Information Gathering in Authoritarian Regimes: Evidence from a Natural Disaster in the GDR*

Hanno Hilbig†, Hans Lueders‡, Sascha Riaz§

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Abstract

How do autocratic regimes learn about the preferences of citizens? We study two forms of gathering information in the German Democratic Republic: voluntary information provision through citizen petitions, and government surveillance. Based on a novel data set of all petitions submitted to the GDR State Council between 1975 and 1990, we analyze how the regime reacted to an exogenous decline in voluntarily provided information induced by a natural disaster in 1979. Using an instrumented difference-in-differences design, we then show that the regime tried to offset a reduction in voluntarily shared information by increasing surveillance at the local level. Finally, we present evidence that surveillance through the secret police did not improve the regime's ability to contain protests in 1989/90.

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†PhD Candidate, Department of Government, Harvard University, hhilbig@g.harvard.edu

‡PhD Candidate, Department of Political Science, Stanford University, hlueders@stanford.edu

§PhD Candidate, Department of Government, Harvard University, riaz@g.harvard.edu

1 Introduction

Authoritarian governments require precise information about the level of support they enjoy among their country's population in order to stay in power. Absent such information, dictators are agnostic "whether the population genuinely worships them or worships them because they command such worship" (Wintrobe 1998, p. 20). When dictators remain ignorant about their population's grievances, popular protest may come as a surprise, spiral out of control, and threaten the survival of the regime itself (Kuran 1991; Lohmann 1994).

Yet, information acquisition is challenging in authoritarian regimes because, unlike in democratic countries, public support for the government cannot be gauged through elections or public opinion polls: the playing field is tilted in favor of the ruling party such that elections are rather a demonstration of the regime's power and control over the populace than a referendum over its performance (Gandhi and Lust-Okar 2009). Likewise, citizens in autocracies are afraid of repercussions if they reveal true opinions of the regime. Preference falsification is widespread, making public opinion polls a less useful tool to monitor public opinion in autocracies (Kuran 1991, 1995; Coffey and Horne 2011).

How, then, do authoritarian regimes gather information about citizen grievances and the level of popular support they enjoy? Even unfree elections provide some information about popular support and grievances (Malesky and Schuler 2011; Ong 2015). However, they are not sufficient to collect all required information about the population. Dictators thus often resort to two alternative avenues. First, they can rely on information voluntarily provided by citizens. Second, authoritarian regimes may monitor the population through surveillance by secret police forces.

Both forms of information gathering have been used widely in autocratic regimes. Many socialist countries created official channels through which citizens could submit formal complaints to local and national authorities (Dimitrov 2014*b*, 2015; Chen, Pan and Xu 2016; Distelhorst and Hou 2017). But dictators also regularly create dense secret police networks tasked with spying on the population, learning about their grievances, and identifying—and neutralizing—potential opponents (Nielsen 2009; Dimitrov and Sassoon 2014).

A growing literature examines the role of both forms of information gathering in authoritarian stability (e.g., Nielsen 2009; Dimitrov 2013; Lorentzen 2013; Dimitrov and Sassoon 2014; Distelhorst and Hou 2017; Thomson 2017). However, extant research usually considers both forms in isolation and does not study their interactions. To what extent do dictators employ both forms of information gathering strategically? Are they substitutes or comple-

ments for each other? And are both equally effective at identifying dissent and potential unrest early?

This paper answers these questions using novel data on voluntarily provided information and government surveillance in the former German Democratic Republic (GDR). The country's constitution gave every citizen the right to submit complaints or petitions (*Eingaben*) to all levels of government. Hundreds of thousands of petitions were written every year, and numerous government employees meticulously catalogued and answered every single petition. Detailed reports and summary statistics on the content and origin of the petitions are an impressive testimony of the important political role that petitions played as a source of information for the country's socialist government.

The petition system was paired with a dense network of secret police members. The state security service (*Staatssicherheitsdienst* or, henceforth, *Stasi*) penetrated all aspects of public and often even private life. While formal *Stasi* employees were present in all cities and major companies, the majority of *Stasi* members were informal collaborators: private citizens who were recruited or forced to spy on their neighbors, friends, and sometimes even family members (Gieseke 2000; Rosenberg 2007).

We study the relationship between these two forms of information gathering: to what extent were petitions and the secret service substitutes in the GDR? Did both provide the government with the same amount and quality of information?

To answer these questions, this paper examines the effect of petitions on *Stasi* presence. To address concerns about the endogeneity of these variables, our research design exploits variation in snowfall during a natural disaster in 1978/79 to instrument for petition-writing: several heavy winter storms brought unusually large amounts of snow over a short period of time in late-December 1978 and early January 1979. In many areas of the country, snowfall exceeded long-term averages by several meters. Parts of the country were cut off from the outside world. In these areas, electricity and heating broke down for several days. Disaster relief was slow and had to rely on East German and Soviet soldiers and tanks, while the country's leadership was out of the country (Lüddemann 2020).

However, not all areas of the country were equally affected by the winter. Exposure to unusual amounts of snow were correlated with a decrease in petition-writing to the State Council—the country's main executive body. This is because the experience of massive snowfall in combination with the central government's delayed disaster relief efforts may have reduced citizens' trust in or satisfaction with the government. Both are preconditions for high petition activity. The amount of snowfall in 1978/79 is arguably exogenous to

Stasi presence and thus helps us establish the causal relationship between both forms of information gathering. Our results provide the first evidence of its kind that voluntary and coercive forms of information gathering are substitutes: we find that *Stasi* presence went up in areas that, due to arguably exogenous heavy snowfall, submitted fewer petitions to the government.

We further investigate whether the source of information makes a difference for regime stability by examining the consequences of *Stasi* presence and petition volume on protest activity in 1989/90, which ultimately led to the fall of the Berlin Wall, the demise of socialist one-party rule in East Germany, and German reunification. We find that increased *Stasi* presence had no effect on the probability of protest occurrence or protest turnout. This finding suggests that the way authoritarian governments gather information may have little effect on the government's capacity to predict and prevent protests in times of mass mobilization against the regime.

