likely considerably more varied on social characteristics than typical in rural areas. This leads contextual effects in cities, on balance, to be both more intense, more complex, and harder to predict.

While Sampson (2012), Cox (1971), and most urban sociology focuses on democracies, there is no reason to expect their insights to not apply in the authoritarian context. Indeed, the complexity of cities should be expected to be higher in most authoritarian regimes; authoritarianism induces heavier concentration in a smaller number of urban centers relative to democracies (Wallace, 2013, 2014). The effect of local context on collective action may also be expected to be larger and more complex; whereas the costs of collective action are generally low in democracies, the high cost of organizing in authoritarian regimes necessitates a larger and more robust community capable of sustaining that cost. Likewise, as electoral authoritarian regimes become more common, we should expect the socio-spatial complexity of the city to play role in elections as well. While vote choice is constrained, sometimes severely, in electoral authoritarian regimes, the fact remains that it exists. We have no reasons to doubt that the complex social context of the city plays a role in that choice.

Combining these streams of literature, it is clear that cities are a unique phenomenon where social complexity, space, and the state intersect. This makes them qualitatively dif-

ferent from rural areas, where social complexity can exist, but is rarely patterned across a relatively small spatial area under a single unit of governance. This uniqueness does not mean that cities are inherently ungovernable; rather, it means the potential for unintended reactions to policy are substantially higher. We should expect that rational city governments will attempt to manage urban complexity and target their policies in ways they believe will maintain their power. We should also expect this task to be difficult and unpredictable; city governments, particularly in large cities, are interacting with a system of social groups whose composition and patterns of interactions they lack the data to fully understand. Poorly-targeted policy actions will interact with the complex socio-spatial surface of cities to produce both negative and positive externalities across space. Well-targeted policy actions are less likely to do so, though crucially, depend on the quality of information available to the city government to effectively target policy and the accuracy of their assumptions about how citizens will react.

Regardless of regime type, this complexity means that cities will be more difficult to govern than rural areas. However, in the absence of real mechanisms of competition and participation the authoritarian task is considerably harder. Authoritarian rulers must govern this complex space in an information poor environment. As I have argued, the city is not a single community that an authoritarian can uniformly coerce or coopt, but rather a set of interlocking, often loosely-defined spatial groupings of individuals whose reactions to urban governance are mediated through the socio-spatial communities of which they are a part. Compared to democracies, authoritarians have less knowledge of these communities and their preferences; elections are neither free nor fair, and citizens are incentivized to falsify their preferences. Even if authoritarians could gather reasonably accurate information, it will not be perfect; policies that appease one set of groups and neighborhoods may mobilize others, groups with a strong tradition of mobilization may be a thorn in the regime's side even when effectively targeted by policy, and policy that mobilizes specific communities may establish the networks required for enduring mobilization. Particularly threatening to

authoritarianism is the possibility of brokerage afforded by the density of cities. Where authoritarian policy or repression affects socially-mixed neighborhoods or many different types of neighborhoods, communities that may otherwise have remained disconnected may come into conflict or begin to cooperate. The illegibility of the city's social terrain makes it near impossible to fully anticipate these potential reactions in advance, regardless of the level of information.

Where authoritarian urban governance differs substantially from democratic urban governance is in the risk entailed in policy decisions. As the urban threat literature establishes, authoritarian regimes routinely redistribute resources from the countryside to the cities in order to co-opt urbanites and forestall urban discontent (Wallace, 2013, 2014). Wallace (2013) refers to this as a Faustian bargain, lowering the risk of short-term regime failure while inducing further concentration in urban areas, raising the risk of medium-term to long-term failure. However, the socio-spatial complexity and inherent unpredictability of cities raise the possibility that this redistribution, even if well targeted, could in fact contribute to the urban discontent is it intended to avoid. Provision of any type of good to urban citizens (public, private, or club) has the potential to backfire; infrastructure projects may be poorly executed or disruptive, and club and private goods may create conflict between those who do and do not receive them, or those who do not receive goods and the state. The complexity of the city makes unintended consequences to policy likely, particularly in the absence of high-quality information of preferences and attitudes. This adds another twist to Wallace (2013)'s Faustian bargain; not only does redistribution to cities increase the long run risk of regime failure, redistribution within cities can create the same dangerous discontent it is intended to forestall.

Case Selection

To demonstrate the destabilizing effect of urban redistribution, I examine the relationship between a highly targeted social policy and opposition support in a paradigmatic electoral authoritarian regime, Russia. A large project to provide new housing in Moscow targeted at regime supporters preceded substantial opposition gains on municipal formation [1] councils in September 2017, despite the program being highly popular among those receiving new housing. While this mobilization was ultimately not regime threatening, it nevertheless represents an interesting case study of the difficulty of authoritarian urban governance, and did force the Moscow city government to adopt riskier tactics to maintain control. The spatially targeted nature of this project makes it an ideal case study of how urban cooptation attempts can backfire when met with the complexity of the urban socio-spatial terrain.

The Moscow renovation project is intended to replace decaying Soviet housing stock throughout the city, in particular the five to nine story walk-up apartment buildings colloquially known as "Khrushchyovki". These buildings were constructed in the aftermath of the Second World War to resolve a severe housing shortage, and were never intended to stand as long as they have; as such, they are in varying degrees of disrepair. The Moscow administration selected 4,573 buildings for potential inclusion in the project. Residents were then allowed to vote on whether or not the buildings were to be demolished; if two-thirds of the apartments in a building supported demolition, it was included in the project. The administration promised residents of included buildings that they would be resettled in equivalent housing in a newly-constructed building if they voted for inclusion. Nearly all selected buildings voted for inclusion. However, despite the apparent popularity of the project with residents of included buildings, the project inspired protests throughout Moscow, with Muscovites expressing concerns about the impact of such a large construction project on their neighborhoods, the potentially low quality of new buildings, and potential transport disruptions associated with the project (Levada Center, 2017). As demonstrated in Figure

