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

Hanno Hilbig†, Hans Lueders‡, Sascha Riaz§

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Abstract

Dictators routinely rely on citizen complaint systems and government surveillance to gather much-needed information about citizen grievances and their popular support. However, the former crucially depends on citizens' willingness to cooperate. How do dictators respond when citizen cooperation declines and they are faced with a loss in voluntarily provided information? This paper draws on novel data on petitions submitted to the government of the former German Democratic Republic (GDR) between 1975 and 1989 and information about the local presence of state security informants to answer this question. We analyze how the GDR regime reacted to an exogenous decline in petitions induced by a natural disaster in 1978/79. Using an instrumented difference-in-differences design, we show that the regime offset a reduction in voluntarily shared information by increasing involuntary information gathering through government surveillance. Finally, we present evidence that surveillance through the secret police did not improve the regime's ability to contain protests in 1989/90. The paper contributes to a growing literature on information acquisition in authoritarian regimes and provides novel insights into the internal politics of closed authoritarian regimes.

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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 the population. Absent such information, dictators are agnostic "whether the population genuinely worships them or worships them because they command such worship" (Wintrobe 1998, p. 20). 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 more challenging in authoritarian than in democratic regimes. Dictators cannot rely on elections because they are neither free nor fair (Gandhi and Lust-Okar 2009). Due to widespread preference falsification, public opinion polls cannot used to gauge public support for the regime either (Kuran 1991, 1995; Coffey and Horne 2011). To solve this challenge, dictators routinely resort to two alternatives: information that citizens provide voluntarily through citizen complaint systems (e.g., Dimitrov 2014*b*, 2015; Chen, Pan and Xu 2016; Distelhorst and Hou 2017), and information gathered involuntarily through government surveillance (e.g., Nielsen 2009; Dimitrov and Sassoon 2014).

Importantly, complaint systems crucially depend on the cooperation of the population. How do dictators respond when citizen cooperation in this regard decreases and they are faced with a loss in voluntarily provided information? Are they able to compensate with an increase in government surveillance? And, if so, does the source of information impact dictators' ability to identify and suppress popular unrest?

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 an army of government employees meticulously catalogued and answered every single one of them. The petition system was paired with a dense network of secret police officials. 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).

To address concerns about the endogeneity of citizen complaints and government surveillance, 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. 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).

Exposure to unusual amounts of snow was 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, or made them more diffident with respect to the regime. 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 involuntary forms of information gathering can be substitutes: we find that the GDR government compensated for a decrease in petitions through increased *Stasi* presence.

We further investigate whether the source of information makes a difference for regime stability by examining the consequences of *Stasi* presence on participation in the 1989/90 protests, which ultimately led to the fall of the Berlin Wall and the demise of socialist one-party rule in East Germany. We find that *Stasi* presence had no effect on the probability of

protest occurrence or popular protest participation.

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 contributes to this scholarship. 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 authoritarian politics, in particular in a data-scarce setting such as the former socialist regimes of Central and Eastern Europe. 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.

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 all political leaders, dictators require precise information about the level of public support they enjoy and the amount and distribution of popular grievances. It is crucial for autocrats to identify citizen discontent early, before it spreads and causes potentially

regime-threatening mass protest (Kuran 1991; Dimitrov 2014*b*; Dimitrov and Sassoon 2014).

In democracies, public support for the government is usually gauged through public opinion polls and regularly held free and fair elections. Yet, these tools are of little use in dictatorships. The playing field is tilted in favor of the ruling party, and elections are rarely a referendum over the government's performance (Gandhi and Lust-Okar 2009). In the former German Democratic Republic, for example, all political candidates and parties were part of the same electoral list: the *National Front*. Large-scale voter mobilization efforts, coupled with widespread voter intimidation and the lack of an actual choice, ensured that electoral support for the socialist regime was quasi-unanimous. 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 have 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, dictatorships often rely on two alternatives: citizen complaint systems and government surveillance.

2.1 Voluntary information-gathering through petitions

Many dictatorships offer their citizens formal, legal avenues through which they can submit information about grievances to local and national authorities. In Bulgaria (Dimitrov 2014*b*), Iraq (Dimitrov and Sassoon 2014; Walter 2018), or the Soviet Union (Dimitrov 2014*a*), for example, citizens could write letters to the government. Today's communist China allows its citizen to ask questions or voice concerns and opposition to government actions through the "Mayor's mailbox" or "letters and visits (*xinfang*)" systems (Luehrmann 2003; Chen 2008; Dimitrov 2015; Chen, Pan and Xu 2016; Chen and Xu 2017; Distelhorst and Hou 2017; Tsai and Xu 2018). Singapore uses constituency services to gather information about popular grievances and help citizens address them (Ong 2015).