Research on authoritarian politics has flourished in recent years. The demise of some dictatorships has provided researchers with new data sources (e.g., Dimitrov 2014*a*; Blaydes 2018). Likewise, methodological advances have enabled scholars to develop new, creative ways to address questions about regime stability (King, Pan and Roberts 2013) or dissent in autocratic regimes (Pan and Siegel 2020), among many others. Our paper joins recent work on authoritarian politics. Using novel, formerly classified data on information gathering in the German Democratic Republic and an instrumental variables design, our research helps open the "black box" of the internal politics in authoritarian regimes. While a growing literature examines different forms of information gathering in autocratic regimes (e.g., Nielsen 2009; Dimitrov 2013; Lorentzen 2013; Dimitrov and Sassoon 2014; Distelhorst and Hou 2017; Thomson 2017), extant research mostly considers these forms in isolation. We are one of the first to explicitly consider the substitutability of different ways to collect information and its impact on regime stability. Our research design, which exploits exogenous variation in petition writing due to exposure to heavy snowfall in winter 1978/79, joins a nascent literature on the effect of natural disasters on autocratic politics (Chaney 2017; Lazarev et al. 2014; Andrabi and Das 2017).

The remainder of this paper is structured as follows. We discuss the role of information gathering in autocracies and outline our argument about the substitutability of different forms of information gathering in Section 2. Section 3 describes our data and introduces the research design. The findings are reported in Section 4. We discuss the significance of our findings and conclude in Section 5.

2 Information Gathering in Authoritarian Regimes

Like every government, autocratic leaders require precise information about public opinion of their rule. It is crucial for autocrats to identify grievances early, before dissatisfaction becomes so strong that public unrest becomes feasible and threatens government survival (Dimitrov 2014*b*; Dimitrov and Sassoon 2014).

In democracies, public support for the government is usually gauged through regularly held free and fair elections and public opinion polls. Yet, these tools are of little use in dictatorships. The playing field is tilted in favor of the ruling party, and elections are rather a demonstration of the regime's power and control over the populace than a referendum over the government's performance (Gandhi and Lust-Okar 2009). In the former German Democratic Republic, for example, all parties were part of just one list – the *National Front* – and voters could either vote to approve or disapprove this list. Large-scale voter mobilization efforts, coupled with widespread voter intimidation and the lack of an actual choice, ensured that electoral support for the socialsit regime was usually above 95 percent. Of course, even one-party elections can provide some information to the government, for instance on the popularity of local cadres or the spatial distribution of regime critics (Malesky and Schuler 2011). However, autocrats' need to secure electoral victory places important limits on the amount of information they can gather through elections.

Likewise, public opinion polls cannot serve the same functions they do in democracies. Citizens in autocracies are concerned that revealing their true opinions of the regime will have repercussions. Preference falsification is thus widespread (Kuran 1991, 1995), making public opinion polls a less useful tool in gauging public opinion (Coffey and Horne 2011). In fact, the leadership of the GDR attributed so little importance to opinion polling that it shut down the only state-run agency conducting public opinion research – the Institute for Opinion Research – (*Institut für Meinungsforschung*) in January 1979, more than a decade before the regime's demise (Niemann 1993).

Instead, many dictatorships rely on the voluntary provision of information through citizen complaint systems, and government surveillance of the populace through a sophisticated secret service police force. This section introduces both forms of information gathering, discusses their advantages and disadvantages, and then discusses potential reasons why they may be substitutable.

2.1 Petitions as source of voluntary information provision

To reconcile the need for information about public grievances with the difficulties of obtaining such information through elections and opinion polls, many socialist and communist dictatorships have opted for an alternative channel. Governments in these countries have created numerous avenues through which their citizens can submit petitions and complaints (*Eingaben*) to local and national authorities (Dimitrov 2015; Distelhorst and Hou 2017).

Petitions are a better "barometer of public opinion" (Dimitrov 2014*b*) in authoritarian regimes than elections or opinion polls because they are voluntary. They grant citizens an official channel to express their grievances. Citizens can employ legal means to express their demands instead of extralegal means such as protest. Moreover, petitions are a useful source of information because socialist governments have made enormous efforts to create an infrastructure that is able to respond to most citizen requests and create summaries of grievances, which helped guide policy-making. Citizens in the former GDR could submit petitions and complaints to all branches of government, from the municipality all the way to the politburo. Petitions and complaints also frequently concerned government agencies, the state-run media, and even businesses. The government meticulously catalogued each petition and classified it by issue and county of origin. Summary reports were created at all levels of government. These reports then informed the government about popular grievances both at the national and local level. Numerous memos and discussion briefs about how to address those grievances prove how seriously the government took citizen complaints (Staadt 1996).

Other socialist countries, such as Bulgaria, Romania, or the Soviet Union, used similar mechanisms to gauge public opinion (Dimitrov 2014*a*; Dimitrov and Sassoon 2014). Today's communist China has given its citizens similar channels—for instance through the "Mayor's mailbox"—to voice concerns and opposition to government actions (Luehrmann 2003; Chen, Pan and Xu 2016; Chen and Xu 2017; Distelhorst and Hou 2017; Tsai and Xu 2018). Similarly, Singapore uses constituency services to gather information about popular grievances and help citizens address them (Ong 2015).

Yet, writing a petition fundamentally requires that citizens have trust in their government (Dimitrov 2014*b*; Distelhorst and Hou 2017): trust that the government will take their complaint seriously and try to address their concern. Moreover, it requires that petition writers belief the government has the capacity to respond and solve the issue. Once trust declines, petitions become less useful as source of information. Dimitrov (2013), for example shows how the volume of petitions declined in the lead-up to the Tienanmen protests and

the collapse of the Bulgarian communist regime—two periods of low popular trust in the regime.

Consequently, the authoritarian government can never be certain if low levels of petitions are indicative of citizen support and satisfaction, distrust in the government, or fear of repercussions.[1]

2.2 Government surveillance

Secret police can help reduce this uncertainty for autocratic regimes. Unlike voluntary forms of information gathering, information gathered through government surveillance does not require the voluntary cooperation of the population. In addition, a dense network of secret police agents can help identify sources of unrest and dissenters better than petitions, since citizens are unlikely to reveal potentially compromising information about their own willingness to participate in anti-government protests. In addition, government surveillance helps gather much-needed information about the loyalty of political elites. Government surveillance may not only target the population, but also those stakeholders who may pose a threat to the survival of the dictator.

The former German Democratic Republic established its own state police force just months after the foundation of the Republic: founded in February 1950, the Ministry for State Security (*Stasi*, following the German name: Ministerium für Staatssicherheit) soon developed into what has been described as one of the most effective intelligence agencies in the world (Rosenberg 2007). Daily operations of the *Stasi* relied on a vast network of informants. Estimates suggest that up to 189,000 of these "informal collaborators" were active in 1989 (Der Spiegel 2008). An estimated additional 90,000 East Germans were official *Stasi* employees (Gieseke 2000). The *Stasi* perpetrated all parts of society. Especially the "informal collaborators," whose identity was unknown to ordinary East German Citizens, meticulously collected information about all aspects of their targets' life. Oftentimes, their work involved spying on their neighbors, friends, and sometimes even family. Consequently, citizens could never fully trust others.