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[1]The Moscow equivalent of a city district

1, the project is distributed over an extremely large spatial scale, affecting the majority of Moscow's densely populated urban core.
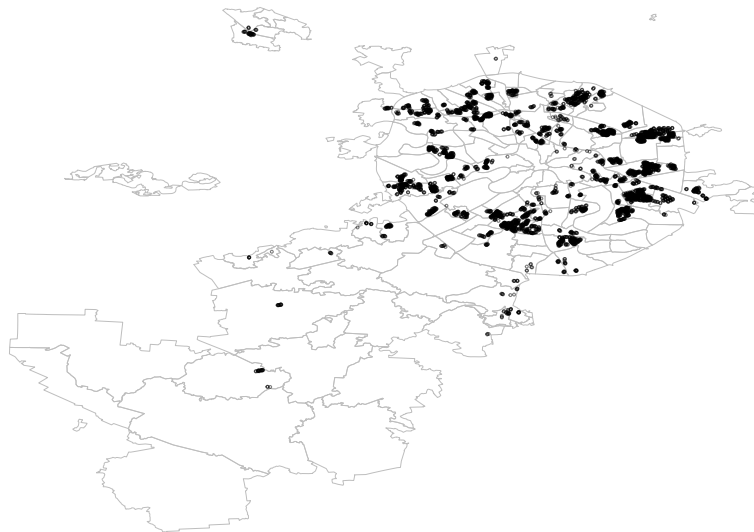

Figure 1: Buildings Selected for Demolition

There is strong evidence that the plan was intended to advantage previous regime supporters as a form of patronage. Smyth (2018), using fine-grained building and neighborhood level data, demonstrates that while older buildings were more likely to be selected, consistent with the city government's stated goal of replacing old housing stock, age has a substantively small effect on the probability of inclusion when comparing the oldest Khrushchyovki (built in 1955) to the youngest (built in 1970). Two factors did result in substantially different probabilities of inclusion: high support for Putin in the last presidential election and low rents, increasing the probability of inclusion by approximately 20% and 45% respectively. While the program's stated goal of improving the quality of Moscow's housing stock is on some level true, it is clear that the program also presented an excellent opportunity to reward poorer regime supporters with a precious private good in densely-populated and fast-growing Moscow. Simultaneously, it also punishes those who opposed the regime via denying them the good. On paper, it appears as a smart and successfully spatially-targeted project: rewarding supporters, punishing the opposition, and providing an example of government

responsiveness to citizens' needs.

However, I argue that even this specifically targeted patronage policy led to unintentional effects due to the socio-spatial complexity of Moscow. Though the intent was to co-opt regime supporters and cement United Russia's hold of Moscow, both micro-targeting and containment of spillover effects were impossible. In terms of targeting, the lowest level at which electoral information is available is the polling station. In densely populated Moscow, polling stations can contain many buildings and many diverse social groups, making fine-grained rewards or punishment impossible without accurate building-level data. Even if such building-level data did exist, the spatial nature of the project makes unintended consequences likely. While the regime would be able to target buildings near perfectly with building-level data, the projects has effects on neighboring buildings, people who work or use transit through an area, or even on distant regions dissatisfied that buildings in their district were not included. I hypothesize that is precisely the difficult nature of targeting and the potential for unintended consequences that caused the renovation project to fail as a cooptation tool. Instead of reinforcing the power of the Moscow regime, the housing project produced a wave of opposition against the regime that caused them to lose their previously near unanimous control of low-level institutions of urban governance.

Data

I have brought electoral data down to the lowest level available: the polling station. Moscow has 3,619 voting districts, many of which serve geographically small and densely populated areas, meaning most municipal formations have several polling stations. Both the dependent variable (opposition vote) and treatment variable (proximity to renovated buildings) are calculated at this level. The dense nature of electoral districts in Moscow and their embedding in municipal formations and regions allows me to investigate how electoral opposition varied in response to the renovation project at the highest available level of spatial

resolution.

The primary independent variable is the impact of the Moscow renovation project in the area surrounding the polling station. I operationalized this as the average distance to all affected buildings from the polling station in kilometers. This is similar to the operationalization used in Ichino and Nathan (2013), which likewise seeks to recover contextual effects on voting. Additionally, this measure is more empirically realistic than a simple count within electoral districts, as this would require assuming that electoral districts are relevant to how voters experience everyday life and the renovation project. The interpretation of this measure is simple, but slightly counter-intuitive: a high value indicates low proximity to any affected buildings, whereas a low value indicates high proximity to many affected buildings.

The dependent variable of interest is the share of the polling station level vote won by the opposition. There are 3,266 polling stations in total, representing elections to 125 municipal councils [2]. I have operationalized a maximal definition of the opposition. The maximal definition includes all parties except the Communist Party of the Russian Federation and United Russia, the regime party. I did not include the Communist Party despite their role as a nominal opposition party, as they are widely considered co-opted (Reuter and Robertson, 2014). While the large "in-system" opposition parties have been accused of collaborating with or being astroturfed by the regime, the fact remains that United Russia attempts to maximize *their* vote, as the loss of political control to even astroturfed parties still represents a political defeat. Regardless, votes for the Communist Party collapsed in the September 2017 election. Electoral data was scraped from the Moscow central election committee's website.

The following control variables are also included in the analysis: turnout, opposition vote in the 2013 Moscow mayoral election, opposition vote in the party list in the 2016 Duma elections, opposition vote in single member simple plurality seats in the 2016 Duma election, distance to the Kremlin, education, welfare dependence, and average monthly pay.