Petition systems give citizens an official, legal channel through which they can express their grievances to the regime. Socialist governments took citizen complaints very seriously, as evidenced by the enormous infrastructure created to respond to citizen complaints as well as numerous summary reports produced for internal use. The example of the petition system in the former GDR underscores the importance of petitions as source of information for the government. Estimates suggest that GDR citizens submitted more than half a million petitions (*Eingaben*) every year to all branches of government, ranging from the municipality to the politburo, and from the media to state-owned companies (Class, Kohler and Krawietz 2018). The government meticulously catalogued each petition and classified it by issue and county of origin. Frequent summary reports with policy recommendations were created at all levels of government (Staadt 1996).

Petitions served several valuable purposes for the government (see also Dimitrov 2014*b*):[1] first, they provide invaluable information about citizen grievances. To illustrate, Table 1 demonstrates the breadth of topics covered in petitions to the GDR's State Council (*Staat-*

[1]The following discussion is informed by original archival research at the German Federal Archives in Berlin.

Table 1: Content of Petitions to the GDR's State Council in 1978

Topic	Number	Share
# Petitions	58,391	
# Problems	78,841	100.00%
Housing[1]	33,875	42.97%
Legal questions[2]	7,845	9.95%
Construction and Repairs[3]	7,304	9.26%
Economic[4]	7,046	8.94%
Domestic affairs[5]	6,166	7.82%
Education, health, and social services[6]	4,934	6.26%
Exit[7]	4,044	5.13%
Criticism of local authorities[8]	3,211	4.07%
Trade and supply[9]	3,034	3.85%

[1] *Wohnhausfragen*; [2] *Rechtsfragen*; [3] *Bauwesen & Wohnhausreparaturen*; [4] *Arbeitsvermögen & Land-, Forst-, und Nahrungsgüterwesen & Wirtschaftsfragen* ; [5] *Innere Angelegenheiten*; [6] *Bildungswesen & Gesundheits- und Sozialwesen*; [7] *Übersiedlung*; [8] *Arbeitsweise*; [9] *Handel und Versorgung*.
Source: Own data collection at the German Federal Archives in Berlin.

srat)—the country's main executive body—in 1978. Internal reports distinguished between problems with housing (e.g., lack of space, poor housing conditions, requests for a different apartment), legal issues (e.g., family law, civil law, or requests for assistance with the re-integration into society after jail time), construction and repairs (e.g., lack of construction materials, delays in the completion of housing projects, or poor housing conditions), economic issues (e.g., financial questions, job assignments, or environmental pollution), domestic affairs (e.g., armed forces, the police, or—somewhat counter-intuitively—tariffs and international travel), education, health care, or social services (e.g., lack of child care or poor quality of school instruction), exit visa applications, criticism of local authorities (e.g., local authorities' lack of responsiveness or unfair treatment of petitioners), and trade and supply (e.g., local supply shortages).[2] The government used this information to identify under-served areas and improve the supply of goods and services (Staadt 1996).

Second, petitions often include criticism of local officials, such as unfair treatment[3] or

[2] Taken from summary reports for 1978. E.g., Bundesarchiv DA 5/10906 (Erfurt); Bundesarchiv DA 5/10910 (Karl-Marx-City); Bundesarchiv DA 5/10916 (Schwerin).

[3] E.g., Bundesarchiv DA 5/10912.

a lack of responsiveness.[4] The central government often took action in response to these petitions. Follow-ups with local authorities regularly confirmed that citizens' critiques were justified[5] and resulted in a revision of previous decisions.[6] That is, petitions provided information about the behavior of local authorities and helped the government monitor and control them.

Third, GDR law mandated that all petitions had to receive an official response within four weeks (Class, Kohler and Krawietz 2018). Even though the government was unable to fulfill the majority of citizens' requests, the fact that each petition received a response and that numerous petitions indeed resulted in a re-evaluation of local decisions suggests that the petition system helped signal the government's responsiveness to its citizens and their requests.

Finally, the text of individual petitions reveals that most citizens employed a very specific language: in numerous letters, citizens argue that unfair treatment by local governments contradicts socialist principles. Proposed legal changes are framed as improvements to socialism.[7] Likewise, especially older citizens tended to underscore their lifelong contributions to the Socialist Republic to support their requests.[8] It is plausible that employing this specific rhetoric improved citizens' chances of success. Yet, following a specific rhetoric might have shaped public discourse more broadly, just like government surveillance can shape public discourse (Holquist 1997; see below).

In sum, petitions can provide the government with valuable information and can serve as "barometer of public opinion" (Dimitrov 2014*b*) in authoritarian regimes. However, because petitions are voluntary, they require that citizens have trust in the government (Dimitrov 2013, 2014*b*; Distelhorst and Hou 2017). Citizens will only be willing to submit a petition if they believe that the government will take their complaint seriously, will be able to respond

[4]E.g., Bundesarchiv DA 5/10932.
[5]E.g., Bundesarchiv DA 5/10913; Bundesarchiv DA 5/10926.
[6]E.g., Bundesarchiv DA 5/10914; Bundesarchiv DA 5/10926
[7]E.g., Bundesarchiv DA 5/10911
[8]E.g., Bundesarchiv DA 5/10913; Bundesarchiv DA 5/10926.

appropriately, and will not punish the petition writer.