Yet, even government surveillance is not necessarily a panacea for the dictator's informational needs. While a secret police may not require high levels of citizen trust in the government to collect information, they require a minimum amount of trust among citizens: citizens will only share truthful information about their grievances in private conversations if are sufficiently confident that they not be reported to the government.

[1]See Lorentzen (2013) for a similar argument about citizen protest in autocratic China).

In addition, relying on a secret police to gather much-needed information creates important principal-agent problems. The amount of high-quality information that the government receives through this channel crucially depends on its ability to effectively monitor the agent and incentivize them to collect and share the right information. Dimitrov and Sassoon (2014) argue that the quality of information provided by informants depends on the material benefits they receive in return. In Stalinist Bulgaria, for instance, the government was concerned about the poor quality of information obtained from those informants who were forced to work for the state security forces and did not receive the same benefits as voluntary informants.

2.3 Partial substitutability

In sum, information gathering through petitions and government surveillance has distinct strengths and weaknesses. Both strategies also help autocrats collect different types of information. It is likely that authoritarian governments try to employ both. However, it is plausible that there exists partial substitutability between voluntary information gathering and government surveillance, and autocratic governments can, to some extent, compensate the loss of information gathered through one channel by increased information gathering through the other one.

It is plausible that authoritarian governments prefer to collect most information voluntarily. Insofar as citizen trust in the government is high, they are willing to share their grievances with the government, and secret police forces can focus on identifying and neutralizing regime critics. However, once trust in the regime declines, petitions are no longer a reliable source of information about citizen grievances. In that case, the government has to expand its surveillance program and also try to have secret police forces gather information about citizen grievances. That is, the regime may seek to offset a decrease in petitions through increased government surveillance.

However, the reverse is harder to accomplish. A decrease in government surveillance activity—for example, because the regime is unable to recruit a sufficient number of spies or because citizens have found ways to hide from surveillance—cannot as easily be compensated by improved voluntary information gathering because such information acquisition requires high citizen trust in the government. While the government may try to achieve higher trust—for instance, by responding faster to citizen complaints or increased redistribution—these efforts are not guaranteed to be successful. The autocratic government may remain thus ignorant about the true level of support it enjoys among the population.

Thus, we argue that a decrease in petitions can in part be compensated by increased *Stasi* presence. In contrast, it is more challenging for the government to acquire more information voluntarily if its capacity to spy on its population decreases. Our empirical analysis thus focuses on the extent to which decreases in voluntary information gathering result in more government surveillance.

3 Data and Empirical Strategy

3.1 Data on Information Gathering

Our research focuses on the interaction between different ways in which the national government of the former German Democratic Republic attempted to gather information on popular support, grievances, and potential sources of unrest. We therefore restrict the analysis to the central government's efforts at gathering information.

We measure the voluntary provision of information through petitions, as explained above. Petitions could be sent to several central government bodies. Chiefly among them were the People's Chamber (*Volkskammer*), the Council of Ministers (*Ministerrat*), and the the State Council (*State Council*). The volume of petitions sent to each of these three institutions differs considerably, however. The People's Chamber, for example, received less than 2,000 petitions per year. Data on the petition volume to the Council of Ministers are only available for the late 1980s. In that period, between 20,000 and 30,000 petitions were received by the Council of Ministers each year. Most petitions were sent to the State Council: between 50,000 and 80,000 per year. Combined with the fact that the State Council was the de facto prime decision-making body in the former German Democratic Republic, we focus on State Council petitions.

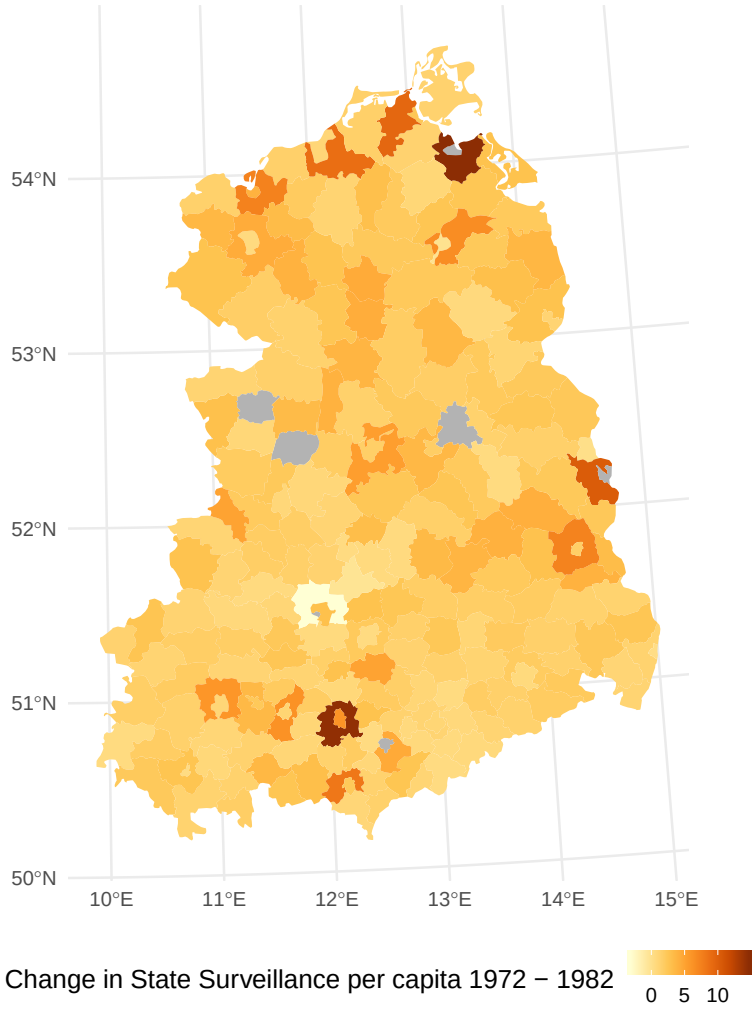
Numerous internal, classified reports on the number and content of petitions by county and year underscore the important role that petitions played in politics in the former German Democratic Republic. After the demise of socialist rule in East Germany, these reports were made available to researchers at the German Federal Archives in Berlin. Information on the number of petitions submitted to the State Council by county and year were retrieved from these reports and scaled by county population.[2]

To measure state surveillance, we draw on a novel data set that allows us to measure both temporal and spatial variance in the intensity of state surveillance in the GDR. Specifically

[2]Data on GDR counties' population size by year was obtained from Class (2017).

we observe the number of local Stasi agents in every GDR county at two points in time, 1972 and 1982. As for petitions, we also scale this measure by county population size to obtain our measure of surveillance intensity. Figure 1 depicts the evolution of state surveillance intensity across the GDR between 1972 and 1982.[3]

Figure 1: Evolution of state surveillance in the GDR between 1972 and 1982.