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[2]The remaining municipal formations have elections on off-years

I calculated turnout and all past voting data at the polling station level. Turnout is included to account for the low-turnout nature of local elections in Russia. Low turnout in municipal council elections could be expected to be either an advantage or disadvantage to the opposition; it could indicate both lack of regime machine mobilization or lack of opposition party mobilization. I include past voting data in the most recent local and national elections to control for electoral districts already more inclined to support the opposition, mitigating one potential political confounder. Kremlin distance is the distance from a polling station to the Kremlin, the center of Moscow. This is intended to be a rough proxy of both property values and the desirability of housing; the center of Moscow is both wealthier and more proximate to businesses, entertainment, transportation, etc.

Education and welfare dependence come from the 2010 Russian Census, and are aggregated at the regional (okrug) level for model interpretability (see next section). Unfortunately, this is the most recent such data that is currently publicly available below the city-wide level. Education is the percentage of regional residents who have at least a bachelor's degree. Welfare dependence is the share of regional residents who report that some form of social transfer is their primary source of income, excluding those who rely on student stipends. Average monthly pay comes from 2016 data provided by MosStat, the Moscow government's statistics office. Novomoskovsky Region is not included in the analysis, as it was annexed by Moscow from Moscow Oblast in 2012 [3], so disaggregated census data is not available. As Figure 1 demonstrates, this region possesses very few included buildings [4].

Empirical Strategy

Demonstrating that the complexity of the city contributed to unpredictable side effects and opposition victories in municipal formation elections requires that two conditions be observed. First, exposure to renovation must have a substantively significant effect on oppo-

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[3]Moscow Oblast surrounds Moscow, but is governed separately as a federal region
[4]Novomoskovsky is the long "strip" extending to the south from the "circle" which makes up Moscow prior to 2012

Table 1: Summary Statistics

Statistic	N	Mean	St. Dev.	Min	Max
Opposition Vote %	3,266	0.243	0.117	0.002	0.777
Mean Distance	3,266	17.493	5.353	11.922	40.426
Turnout	3,266	0.152	0.064	0.046	1.000
Mayor: Opposition Vote	3,266	0.373	0.065	0.000	0.733
Duma SMSP: Opp. Vote	3,266	0.491	0.144	0.034	0.983
Duma PR: Opp. Vote	3,266	0.459	0.067	0.026	0.676
Kremlin Distance	3,266	13.457	6.715	0.755	39.025
Government Dependence	3,266	19.664	1.260	16.985	21.346
Higher Education	3,266	35.132	4.218	29.937	47.382
Monthly Pay (Rubles)	3,266	71,495.910	10,584.690	60,992.420	102,285.900

sition voting that is distinguishable from zero. However, we should not expect this effect to be unidirectional. As previously argued, approval of the project was high among the largely poor, largely regime supporting residents of included buildings. Elsewhere, the project inspired protest and dissatisfaction. This should result in both positive and negative effects for regime voting, leading to the second condition; to establish a link between urban illegibility and the failure of the renovation projects, substantively significant heterogeneity in the effect of exposure to renovation must exist across space. If both conditions are observed to be true, this provides evidence that despite the careful targeting of the Moscow renovation project, it produced unintended and damaging side effects due to the near impossibility of micro-targeting in the complex urban environment.

These are not hypotheses in the typical sense. The point of this empirical exercise is more descriptive than causal. Providing robust and causally-valid evidence that certain types of social complexity contribute to the unpredictability of urban citizens' responses to cooptation and coercion, or that these sources of heterogeneity contribute directly to hazard of regime failure, is beyond the scope of this case study. Rather, I seek to establish that in this particular case, even a precisely-targeted policy in a stable electoral authoritarian regime produced unintended and unpredictable urban mobilization, damaging the regime's ability to control a large capital city in which a significant percentage of the country's population

resides. If my theory is correct, this provides preliminary evidence that the mechanism behind the urban threat to authoritarian rule is the inherent difficulty of targeting cooptation and coercion across a complex, often illegible socio-political space.

Acknowledging the complex social terrain of urban areas and searching for heterogeneity across space renders most of the standard social science statistical toolkit inappropriate. Models such as OLS, standard GLMs, and even their extensions with random effects are not capable of modeling hierarchically-dependent treatment effects without researcher specification of the interactions theorized to drive heterogeneity. Given the relative lack of knowledge about what may drive electoral heterogeneity in authoritarian municipal elections, attempting to use a standard model would require a "specification search", possibly leading to spurious results. Even in the presence of an explicitly interactive theory, manually specifying only a few interactions without exploring the entire space of possible interactions, particularly when many different choices for re-coding the data and specifying theorized interactions exist, can unintentionally lead to a multiple comparisons problem that is difficult to correct, "statistically significant" results that are indistinguishable from noise, and wildly different interpretations of results depending on the interactions actually explored (Gelman and Loken, 2013). I adopt a more principled approach, using Bayesian semi-parameterics to identify latent clusters of effect heterogeneity without researcher discretion, incorporate higher-level geographical information into the assignment to clusters and calculation of effects, and model effect heterogeneity while incorporating uncertainty in latent group assignment.

Specifically, I use a hierarchical Dirichlet process generalized linear model (hdpGLM), a generalization of an infinite mixture model that allows for hierarchical dependence (Ferrari, 2020). The hdpGLM offers several advantages specific to testing for effect heterogeneity in urban space. First, it allows me to explicitly identify effect heterogeneity while not over-determining the model. If effect heterogeneity is minimal or non-existent, Ferrari (2020) demonstrates in both simulation studies and a real-world application that the model will reduce to a noisy approximation of standard linear model. Secondly, the use of latent clusters

sidesteps the messy issue of neighborhood identification and researcher specification searches. Simply using polling station or other administrative boundaries would assume these boundaries are relevant in everyday life, the distribution of social groups through space, and people's conceptions of their own communities. However, the model is able to incorporate both the data hierarchy and demographic variables into cluster assignment, making polling stations in the same region and similar regions more likely to be assigned to the same cluster, while also modeling latent heterogeneity. This acknowledges that within region variation is likely to be lower than between region variation and partially compensates for the lack of polling station level demographic data. The model also allows hierarchical variables to influence the magnitude of effects, while providing coefficients that indicate the degree to which a higher-level variable influences both assignment to clusters (effects-on-assignment) and the estimated effect of lower-level variables (effects-on-effects). Finally, as a generalization of the mixture model, the model naturally incorporates clustering uncertainty into the estimation of effects, thus providing robust estimates that incorporate all relevant aspects of modeling uncertainty.