Yet, the government does not know the true level of support it enjoys among the population Wintrobe (1998). While a high number of petitions may signal trust, a declining petition volume does not necessarily imply the opposite. Few petitions may be indicative of citizen satisfaction and a lack of grievances, but also distrust in the government or fear of repercussions.[9] Moreover, citizen complaints do not inform the government about dissent or rising protest potential: most petitions are worded in a pro-regime fashion, and petitions in which citizens reveal that they are critical of the regime are rare. Thus, while petitions can inform the government about popular grievances and the actions of local officials, they are less able to reduce uncertainty about government opposition.

2.2 Involuntary information-gathering through government surveillance

Government surveillance can help autocratic regimes reduce this uncertainty. Numerous autocratic regimes—such as Saddam Hussein's Iraq (Dimitrov and Sassoon 2014), Franco's Spain (Rodríguez Tejada 2014), King Aleksandar's Yugoslavia (Nielsen 2009), or the Soviet Union (Holquist 1997)—have relied on a dense network of informants to gather information about their population and identify potential sources of unrest and potential regime critics.

Unlike citizen complaint systems, information gathered through government surveillance does not require the voluntary cooperation of the population. A dense network of secret police agents can help identify sources of unrest and dissenters better than petitions, since citizens are unlikely to voluntarily reveal potentially compromising information about their own willingness to participate in anti-government protests. In addition, government surveillance routinely targets those stakeholders who may pose a threat to the survival of the dictator. It thus helps gather information about the loyalty of political elites.

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

Established in February 1950, the GDR's Ministry for State Security (*Ministerium für Staatssicherheit*, or, henceforth, *Stasi*) initially focused its activities on individuals and groups that were openly hostile the regime, such as the non-Marxist parties and other organizations with ties to West Germany. But after the unforeseen popular uprising in June 1953, the GDR government decided to dramatically expand its government surveillance activities. A dense network of informers was created in order to monitor and control the population and key administrative and economic sites (Bruce 2003; Thomson 2017).

The *Stasi* 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.

The information gathered by the *Stasi* was used for several purposes. A dense network of informants allows authoritarian regimes to identify and neutralize regime critics (Pfaff 2001). It further enables the use of targeted instead of mass repression (Dimitrov and Sassoon 2014). The information collected by the *Stasi* was further used to ensure that economic and political advancement were linked to party loyalty (Popplewell 1992). In addition, the *Stasi*'s information gathering activities shaped people's behavior and rhetoric in public by punishing socially deviant actions (Pfaff 2001) and managing how citizens thought they could express themselves (Holquist 1997). While it is unclear whether such punishment actually changed popular attitudes, it reduced the amount of anti-regime discourse and actions, thus leaving citizens ignorant about the true level of regime support among their fellow citizens (Kuran 1991).

Yet, government surveillance may also have important drawbacks for the government's ability to gather information about its citizens. Pfaff (2001) argues that *Stasi* activities often resulted in self-policing among regime critics. While this may deter collective action, it also limits the government's ability to collect information about popular grievances. Likewise, the possibility that even private conversations may be observed by the governments undermines citizen trust—a precondition for the submission of petitions to the government (see above).

Lastly, principal-agent problems may limit the government's ability to gather information about its population. The amount of high-quality information that the government receives through this channel crucially depends on the government's ability to monitor and incentivize informants. Dimitrov and Sassoon (2014), for example, contend that citizens who were forced to serve as informants may provide less reliable information.

2.3 Relationship between voluntary and involuntary information-gathering

Citizen complaint systems and government surveillance can help provide dictators with crucial information about citizen grievances and popular support for their rule. But they also have important drawbacks, as detailed above. What is the relationship between both strategies? Can dictators compensate the decline in one strategy with increased reliance on the other, or do both reinforce each other?

It is possible that voluntary and involuntary information-gathering strategies are complements. The above discussion reveals that both strategies provide different types of information. While citizen complaints are a useful source of information about citizen grievances, local elites, and public trust (Dimitrov 2014*a*), government surveillance helps identify and neutralize regime opponents (Pfaff 2001).

Yet, there are also reasons why both strategies may be partial substitutes for each other.

Petition systems require high levels of citizen trust in the government. Widespread government surveillance, however, can undermine public trust. An increase in government surveillance may thus be accompanied by decreased petition activity. Decreased petition volume may signal high levels of citizen satisfaction or low levels of trust. Increased surveillance may help the government understand the causes of a decline in petitions. Lastly, both petitions and government surveillance can be used to monitor local authorities.