Note: This map shows the change in the number of Stasi agents at the county-level per 10,000 inhabitants between 1982 and 1972.

We also obtained cross-sectional data on the share of Stasi *informers* in the population

[3]For some counties, we only observe the combined number of Stasi agents for both the *Stadtkreis* and *Landkreis* around the same city. In these cases, we merge the same observed number of Stasi agents to both (generally adjacent) units. Our coefficient point estimates in table A.1 are largely robust to discarding these observations from the dataset entirely by row-wise deletion. Discarding these observatins does however render the treatment effect estimates statistically insignificant at the 95% level of confidence due to lacking statistical power.

prior to the fall of the Berlin Wall for 185 out of 217 counties. In contrast to our first measure of surveillance density, this variable measures the number of unofficial collaborators rather than official Stasi agents.[4] This data is based on official Stasi records, published by the Agency of the Federal Commissioner for the Stasi Records and was originally collected by Muller-Enbergs (2008).[5] We use this measure to analyze the relationship between state surveillance and the 1989 protest movement in section 4.2. Since we only observe the average number of unofficial collaborators between 1980 and 1988, we do not use it for our panel models in section 4.1.

3.2 Instrument: snowfall in winter 1978/79

Research on the relationship between different forms of information gathering in authoritarian regimes is challenging due to concerns about reverse causation or collinearity. To mitigate this challenge, we employ an instrumental variables strategy that employs exogenously induced variation in petition volume to study the effect of a sudden decrease in voluntary information sharing between citizens and the regime on state surveillance in the GDR.

We exploit variation in exposure to the arguably strongest natural disaster that hit the former German Democratic Republic during its 40 years of existence. In late December 1978 and early January 1979, a series strong winter storms brought record snowfall that sometimes exceeded usual snowfall by several meters. Large parts of the GDR's public infrastructure, transportation, and communication networks broke down as a result. Coal production halted, resulting in large-scale energy shortages and the shutdown of the electricity network in parts of the country for several days. Heating became unavailable in many households during a period of extremely low temperatures. Disaster relief was slow. As local authorities were unable to cope with the massive snowfall, the central government had to step in. However, the GDR's leadership was out of the country, which slowed down disaster relief even further. The government deployed the armed forces to help with disaster relief. Soviet troops and tanks supported these efforts (Lüddemann 2020).

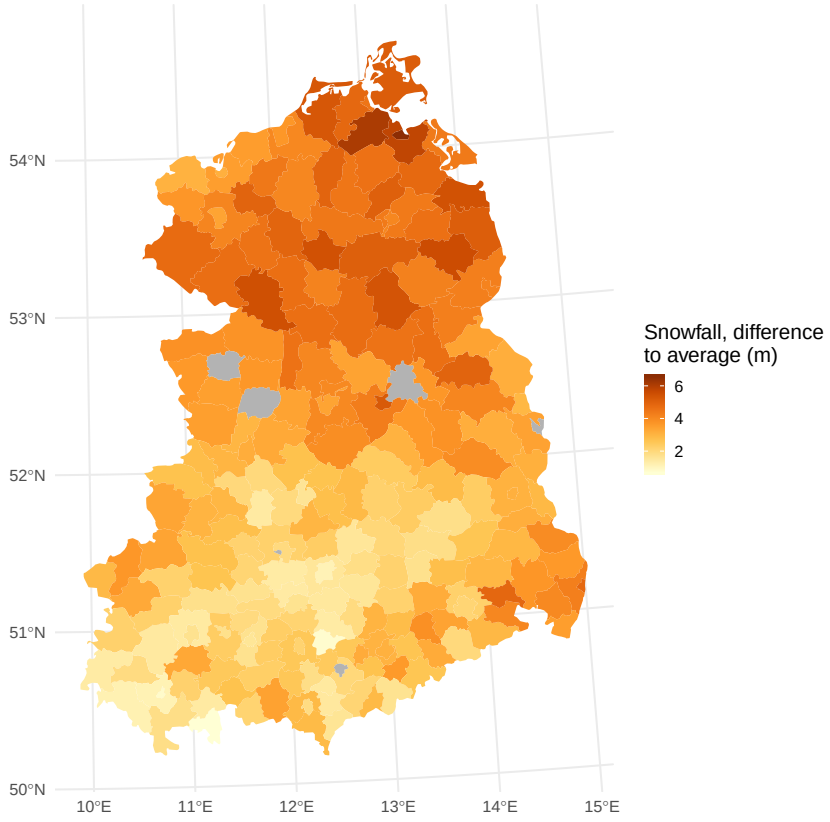
Importantly, exposure to the winter 1978/79 was not uniform across the country. While the Southern counties of the GDR, which are used to large amounts of snowfall in winter, received comparatively little snowfall, counties in the North and East were hit particularly

[4]The Stasi differentiated between three categories of informers: (1) collaborators for political-operative penetration, homeland defense, or special operations as well as leading informers, (2) collaborators providing logistics and (3) societal collaborators, i.e., individuals publicly known as loyal to the state (Lichter, Löffler and Siegloch 2019). In line with Lichter, Löffler and Siegloch (2019), we use the first category of unofficial collaborators (operative collaborators) to construct our measure of surveillance density.

[5]We thank Lichter, Löffler and Siegloch (2019) for sharing the coded dataset with us.

hard. The island of Rügen, for instance, was cut off completely from the outside world for days. We leverage this variation in exposure to the snowfall in 1978/79 to generate exogenous variation in petition activity: petitions decreased in counties with more snowfall, as we will show below.

Figure 2: Winter 1979 treatment intensity by county.



Note: The figure shows snowfall intensity across GDR counties in during the winter of 1979. More specifically, we measure the difference between the median snow depth (in meters) between December 1978 and and February 1979, and then subtract the median snow depth in the preceding 25 years.