More technically, the model is specified as:

$$G_j \mid \alpha_0, G_0, W_j \sim \mathcal{DP}(\alpha_0, G(W_j))$$
$$\theta_{ji} \mid G_j \sim G_j$$
$$y_i \mid X_i, C_i, \theta_{ji}, \sim \mathcal{N}(y_i \mid X_i, \theta_{ji})$$

Where G_j is the set of mixture component means (atoms) for region j, W_j is the set of regional-level covariates, α_0 is the concentration parameter of the Dirichlet process, G is the base measure of the Dirichlet process (which is a function of W_j) and θ is the vector of parameters. The model is then fit with a modified stick-breaking construction and a Gibbs sampler (see Ferrari (2020) for details).

I specify the context-level variables (W_j) at the regional level; while these covariates are

available at the municipal formation level, this produces a model with over 800 parameters that is difficult to fit and summarize. Additionally, many municipal formations contain only 1-3 polling stations, resulting in posterior distributions with a high degree of variance. The model assigns polling stations to clusters within each region, with the cluster-specific treatment effect dependent on the W_j variables. The max number of possible clusters (researcher specification required for the fitting process) was set to 30; the fact that the model does not approach this upper bound indicates that this choice is harmless [5].

This model is particularly well-suited to testing for spatial heterogeneity due to its ability to identify fine-grained underlying heterogeneity without being over-determined (i.e. guaranteed to find heterogeneity). In particular, the model allows effects to not only vary between clusters, but within clusters across regions. For example, suppose a cluster contains polling stations in both a poor region and rich region which are similar enough to be grouped together. The model does not constrain the two heterogeneous regions to have the exact same effect sizes; rather, it samples these effect sizes from a common distribution that's mean is dependent on regional-level covariates, allowing the disparate wealth levels of the two regions to mediate the effect. If significant effect heterogeneity does exist, the model is capable of identifying it in a flexible and fine-grained way, while potentially providing some leverage on what drives this heterogeneity. Additionally, it bears re-emphasis that the model is capable of not finding heterogeneity. While Dirichlet process models, similar to all clustering methods, will always identify multiple clusters, the model will return virtually identical distributions for all parameters in the presence of homogeneity.

Results and Discussion

Figure 2 demonstrates clear heterogeneity in the relationship between renovation and opposition voting both across and within regions in Moscow. This ridge plot shows the posterior distribution of treatment effect by cluster and region. Focusing on only a single

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[5]The model activates 9 clusters.

region, unimodal posterior distributions can be interpreted as lack of effect heterogeneity in that region, whereas multimodal posteriors demonstrate substantively significant differences between clusters. Comparing all regions' posteriors, the model reveals significant treatment effect heterogeneity between regions, meaning models that calculate population-level average treatment effects would have ignored a substantial amount of structure in the data. While a hierarchical model could have revealed the differences between regions, it is not capable of revealing both the differences between and within regions. All variables were normalized, so effects are in terms of standard deviation changes. For reference, Figure A3 displays how non-heterogeneity would appear in this plot.
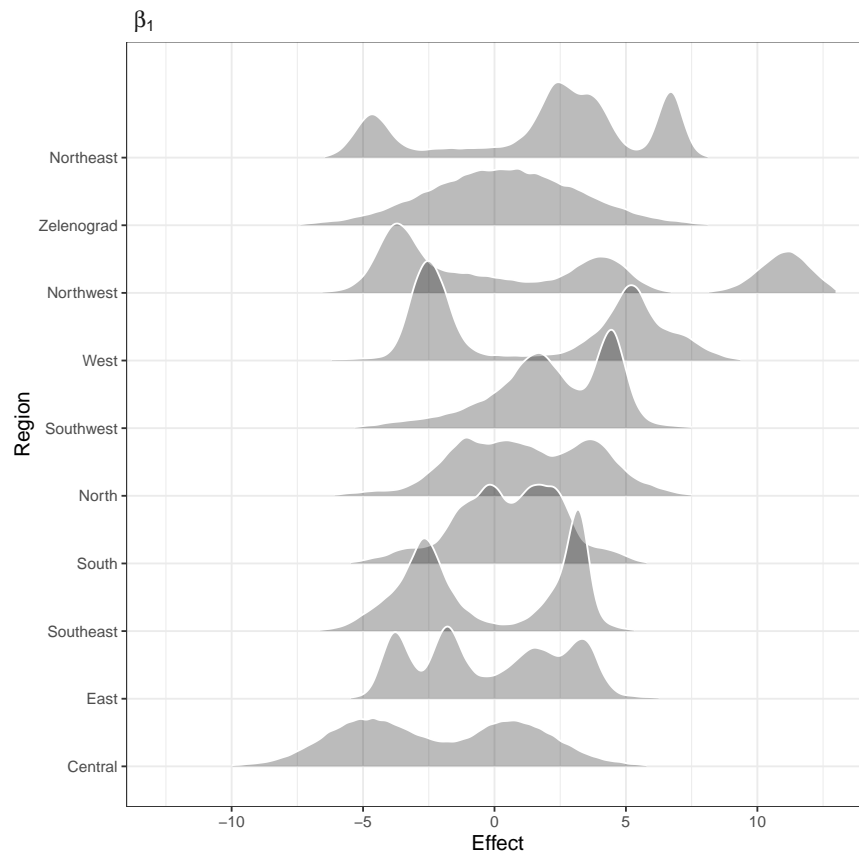

Figure 2: Distribution of the estimated effect of renovation across districts, effects estimated at polling station level.