3 Data and Empirical Strategy

3.1 Data on Information Gathering

Our research focuses on the interaction between different ways in which the central 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. Petitions could be sent to several central government bodies. The petition volume received by each body reflects its importance in the political process: the People's Chamber (*Volkskammer*) received less than 2,000 petitions per year. By contrast, between 20,000 and 30,000 petitions were sent to the Council of Ministers (*Ministerrat*). Most petitions were sent to the State Council (*State Council*): between 50,000 and 80,000 per year. Because of its central importance as the main executive body in the former German Democratic Republic, our empirical analysis focuses on petitions submitted to the State Council. Information on the number of petitions submitted to the State Council by county and year were retrieved from numerous internal summary reports accessed at the German Federal Archives in Berlin. The data are scaled by county population size.[10]

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

The GDR also invested considerable resources into information acquisition through state surveillance. We draw on archival data that allows us to measure both temporal and spatial variance in the local presence of *Stasi* agents. This data is based on official *Stasi* records, published by the Agency of the Federal Commissioner for the Stasi Records.[11] We observe the number of local *Stasi* agents in every GDR county at two points in time, 1972 and 1982. The data are scaled 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.[12]

We also obtained cross-sectional data on the share of *Stasi informers* in the population 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.[13] This data is also 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).[14] 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.

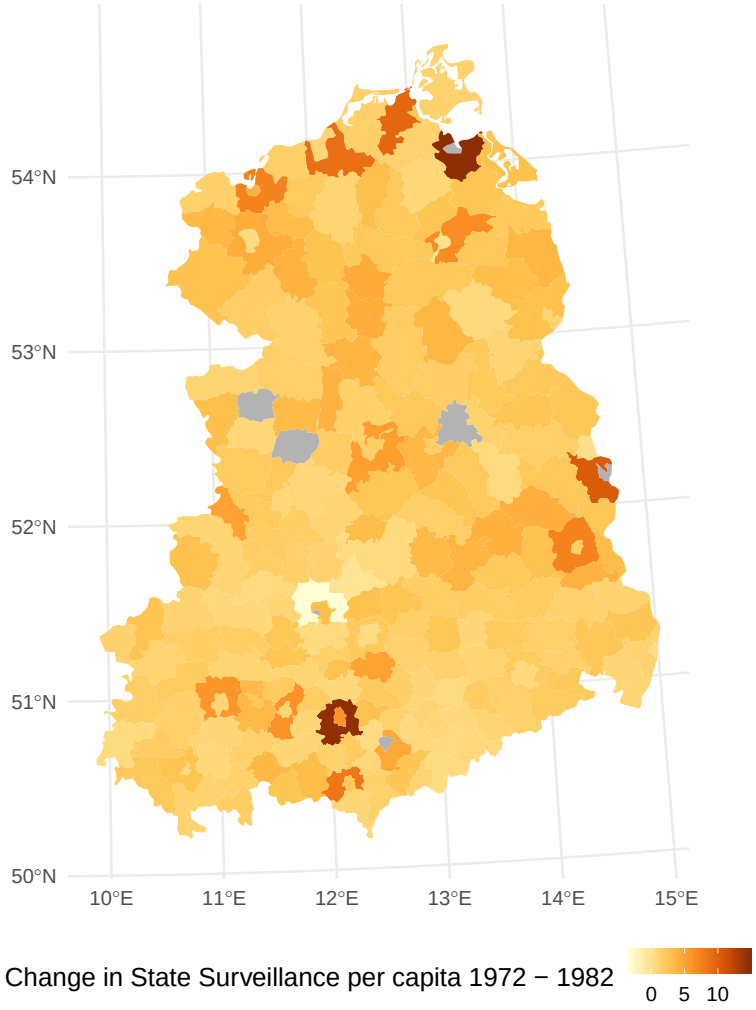
[11]We thank historian Jens Gieseke, who originally collected this data, for generously sharing the data with us.

[12]For 36 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 results remain substantively unchanged when, instead of assuming equal numbers of *Stasi* agents in such units, we proportionally allocate the number of *Stasi* agents based on each county's population size.

[13]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.

[14]We thank Lichter, Löffler and Siegloch (2019) for sharing the coded data set with us.

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.

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 and collinearity. We employ an instrumental variables strategy to mitigate these challenges. Specifically, we follow a growing literature on citizen responses to natural disasters (e.g., Chaney 2017; Lazarev et al. 2014; Ramos and Sanz 2010) and use variation in exposure to the arguably strongest

natural disaster that hit the former German Democratic Republic during its 40 years of existence to instrument for changes in petition volume. This design allows us to investigate the effect of an exogenously induced decrease in voluntary information sharing between citizens and the regime on state surveillance.