We use highly granular weather data from Germany's National Meteorological Service to create this instrument. Specifically, we measure the monthly sum of snow depth during the winter months December–February on more than 1,700 weather measurement stations across the entire GDR.[6] The data is aggregated by county and year using each county-year's median. Our measure of the winter 1978/79 treatment intensity is the difference between a county's snowfall in 1978/79 and its long-term average snowfall over the preceding 25 years. This method ensures that our measure only picks up exceptional amounts of snowfall instead

[6]Figure A.1 in the Appendix shows the distribution of these weather stations across the GDR.

of a county's usual experience with winter. Since we aim to measure the population's actual exposure to the natural disaster, we also exclude weather measurements on stations located on mountains higher than 1,000 metres above mean sea level. Figure 2 shows the spatial distribution of treatment intensity across the territory of the GDR.

3.3 Empirical strategy

Our empirical strategy exploits variance in snowfall intensity during the 1978/79 winter as an instrument for petitions to the central government of the former GDR. We exploit the fact that citizens living in regions that were hit hardest by the winter submitted fewer petitions as a result.

Several reasons explain why exposure to the natural disaster may have reduced citizens' willingness to send petitions to the government. On the one hand, petitioning the government requires trust in the authorities' ability and willingness to help citizens and address their problems (Dimitrov 2015). The government's response to the natural disaster in 1978/79 was delayed and had to rely on East German and Soviet troops and tanks. Citizens in impacted areas may have lost their trust in the government's ability to help them as a consequence. On the other hand, the experience of massive snowfall in 1978/79 may have rendered citizens more diffident with respect to the regime.

We use this exogenous variation in petition submissions to identify the effect of petitions on state surveillance as an alternative way for the regime to gather information. The two-period difference-in-difference estimator is numerically equivalent to a first-difference specification. We therefore estimate a series of instrumented difference-in-difference equations of the following form:

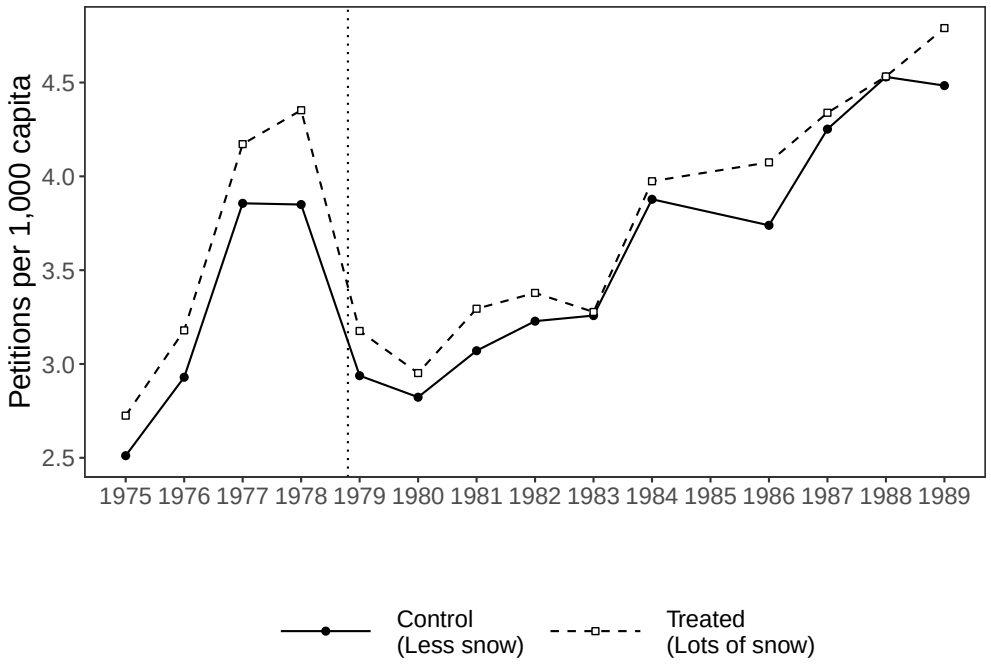
$$\Delta Y_i = \alpha + \pi \Delta T_i + \epsilon_i \tag{1}$$

$$\Delta T_i = \gamma + \delta Z_i + \eta_i \tag{2}$$

The outcome of interest ΔY_i is the change in the total number of Stasi officers in county i between 1972 and 1982, scaled by county population size. The main treatment effect of interest is π, denoting the effect of voluntary information shared through petitions on state surveillance. Specifically, ΔT_i denotes the change in petitions between 1978 and 1979. We instrument this change through our winter instrument Z_i that is defined as described in section 3.2. The raw trends in petitions as a function of winter 1979 treatment intensity

are graphically displayed in Figure 3. Descriptively, we see a clear decrease in the volume of submitted petitions after 1979. Our instrumented difference-in-difference design further leverages the fact that the gap in submitted petitions between counties treated with high and low winter intensity shrinks after 1979.

Figure 3: Petitions per capita in treated and control counties 1975 – 1989



Note: The figure shows the mean number of complaints per 1,000 inhabitants in treated and control counties between 1975 and 1989.