Figure 3 displays median polling station specific effects based on cluster assignment, effectively projecting the modes of Figure 2 on to the map of Moscow. Clusters were assigned

to observations based on the maximum cluster responsibility in the posterior. Effects were judged as distinguishable from zero if the 95% credible interval does not include zero, meaning there is a 95% probability that the true value of the parameter is not zero [6]. Distinct spatial heterogeneity in both the size and direction of effects is evident. Significant effects were identified for 2386, or 73 % of the polling stations in the sample [7]. The median effect's sign was swapped for this plot, so positive effects indicate that opposition vote increased as more buildings were proximate to the polling station, while negative effects indicate that opposition vote decreased.
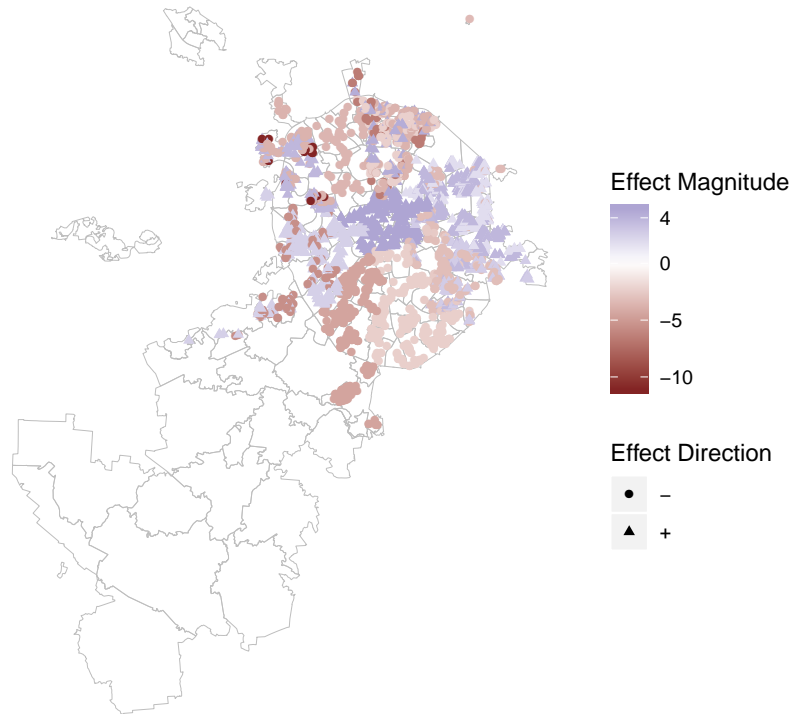

Figure 3: Estimated effects of renovation. Points represent the location of the polling station, and their color represents the standard deviation change in opposition vote percentage associated with a standard deviation change in average proximity to included buildings. Effect signs were swapped, so a positive effect indicates an increase in opposition voting as proximity to renovated buildings increases.

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[6]The credible interval was calculated using highest posterior density

[7]Figure A2 displays the polling stations for which no effect was identified

Figure 3 paints a clear picture of Moscow's "urban voting surface" in response to the renovation project, illustrating the difficulty of urban governance. Clear spatial clustering is present in line with my expectation to observe heterogeneity. Notably, Moscow's central region appears as the most strongly anti-renovation region of the city, displaying an increase in opposition voting that is both statistically significant and significant in magnitude. This increase is approximately 4 standard deviations, or approximately 46% percentage points for each standard deviation closer in proximity to included buildings. All these effects exist despite controlling for past patterns of opposition voting at polling stations in past mayoral and Duma elections, demonstrating that this effect is not endogenous to past habits of opposition. Additionally, the effects persist despite a control for distance to the center of the city (the Kremlin), demonstrating that these effects are not an artifact of the polling stations' centrality.

Figure 3 illustrates clearly the unintended consequences of the renovation project that contributed to the regime's electoral defeat. Clear heterogeneity is visible within regions, particularly the West and Southeast regions, where dense clusters of included buildings exist. The between region heterogeneity is particularly striking with regards to the Central region, where renovation had a strong pro-opposition effect. Keen observers of Moscow politics will note that the center of Moscow is traditionally the hot-bed of opposition activity in the city, and yet the relationship between renovation and opposition voting exists even after controlling for past opposition support at multiple levels of governance, socio-economic factors expected to make the cost of opposition voting and campaigning lower, and any other unobserved factors correlated with residence in central Moscow and observable variables.

The results provide clear evidence of complex, unintended side effects to the renovation project. In areas close to large clusters of renovated buildings, such as the Northeast, West, and Southeast the project had diverging effects, generating both support and opposition to the regime. Even in the Central region, already unfriendly terrain for the regime, the project is associated with a large increase in opposition voting. Ultimately, the population of

discontented voters was large enough and spatially concentrated enough to deal the Moscow regime a series of stunning defeats throughout the city. What was on paper a fairly well-targeted reward for regime supporters instead shattered United Russia's near-unanimous hold on municipal councils.

Turning to the source of the heterogeneity in effects, only informed speculation is available. Unfortunately, the hierarchical component of the model fails to return effects-on-effects distinguishable from zero (Table 2) [8].This could in part be due to the need to aggregate these variables at the regional level, significantly reducing the variance. Additionally, it is possible that the main sources of effect heterogeneity are latent - i.e. driven by variables not available to me. This reflects another advantage of the modeling strategy: even in the presence of confounders, effects with provably valid uncertainty estimates can be found. To some extent, it also speaks to the illegibility of the city; while these social fundamentals are well-known to pattern vote choice in both free and partially-free elections, aggregated demographic measures fail to explain the complex reaction to the renovation policy, even with the benefit of hindsight.

Table 2: Effects-on-effects.Coefficients represent the change in the polling station level coefficient on proximity to renovated building (as in Figure 3) associated with a standard deviation change in the regional-level variable.