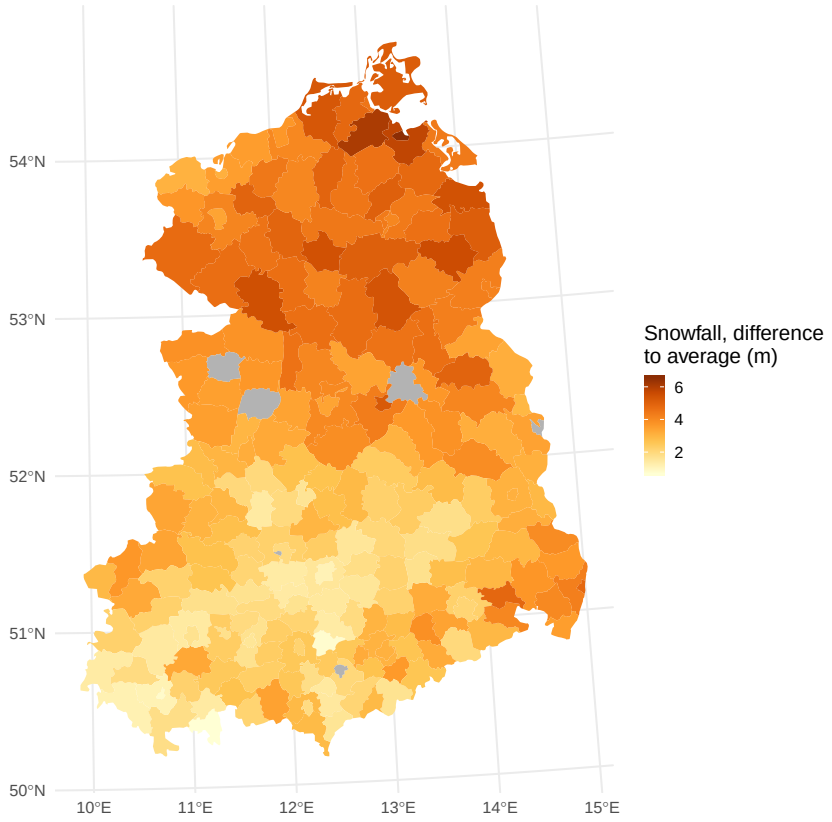
In late December 1978 and early January 1979, a series of strong winter storms brought record snowfall that cut off parts of the country for days. In some areas, snowfall exceeded long-time averages by several meters. Parts of the GDR's public infrastructure, transportation, and communication networks broke down as a result. Coal production halted, resulting in large-scale energy shortages and the shutdown of the electricity network in some areas. 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).

These events led to a reduction in citizens' willingness to send petitions to the central government. 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. In addition, the experience of massive snowfall in 1978/79, coupled with large-scale military presence in particularly affected areas, may have rendered citizens more diffident with respect to the regime.

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

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.

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 the 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.[15] The data are 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.

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

This method ensures that our measure only picks up exceptional amounts of snowfall instead 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 former GDR.

3.3 Empirical strategy

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

We use this exogenous variation in petition submissions to identify the effect of petitions on state surveillance—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:

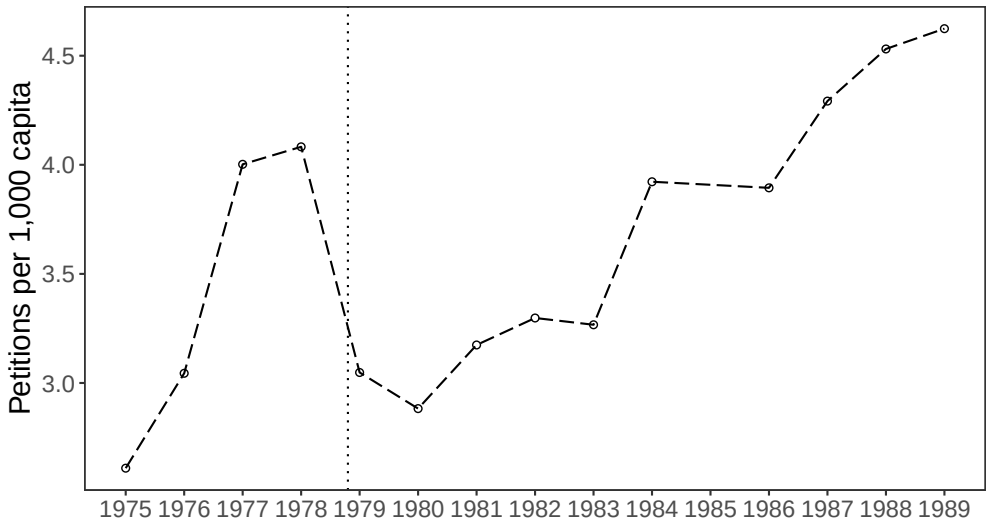
$$\Delta Y_i = \alpha + \pi \Delta T_i + \epsilon_i \tag{1}$$

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

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 as described in the previous section. The raw trends in petitions are graphically displayed in Figure 3. We present the

raw first-stage regression results in table 2 below. Our first-stage effect is robust to different operationalizations of both the treatment and outcome, and also holds when including all available time-periods from 1975 to 1989 in the regression analysis.