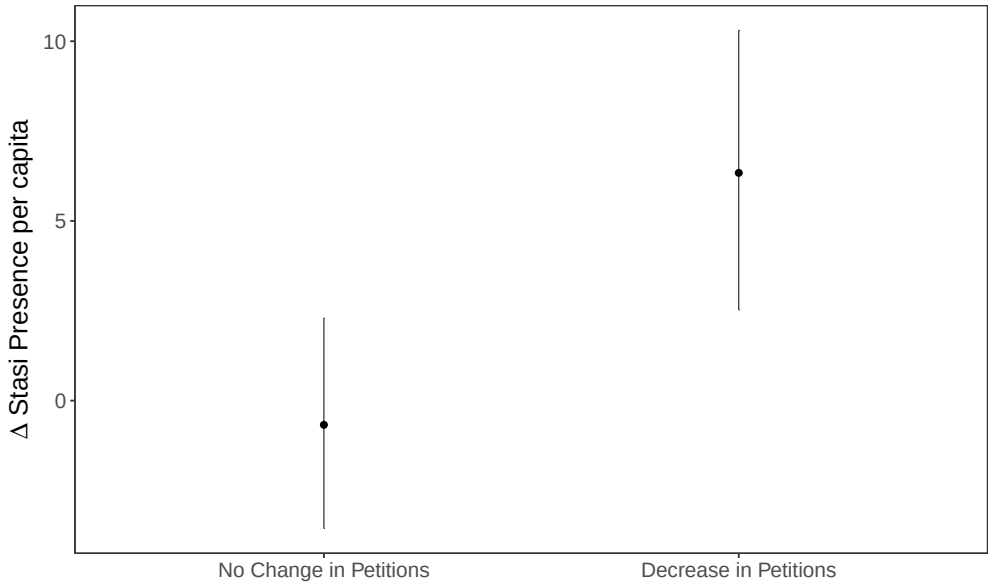
4 Results

4.1 Petitions and State Surveillance

We find strong evidence that the GDR government tried to offset the loss of voluntarily shared information after 1979 by increased Stasi presence at the local level. We visualize our main results in Figure 4 (see also Table A.1 in the appendix). Based on our statistical model, we predict an increase of 6.4 Stasi secret-service cadre per 10,000 county inhabitants for a two-standard-deviation decrease in petitions submitted from the same county. These results are robust to log-transforming the dependent variable to reduce the statistical leverage of outlier observations. We also obtain similar results from an ITT specification where we

directly regress Stasi presence per capita on the winter intensity instrument in a difference in differences setup (see Table A.2).

Figure 4: Main results



Note: Predicted change in Stasi presence at the county level for a two-standard deviation decrease in petitions submitted to the state council. Error-bars indicate 95% confidence intervals. Simulations based on model 1 in table A.1.

4.2 State Surveillance and Regime Stability

We now turn to analyze whether state surveillance in the form of Stasi presence at the local level increased regime stability. For this part of our analysis, we draw on several sources of data. First we obtained data on the share of operative unofficial informers relative to the population prior to the fall of the Berlin Wall from Lichter, Löffler and Siegloch (2019) as described in section 3.1. We combine this with detailed geocoded information on over 2,700 anti-regime protests in the GDR between September 1989 and March 1990 from Crabtree, Darmofal and Kern (2015). We also obtained a variety of county-level covariates measured in 1989 from the same source.

We then estimate cross-sectional regressions of three different outcomes on local Stasi presence. The outcomes are 1) the total number of protests 1989–1990 at the county-level, 2) the average number of participants per protest, and 3) the total number of protest participants by county. We scale all three outcome measures by county population size (in

thousands). In all estimated models, we include the following county-level control variables in addition to state- and district-capital fixed-effects: 1) the share of workers employed in industry and 2) the share of workers employed in agriculture, 3) population density, 4) number of residents per medical doctor, 4) housing space per capita in square meters, 5) pollution from nitrogen oxides in tons per square kilometer, 6) the share of housing units with modern heating and 7) petition volume per capita.[7]

Table 1: Cross-sectional regressions where the outcomes are 1) the total number of protests 1989–1990 at the county-level, 2) the average number of participants per protest, and 3) the total number of protest participants. All outcome variables are scaled by county population size (in thousands). The treatment is the county-level surveillance density measured by the average yearly share of operative unofficial informers relative to the population between 1980 and 1988.

	DV: No. of Protests	**DV: Avg. Turnout**	**DV: Tot. Turnout**
	Model 1	**Model 2**	**Model 3**
Surveillance density	−0.005	18.499	74.804
	(0.096)	(19.659)	(426.838)
Covariates	All	All	All
Fixed Effects	State	State	State
N	185	185	185
R-squared	0.289	0.252	0.478

$^{***}p < .01$; $^{**}p < .05$; $^{*}p < .1$

We present the results in Table 1. Regardless of the specific operationalization of the protest outcome, we do not find a statistically significant relationship between state surveillance and protest occurrence or turnout at the county-level. Counties with a higher population share of Stasi informants did not experience less anti-regime activitiy in the form of protests between September 1989 and March 1990. We caution against a conclusive causal interpretation of this finding. It is possible that local Stasi presence is endogenous, even conditional on covariates and exploiting only within-state variation.

5 Discussion

Research on authoritarian politics has flourished in recent years. Our findings add to a growing literature that examines the role of information gathering for authoritarian stability (e.g.,

[7]Controlling for petition volume might introduce post-treatment bias. The presented results are robust to ommitting this variable from the models.

Nielsen 2009; Dimitrov 2013; Lorentzen 2013; Dimitrov and Sassoon 2014; Distelhorst and Hou 2017; Thomson 2017). This study is one of the first to analyze the interrelationship and partial substitutability of different forms of information gathering in authoritarian regimes. Previous research has generally examined different channels of information gathering in isolation.

Empirically, we have shown that the GDR regime responded to an exogenous decline in voluntarily provided information by increasing state surveillance through secret police presence. However, our results also point to the limits of surveillance as a strategy of autocratic survival: counties with a higher population share of Stasi informants did not experience less protest activity in 1989/1990. State surveillance is no panacea to ensure regime survival.

References

Andrabi, Tahir and Jishnu Das. 2017. "In Aid We Trust: Hearts and Minds and the Pakistan Earthquake of 2005." *The Review of Economics and Statistics* 99(3):371–386.

Blaydes, Lisa. 2018. *State of Repression: Iraq under Saddam Hussein*. Princeton University Press.

Chaney, Eric. 2017. "Revolt on the Nile: Economic Shocks, Religion, and Political Power." *Econometrica* 81(5):2033–2053.

Chen, Jidong, Jennifer Pan and Yiqing Xu. 2016. "Sources of Authoritarian Responsiveness: A Field Experiment in China." *American Journal of Political Science* 60(2):383–400.

Chen, Jidong and Yiqing Xu. 2017. "Why Do Authoritarian Regimes Allow Citizens to Voice Opinions Publicly?" *Journal of Politics* 79(3):792–803.

Class, Fabian. 2017. "Resident Population of the German Democratic Republic 1969-1989 (Version: 1.0.0).".
URL: *http://doi.org/10.7802/1454*

Coffey, John and Cale Horne. 2011. "Measuring public opinion under political repression." *American Diplomacy* .

Crabtree, Charles, David Darmofal and Holger L Kern. 2015. "A spatial analysis of the impact of West German television on protest mobilization during the East German revolution." *Journal of Peace Research* 52(3):269–284.

Der Spiegel. 2008. "New Study Finds More Stasi Spooks.".
URL: *https://www.spiegel.de/international/germany/east-german-spies-new-study-finds-more-stasi-spooks-a-540771.html*

Dimitrov, Martin K. 2013. Vertical Accountability in Communist Regimes: The Role of Citizen Complaints in Bulgaria and China. In *Why Communism Did Not Collapse: Understanding Authoritarian Regime Resilience in Asia and Europe*. Cambridge, UK: Cambridge University Press pp. 276–302.