Variable	Mean	SD	HPD (Lower)	HPD (Upper)
Government Dependence	-0.072	1.206	-2.440	2.300
Higher Education	-0.115	1.619	-3.276	3.043
Avg. Monthly Pay	-0.055	1.574	-3.15	3.036

However, the disaggregated data does offer some post-hoc leverage on the sources of the observed heterogeneity. As Figure 4 demonstrates, the central region is clearly far above the average (the dashed line) on two of the contextual variables: average monthly pay, and percentage of population with higher education. Interestingly, the West region, one

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[8]Note: This includes only estimates for the effect on heterogeneity on the effect of proximity to renovation. Effects-on-effects parameters exist for all variables.
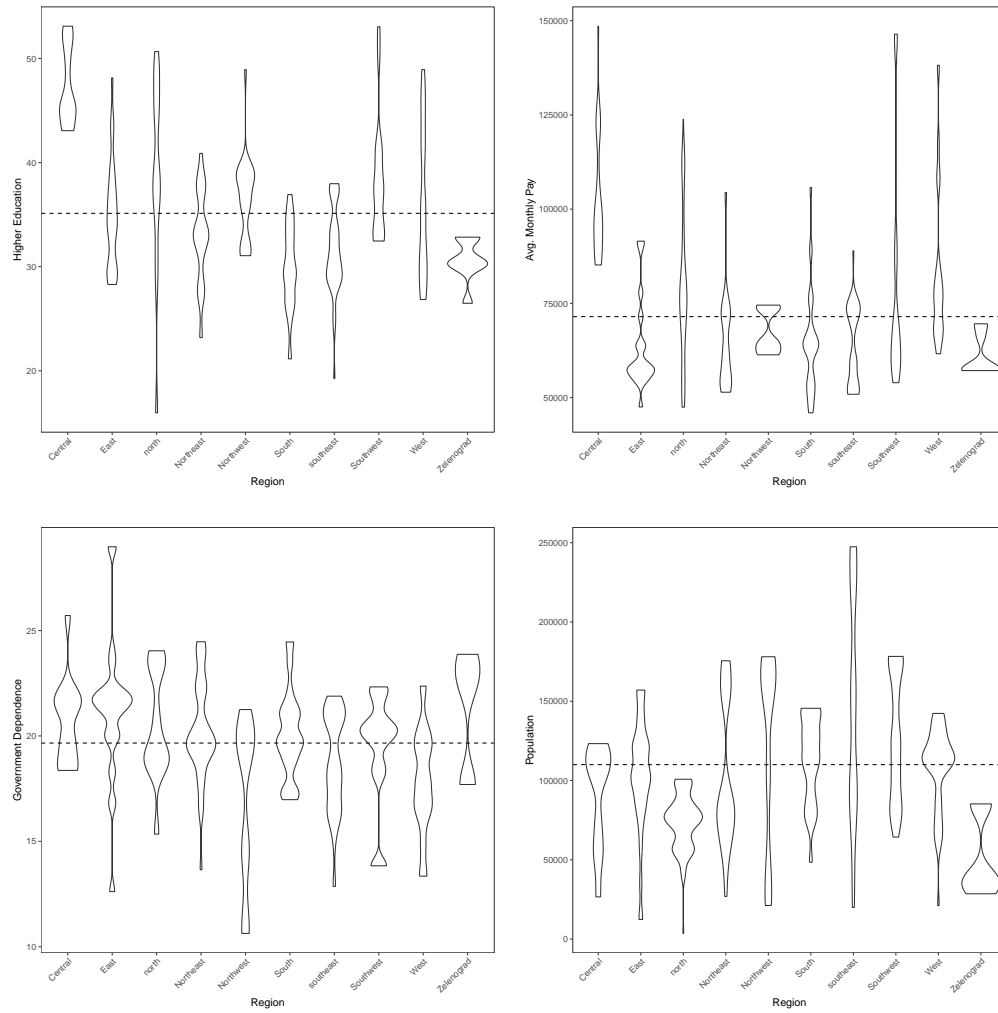
Figure 4: Distribution of regional level socio-economic variables across regions

of the regions that exhibited substantial intra-regional effect heterogeneity, demonstrates high dispersion around the mean on both pay and education. Taken together, this suggests that variance in pay and education either drive some degree of effect heterogeneity but are confounded or that these variables are correlated with the unobserved driver(s) of effect heterogeneity.

The main goal of this article was to examine the dynamics through which urban areas become threatening to authoritarian rule, taking as a starting point Wallace (2013) and Bates (2014)'s observation that authoritarian regimes redistribute to the city in order to buy short term peace at the expense of long-term survival. The results convincingly demonstrate

that the unique socio-spatial illegibility of the city makes this redistribution risky, even in the relatively high-information environment of a particularly capable electoral authoritarian regime. A precisely targeted program that promised new, higher-quality housing created extremely heterogeneous, spatially-patterned reactions. This played a role in significant losses for the regime on municipal formation councils, particularly in the center of Moscow. Even at the hyper-local level, opposition victories this magnitude tarnish the regime's "aura of invincibility", potentially motivating future challengers. Rather than providing short-term stability, the renovation project instead became the proximate cause of a potentially dangerous electoral and organizational surge for the opposition.

Ultimately, the response to the Moscow housing project did not generate national regime-challenging electoral or contentious mobilization. However, it did force the Moscow regime into more overt and risky methods of political manipulation. In municipal formations where United Russia no longer held majorities on the city council, the ruling party resorted to tricks, sabotage, and intimidation to achieve their ends where possible. In many contested municipal formations, including some where United Russia held only a minority, United Russia brought work to a halt. This obstruction has prevented municipal formation heads from being chosen, budgets from being passed, and constituents from being served (Shamardina, 2018). This ultimately appears to be an attempt to discredit the opposition, preventing them from exercising even the minimal power of municipal formation councils to establish enduring political ties to citizens.