Figure 3: Petitions 1975 – 1989



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

Identification in this study hinges on the standard assumptions of instrumental variables estimation. Most importantly, we assume that the intensity of the winter Z_i only affects trends in local *Stasi* presence ΔY_i through its direct effect on the volume of petitions to the State Council (exclusion restriction). We also posit that our instrument is uncorrelated with other unobserved determinants of changes in local state surveillance. We emphasize that because we're differencing the dependent variable, we only require our instrument to be exogenous of *trends*, not levels, in local *Stasi* presence. While we cannot directly test our identification assumptions, we provide evidence in their support. We estimate a series of difference-in-difference models to test whether our instrument is exogenous to observed time-varying placebo covariates. Table A.1 in the Appendix presents the results. We find no statistically significant effect of the winter treatment on regime approval in local and national elections, infant mortality, and the county-level emigration rate.

4 Results

4.1 Petitions and State Surveillance

Table 2: Difference-in-Differences regressions where the dependent variable is the number of petitions at the county-level scaled by county population size. The dependent variable is log-transformed in models 7 and 8. The treatment is the intensity of the winter 78/79 at the county-level. Standard errors are clustered at the county-level.

	DV: Petitions p.c.						DV: Petitions (Log)	
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Winter ×Post	−0.264***	−0.112***	−0.175**	−0.084**	−0.175**	−0.084**	−0.041*	−0.020**
	(0.098)	(0.042)	(0.079)	(0.034)	(0.079)	(0.034)	(0.022)	(0.009)
Treatment	Binary	Continuous	Binary	Continuous	Binary	Continuous	Binary	Continuous
County FE	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Period FE	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	County	County	County	County	County	County	County	County
Time periods	2	2	All	All	All	All	All	All
N	432	432	3016	3016	3016	3016	3016	3016
R-squared	0.222	0.216	0.823	0.824	0.823	0.824	0.810	0.810

***p < .01; **p < .05; *p < .1

Table 3: 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.

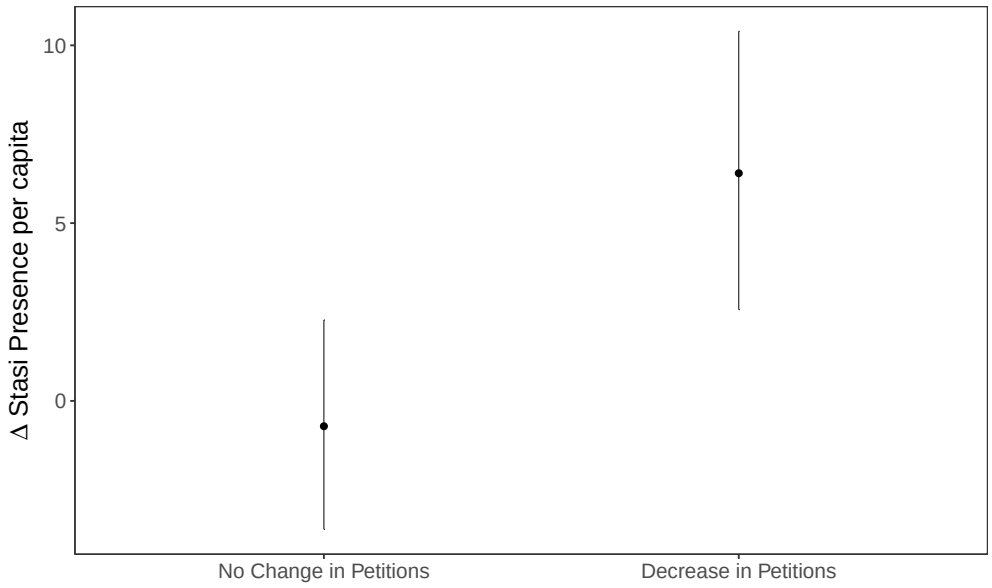
	DV: Stasi Presence p.c.	**DV: Log Stasi Presence p.c.**
	Model 1	**Model 2**
Petitions p. c.	−2.930**	−0.356**
	(1.443)	(0.173)
Time periods	2	2
F-Stat	7.47	7.47
N	213	213

***p < .01; **p < .05; *p < .1

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 3 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 3.

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 informants 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 measures of protest on local Stasi presence. The three measures 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 outcomes by county population (in thousands). In all estimated models, we include the following county-level control variables in addition to state- and district-capital fixed-effects: the share of workers employed in industry, the share of workers employed in agriculture, population density, the number of residents per medical doctor, housing space per capita in square meters, pollution from nitrogen oxides in tons per square kilometer, the share of housing units with modern heating and petition volume per capita. The data is taken from Crabtree, Darmofal and Kern (2015).[16]

Table 4: 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

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

We present the results in Table 4. 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 activity 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

How do dictators respond to a sudden decrease in voluntarily provided information? The existing literature suggests that autocrats rely both on information gathered through citizen cooperation and government surveillance. However, little is known whether these strategies are substitutes and whether one strategy can be used to compensate for a loss in the other.