Dimitrov, Martin K. 2014*a*. "Tracking Public Opinion Under Authoritarianism: The Case of the Soviet Union During the Brezhnev Era." *Russian History* 41(3):329–353.

Dimitrov, Martin K. 2014*b*. "What the Party Wanted to Know: Citizen Complaints as "Barometer of Public Opinion" in Communist Bulgaria." *East European Politics and Soceities and Cultures* 28(2):271–295.

Dimitrov, Martin K. 2015. "Internal Government Assessments of the Quality of Governance in China." *Studies of Comparative International Development* 50(1):50–72.

Dimitrov, Martin K. and Joseph Sassoon. 2014. "State Security, Information, and Repression: A Comparison of Communist Bulgaria and Ba'thist Iraq." *Journal of Cold War Studies* 16(2):3–31.

Distelhorst, Greg and Yue Hou. 2017. "Constituency Service under Nondemocratic Rule: Evidence from China." *Journal of Politics* 79(3):1024–1040.

Gandhi, Jennifer and Ellen Lust-Okar. 2009. "Elections Under Authoritarianism." *Annual Review of Political Science* 12(1):403–422.

Gieseke, Jens. 2000. *Die hauptamtlichen Mitarbeiter der Staatssicherheit: Personalstruktur und Lebenswelt 1950-1989/90.* Ch. Links.

King, Gary, Jennifer Pan and Margaret E. Roberts. 2013. "How Censorship in China Allows Government Criticism but Silences Collective Expression." *American Political Science Review* 107(2):346–343.

Kuran, Timur. 1991. "Now out of never: The element of surprise in the East European revolution of 1989." *World Politics* 44(1):7–48.

Kuran, Timur. 1995. *Private Truths, Public Lies: The Social Consequences of Preference Falsification.* Cambridge, MA: Harvard University Press.

Lazarev, Egor, Anton Sobolev, Irina V. Soboleva and Boris Sokolov. 2014. "Trial by Fire: A Natural Disaster's Impact on Support for the Authorities in Rural Russia." *World Politics* 66(4):641–668.

Lichter, Andreas, Max Löffler and Sebastian Siegloch. 2019. "The long-term costs of government surveillance: Insights from stasi spying in East Germany." *ZEW-Centre for European Economic Research Discussion Paper* (19-049).

Lohmann, Susanne. 1994. "The Dynamics of Informational Cascades: The Monday Demonstrations in Leipzig, East Germany, 1989-91." *World Politics* 47(1):42–101.

Lorentzen, Peter L. 2013. "Regularizing Rioting: Permitting Public Protest in an Authoritarian Regime." *Quarterly Journal of Political Science* 8(2):127–158.

Lüddemann, Steffen. 2020. "Der Katastrophenwinter 1978/79: Als der Osten im Schnee versank.".
URL: *https://www.mdr.de/zeitreise/katastrophenwinter-von-neuzehnhundertachtundziebzig-in-der-ddr100.html*

Luehrmann, Laura M. 2003. "Facing Citizen Complaints in China, 1951-1996." *Asian Survey* 43(5):845–866.

Malesky, Edmund and Paul Schuler. 2011. "The Single-Party Dictator's Dilemma: Information in Elections without Opposition." *Legislative Studies Quarterly* 36(4):491–531.

Muller-Enbergs, H. 2008. "Inoffizielle Mitarbeiter des Ministeriums für Staatssicherheit. Teil 3: Statistik, Ch.".

Nielsen, Christian Axboe. 2009. "Policing Yugoslavism: Surveillance, Denunciations, and Ideology during King Aleksandar's Dictatorship, 1929-1934." *East European Politics and Societies* 23(1):34–62.

Niemann, Heinz. 1993. *Meinungsforschung in der DDR: Die geheimen Berichte des Instituts für Meinungsforschung an das Politbüro der SED*. Cologne, Germnay: Bund-Verlag.

Ong, Elvin. 2015. "Complementary Institutions in Authoritarian Regimes: The Everyday Politics of Constituency Service in Singapore." *Journal of East Asian Studies* 15(3):361–390.

Pan, Jennifer and Alexandra A. Siegel. 2020. "How Saudi Crackdowns Fail to Silence Online Dissent." *American Political Science Review* 114(1):109–125.

Rosenberg, Steve. 2007. "Computers to solve Stasi puzzle.".
URL: *http://news.bbc.co.uk/2/hi/europe/6692895.stm*

Staadt, Jochen. 1996. "Eingaben: Die institutionalisierte Meckerkultur in der DDR." *Arbeitspapiere des Forschungsverbundes SED-Staat* 24/1996.

Thomson, Henry. 2017. "Repression, Redistribution and the Problem of Authoritarian Control: Responses to the 17 June Uprising in Socialist East Germany." *East European Politics and Societies and Cultures* 31(1):68–92.

Tsai, Lily L. and Yiqing Xu. 2018. "Outspoken Insiders: Political Connections and Citizen Participation in Authoritarian China." *Political Behavior* 40(3):629–657.

Wintrobe, Ronald. 1998. *The Political Economy of Dictatorship*. Cambridge, UK: Cambridge University Press.

A Supporting Information (Online Only)

Table A.1: Instrumented difference-in-difference regressions where the dependent variable is the change in the number of secret-service cadre between 1972 and 1982. The dependent variable is measured at the county-level and scaled by county population size. The treatment is the change in the number of complaints submitted at the county-level between 1978 and 1979. The treatment is also observed at the county-level and scaled by county population size. We instrument the treatment through the intensity of the winter 78/79 at the county-level.