Additionally, the opposition's unexpected gains in municipal council elections forced the Moscow regime to clamp down on the competitiveness of 2018's mayoral race. Moscow uses a so-called "municipal filter" that requires mayoral candidates to get at least one signature from a municipal deputy in 110 out of the 130 municipal formations. The opposition did not have seats on enough councils to pass the filter by themselves, and United Russia moved to make sure no opposition candidate from outside the so-called "in-system" opposition would be able to do so, forbidding their members from endorsing any opposition candidates to

"maintain their monopoly on the municipal filter" (Meduza, 2017). This ultimately resulted in a noncompetitive, low turnout race where incumbent mayor Sergei Sobyanin took over 70% of the vote (Kolesnikov, 2018).

The takeaway for the study of authoritarianism is that, as theorized, buying social peace in the cities not only increases the long term risk of regime failure via urban concentration, but can itself be a potent short-term risk. In Moscow, even a generous patronage project evolved into a local political crisis, forcing the regime to engage in more blatant and risky manipulation of the political sphere and potentially motivating further backlash. Ironically, the risk of unintended consequences to cooptation or coercion only increases when the regime does succeed, as urban bias provokes further migration to a few large cities, increasing both urban concentration and the socio-political complexity of the city. Authoritarian regimes that buy short-term stability in the cities are faced with growing inability to target and predict the effects of policy, increasing both the general risk that regime-threatening mobilization will occur and the specific risk that their attempts to prevent mobilization will become its proximate cause. Wallace (2013)'s characterization of urban bias as a Faustian bargain is more complicated and correct than originally characterized.

While the renovation project is certainly unique, conflict over the use of space in cities certainly is not. The defining feature of urban politics is conflict over space: its usage, its owners, its value, and its meaning (Lefebvre, 1991). When cooptation and coercion are spatially targeted, as they often are, the illegibility of urban areas makes unintended side effects likely in democracies and authoritarian regimes alike. However, as the example of Moscow demonstrates, these unintended side effects can lead to much more than a temporary electoral setback under authoritarianism. They can force authoritarian regimes into riskier and more overt coercion, induce a fractured opposition to coordinate, and in dramatic cases, set into motion the type of wide urban discontent that so commonly brings down authoritarian regimes.

Conclusion

My results point to an important, underappreciated, and understudied factor in the survival of authoritarian regimes: urban governance. While considerable scholarly energy has been spent in recent years looking below the national state into regions, comparatively little literature has investigated politics at or below the urban level. As the site of most protest and electoral resistance to authoritarianism, this urban blind spot prevents us from more fully understanding the when, where and who of authoritarian collapse.

Further research in this vein must acknowledge and grapple with the fact that cities are important for understanding authoritarian rule because of their socio-spatial complexity. They cannot be treated either as monolithic units in their own right or as a simple agglomeration of urban individuals, who are somehow uniformly different than rural individuals. Rather, cities are a complex meeting point of the state, the economy, and socially heterogeneous groups of people - all reified within a small spatial area. The socio-spatial context of the city is key to explaining how authoritarians succeed or fail in preventing urban discontent.

However, while my results present the importance of studying the urban socio-spatial terrain for understanding authoritarian control and survival, much remains to be learned in the specifics. In particular, the existing literature seems to suggest that certain forms of sociospatial complexity seem likely to introduce more or less illegibility and resistance to coercion cooptation. The concentrated disadvantage of the slum could make slum dwellers easy to coopt, or the informal nature of slums could create an entirely illegible space resistant to state power, such as some of Brazil's favelas (Sampson, 2012; Wallace, 2014). Concentrations of educated, middle class professionals could create communities that encourage the growth of civil society and resistance to authoritarianism, as the conventional wisdom goes, or pockets of captured populations dependent on the state for gainful employment (Rosenfeld, 2017). We know relatively little about how specific distributions of people and resources through urban space affects urban politics in democracies, let alone in authoritarian regimes. Unless

we remedy this, we will continue failing to identify why and when cities produce disruptive and regime-challenging waves of resistance.

The complexity of the city poses an equally complex task for researchers. Capturing either the social or spatial complexity of cities, let alone both, has long required herculean data collection efforts, even in democracies. In the data-poor environment of authoritarian regimes, creative use of both qualitative and quantitative methods will be needed to capture this inherent heterogeneity. However, given the potential leverage to be gained on important questions in democratization, contentious politics, and electoral movements in authoritarian regimes, the effort seems well worth the cost.

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Appendix

MCMC Diagnostics

The model was fit using a blocked Gibbs sampler. 30,000 iterations were completed after a burn-in of 50,000. Table A1 displays the effective sample size for the model, and Figure A1 displays the traceplots (with the burn-in samples removed).