This paper draws on novel data on information gathering in the former German Democratic Republic to fill this gap in the literature. Specifically, we study the relationship between voluntary information gathering through the extensive petition system and involuntary information gathering through the dense network of state security informants. To mitigate concerns about the endogeneity of these variables, we exploit an exogenous decline in the amount of petitions submitted to the country's central government in response to a major natural disaster: in 1978/79, a series of strong winter storms brought record-level snowfall to some parts of the country. Electricity in parts of the country broke down. The government's disaster relief efforts were slow and had to rely on East German and Soviet troops. We first show that this winter 1978/79 resulted in a decline in petitions from heavily affected areas, and then exploit this exogenous change to show that the government increased state surveillance to compensate for a loss in voluntarily provided information.

Our findings contribute to the existing literature in multiple ways. Our research design exploits exogenous variation in exposure to a natural disaster. We show that citizens in areas that suffered most from the winter in 1978/79 submitted fewer petitions to the central government. In doing so, we join a nascent literature on the effect of natural disasters on autocratic politics (e.g., Chaney 2017; Lazarev et al. 2014; Andrabi and Das 2017).

A growing body of research seeks to understand how dictators gather much-needed information about their amount of popular support, citizen grievances, and regime critics (e.g., Nielsen 2009; Dimitrov 2013; Lorentzen 2013; Dimitrov and Sassoon 2014; Distelhorst and Hou 2017; Thomson 2017). However, this literature often analyzes a particular form of information gathering in isolation, without considering the relationship between the different options dictators have at their disposal. We find that dictators are able to compensate for a decrease in voluntarily provided information through increased state surveillance.

Information gathering through citizen complaint systems in authoritarian regimes crucially depends on the voluntary cooperation of citizens. Our findings are relevant to research on citizen resistance in authoritarian regimes (e.g., Scott 1984; O'Brien 1996; Rivetti 2017; Pan and Siegel 2020). We find a decreased willingness to cooperate with the regime had little effect: a decrease in petitions was compensated by an expansion of *Stasi* presence, and the specific source of information did not change protest participation in 1989/90. On the one hand, this finding suggests that state surveillance is no panacea to ensure regime survival in times of mass mobilization against the regime. But on the other hand, it also means that less voluntarily provided information did not weaken the regime's ability to suppress protest.

However, it is possible that increased *Stasi* presence may have had long-term negative consequences: Jowitt (1992) argues that dense networks of state security informants reduce citizen trust in their neighbors and the government, which may have long-term negative consequences regarding citizen support for democracy. In fact, East Germans are still more distrusting of other citizens today (Rainer and Siedler 2009).

Research on authoritarian politics has flourished in recent years. Scholars are turning to novel data and methods to understand politics in closed, secretive, and highly repressive regimes (e.g., King, Pan and Roberts 2013; Blaydes 2018; Pan and Siegel 2020). This paper analyze novel archival data from an otherwise data-scarce environment to contribute to this literature.

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A Supporting Information (Online Only)

Table A.1: Difference-in-Differences regressions for different outcome variables: 1) SED approval in local elections, 2) SED approval in national elections, 3) infant mortality, and 4) the county-level emigration rate. Electoral approval is measured as the share of voters who turned out and casted a valid vote in favor of the ruling SED party. We only consider the most recent local and national elections pre/post 1979. The treatment is the intensity of the winter 78/79 at the county-level. Standard errors are clustered at the county-level.

	DV: Local SED Approval	**DV: Nat. SED Approval**	**DV: Infant Mortality**	**DV: Emig. Rate**
	Model 1	**Model 2**	**Model 3**	**Model 4**
Winter ×Post	0.0005	−0.001	−0.523	0.013
	(0.0003)	(0.001)	(0.431)	(0.009)
Treatment	Continuous	Continuous	Continuous	Continuous
Cluster	County	County	County	County
Time periods	2	2	2	2
N	430	430	432	432
R-squared	0.034	0.060	0.011	0.0004