	DV: Stasi Presence p.c.	**DV: Log Stasi Presence p.c.**
	Model 1	**Model 2**
Petitions p. c.	-2.887^{**}	-0.350^{**}
	(1.433)	(0.171)
Time periods	2	2
F-Stat	7.47	7.47
N	213	213

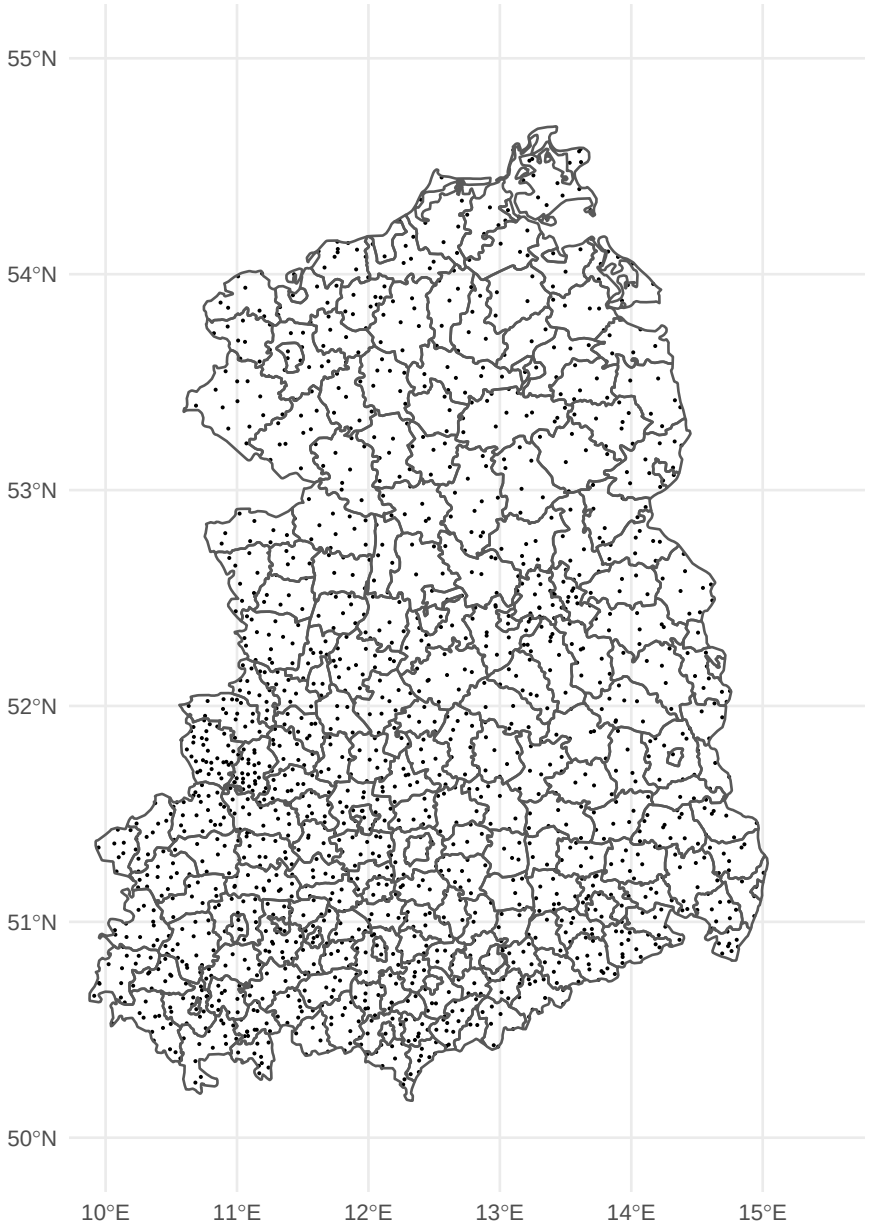
$^{***}p < .01$; $^{**}p < .05$; $^{*}p < .1$

Table A.2: Difference-in-Differences regressions where the dependent variable is the number of secret-service cadre at the county-level scaled by county population size. The dependent variable is observed in 1972 (pre-treatment) and 1982 (post-treatment). The treatment is the intensity of the winter 78/79 at the county-level. Standard errors are clustered at the county-level.

	DV: Stasi Presence p.c.			
	Model 1	**Model 2**	**Model 3**	**Model 4**
Winter ×Post	0.310^{**}	0.310^{**}	0.308^{**}	0.308^{**}
	(0.135)	(0.135)	(0.136)	(0.136)
State FE	No	No	Yes	Yes
Cluster	County	County	County	County
Time periods	2	2	2	2
N	427	427	427	427
R-squared	0.171	0.171	0.229	0.229

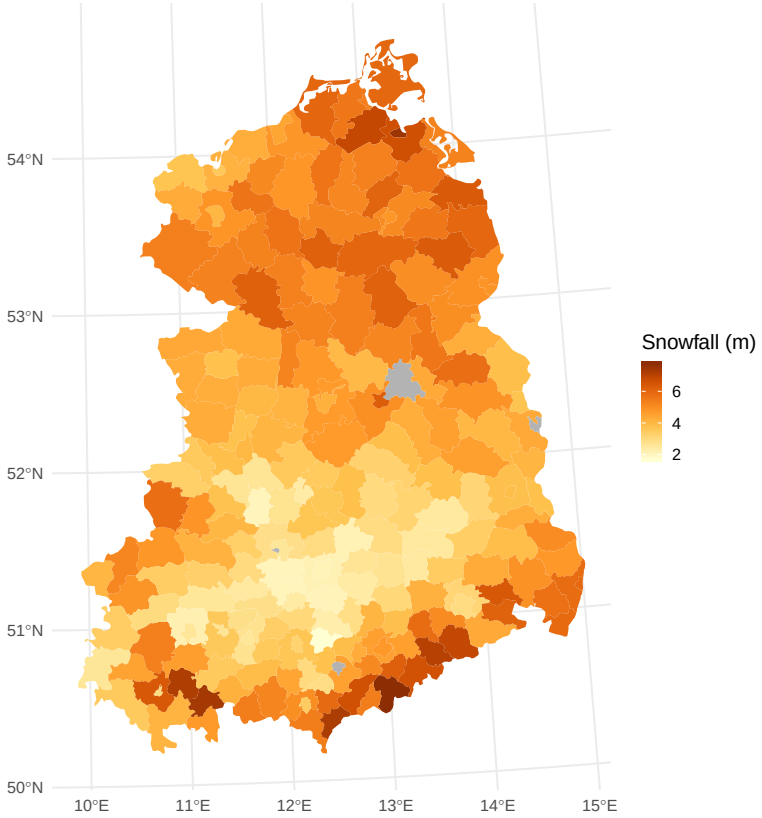
$^{***}p < .01$; $^{**}p < .05$; $^{*}p < .1$

Figure A.1: Weather Measurement Stations



Note: The figure shows the spatial distribution of weather measurement stations across the GDR. Each dot represents the location of one weather measurement station in our dataset.

Figure A.2: Winter 1979 by county.



Note: The figure shows the average snow depth (meters) between December 1978 and February 1979 across GDR counties.