Table A1

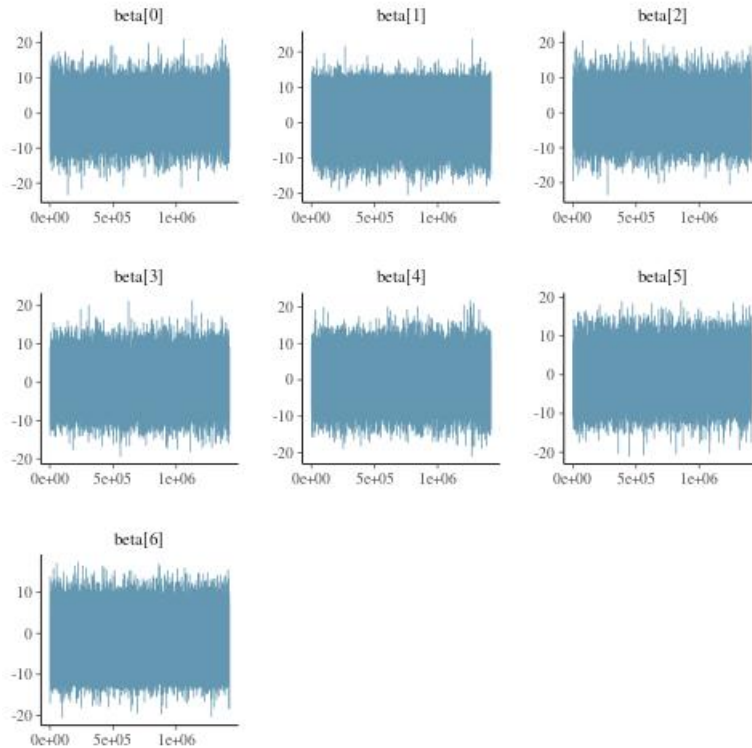|	
Intercept	$831,861.900$
Mean Renovation Dist.	$767,734.500$
Turnout	$811,040.700$
Opp. Vote (Mayoral)	$801,540.500$
Duma SMSP Opp. Vote	$755,577.600$
Duma PR Opp. Vote	$768,290.700$
Kremlin Distance	$880,076.600$
σ	$1,213,698.000$

Figure A1: Trace plots: coefficients are the same order as Table A1. Sigma not included because it is cluster specific.
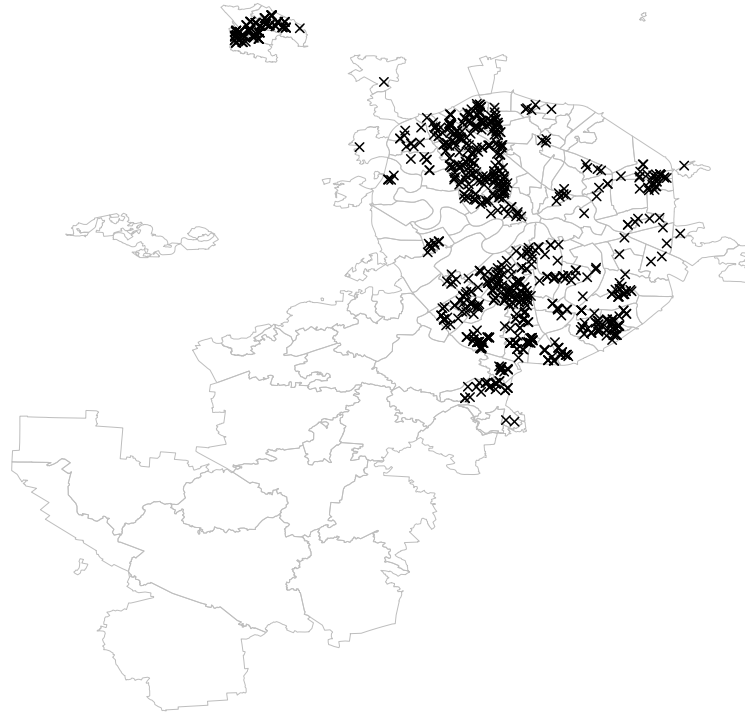
Non-Significant Effects

Figure A2: Polling stations for which no significant effect was identified

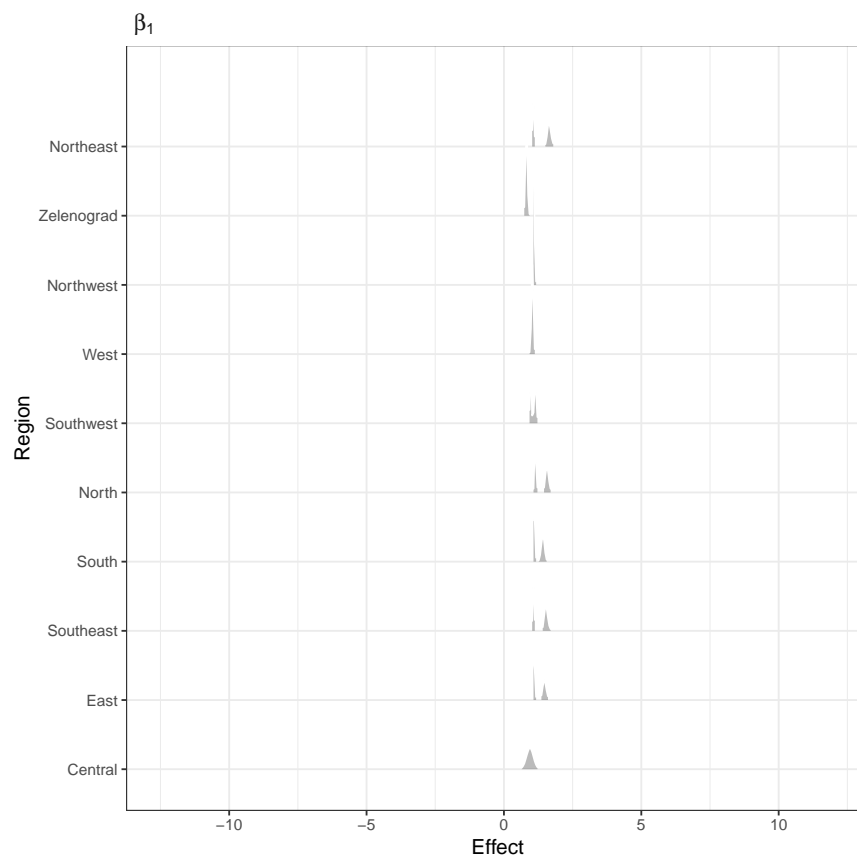## Lack of Heterogeneity Within and Across Regions

Figure A3: hdpGLM run with Kremlin distance as the outcome and mean distance to renovated buildings as the independent variable. While the model identifies four clusters, parameter estimates cluster tightly around a single mode or two similar modes. No heterogeneity is visible between reasons. Effectively, this model returns estimates similar to a standard linear model, with noise due to the unnecessary mixture components.