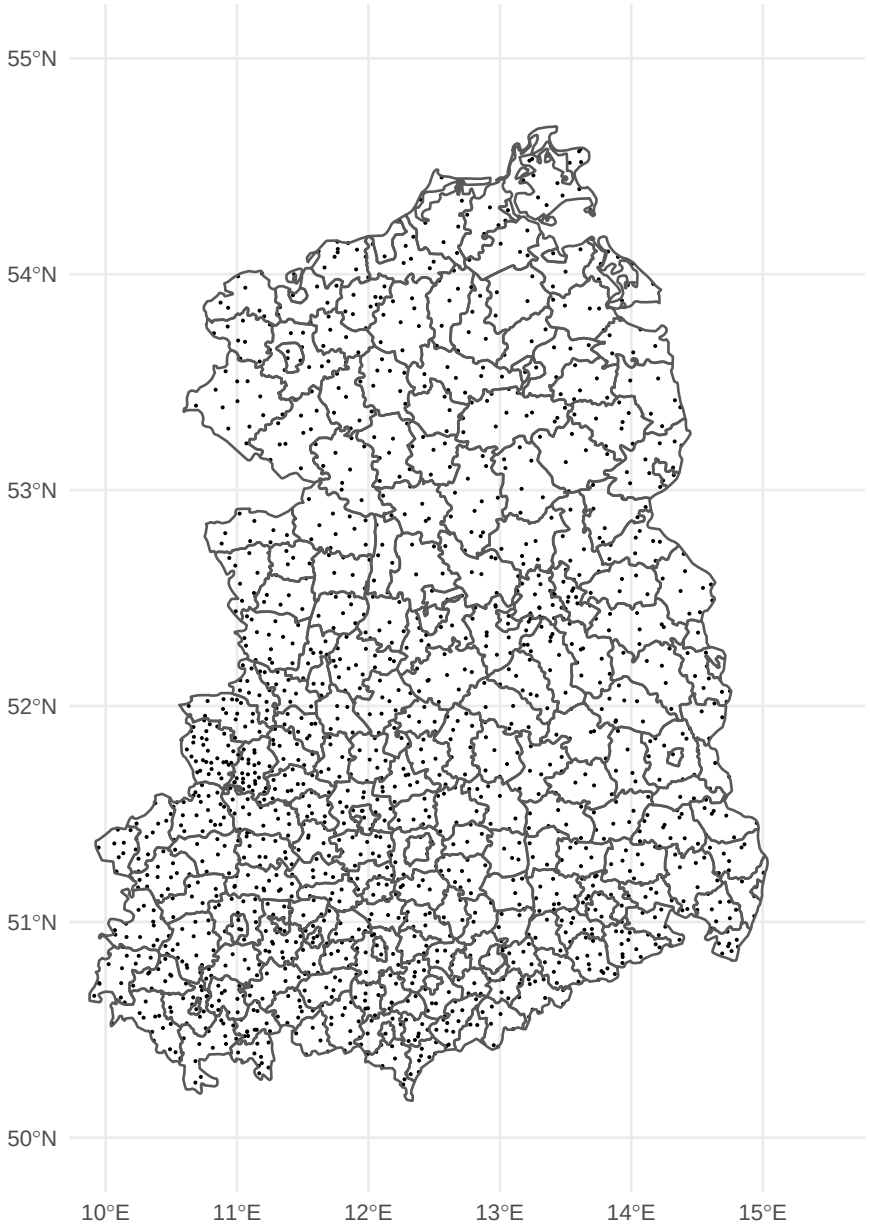
$^{***}p < .01$; $^{**}p < .05$; $^{*}p < .1$

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

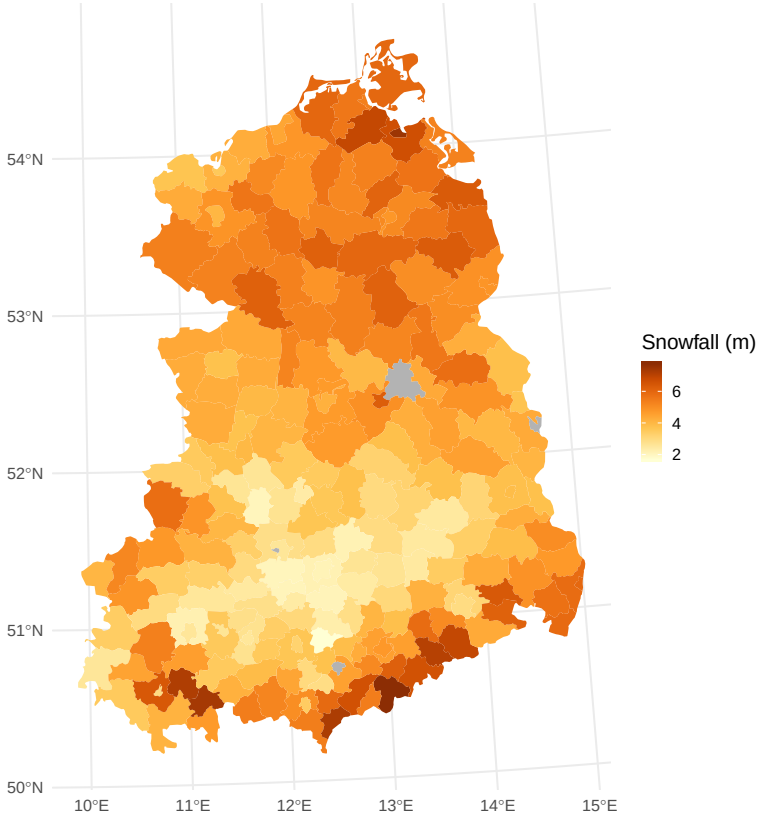
$^{***}p < .01$; $^{**}p < .05$; $^{*}p < .1$

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.