

Domestic Politics and Transnational Repression: Evidence from a Zero-Inflated Poisson Model

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Introduction: Repressing Citizens Overseas

REPRESSION under autocracies has been one of the most well-studied phenomena of Political Science. It is widely accepted that repression is the key of how autocrats stay in power. For decades, scholars have convincingly demonstrated many nuances regarding *how*, *when*, and *why* repressions occur, leaving us with a rich repertoire of literature on the subject.¹ In particular, academics have paid more attention to the growing sophistication of authoritarian crackdowns on targeted populations. For instance, in contemporary China, although the crudest forms of repression abound, more subtle and less accountable tactics have been in effect.²

So far, most of this repression literature has focused on *domestic* repression, which has been largely conceptualized within certain spatial-jurisdictional boundaries following the norm of territorial sovereignty.³ However, in light of globalization and interstate economic dependency, the classic Weberian conception of states being the monopolizers of coercion within their designated territorial boundaries suffers from severe theoretical and practical limitations. I contend that what remains an understudied area in authoritarian repression is its *transnational* aspects.

Most non-democratic regimes today are no longer as closed-off as Maoist China or the DPRK in contemporary North Korea. Rather, with their economies becoming increasingly integrated with the international community, population outflow and other cross-border exchanges have become not only inevitable but essential to regime resilience. However, the perverse side of such supposedly liberalizing openness is that authoritarian practices tend to spill over national borders simultaneously. Thus, many scholars have advocated for a re-imagination of territories, space, state power, and state sovereignty when it comes to repression.

In a 2017 paper, international relations professor Marlies Glasius influentially developed “a new theory to better understand how authoritarian rule is exercised over populations abroad and to connect this extraterritorial dimension to the character and resilience of contemporary authoritarian rule.”⁴ Authoritarian toleration and management of population mobility could very well be leveraged as reasons and conduits to surveil, intimidate, or even inflict physical harm on diaspora communities—operations collectively termed as “extraterritorial security practices.”⁵ Benefiting from the dedicated efforts of international human rights organizations, many case studies widely

¹Christian Davenport, “State repression and political order,” *Annu. Rev. Polit. Sci.* 10, no. 1 (2007): 1–23; Christian Davenport, “State repression and the tyrannical peace,” *Journal of Peace Research* 44, no. 4 (2007): 485–504.

²Lynette H Ong, *Outsourcing repression: Everyday state power in contemporary China* (Oxford University Press, 2022); Yanhua Deng and Kevin J O’Brien, “Relational repression in China: using social ties to demobilize protesters,” *The China Quarterly* 215 (2013): 533–552.

³Davenport, “State repression and political order.”

⁴Marlies Glasius, “Extraterritorial authoritarian practices: A framework,” *Globalizations* 15, no. 2 (2018): 179–197.

⁵Glasius.

confirm the empirical reality of transnational repression (henceforth TR) perpetrated by authoritarian regimes. Some well-known cases include the Russian regime's hunting of exiled political dissidents, Rwanda's multiple assassinations of RPF defectors, the PRC's mass scale arrests and extraditions of the Uighur, and other TRs committed by several Central Asian Republics and Middle Eastern states.⁶

In short, authoritarian leaders today possess ample motives and channels to project their coercive power overseas to repress social groups deemed potential political threats—a claim increasingly supported by accumulating empirical observations over the last decade. However, while previous case studies expose the rich *modus operandi* of TR, we have a limited understanding on the domestic factors that plausibly shape the calculus of the TR source states when they choose to engage in risky transnational operations.

This article proceeds as follows. We begin by situating TR within the broader theory of authoritarian survival and extraterritorial coercion. We then revisit and replicate a published empirical study on domestic drivers of TR to establish a baseline for comparison. Next, we diagnose a central methodological challenge in TR data—the prevalence of excessive zero counts—and demonstrate why conventional count models such as Poisson and Negative Binomial may misrepresent the underlying data-generating process (DGP). To address this issue, we introduce a two-stage Zero-Inflated Poisson (ZIP) framework that distinguishes between regimes that are structurally unlikely to engage in TR and those that face a genuine risk of perpetration. We then present empirical results from the ZIP model, showing that mixed regimes (anocracies), rather than fully closed autocracies, are more likely to act as transnational repressors. Finally, we examine how specific domestic constraints—including election, party strength, and state capacity—condition TR behavior within these regimes, and we discuss what these findings reveal about authoritarian governance and international human rights protection.

Transnational Repression: Concept and Scope

An event is considered a case of TR only if a source state represses its *own citizens* in another (home) state outside its national border. Admittedly, TR is by no means a 21st-century phenomenon. Its shadow stretches to the end of the Cold War era. Throughout the 1970s and 1980s, South America was a breeding ground for TR perpetrators. At least eight US-sponsored military dictatorships jointly plotted a series of cross-border kidnappings, tortures, rapes, and murders of hundreds of their political opponents—collectively known as the infamous Operation Condor.⁷ However, a burgeoning body of literature has shown that TR practices today are considerably

⁶Edward Lemon, Bradley Jardine, and Natalie Hall, “Globalizing minority persecution: China’s transnational repression of the Uyghurs,” *Globalizations* 20, no. 4 (2023): 564–580; James Leibold, “Surveillance in China’s Xinjiang region: Ethnic sorting, coercion, and inducement,” *Journal of contemporary China* 29, no. 121 (2020): 46–60; Saipira Furstenberg, Edward Lemon, and John Heathershaw, “Spatialising state practices through transnational repression,” *European Journal of International Security* 6, no. 3 (2021): 358–378; David Lewis, “‘Illiberal Spaces’: Uzbekistan’s extraterritorial security practices and the spatial politics of contemporary authoritarianism,” *Nationalities Papers* 43, no. 1 (2015): 140–159; Human Rights Watch, “Rwanda: Repression Across Borders,” Accessed: 2025-12-03, January 2014, <https://www.hrw.org/news/2014/01/28/rwanda-repression-across-borders>; J. Patrice McSherry, “Rwanda’s Khashoggi: who killed the exiled spy chief?” Accessed: 2025-12-03, January 2019, <https://www.theguardian.com/news/2019/jan/15/rwanda-who-killed-patrick-karegeya-exiled-spy-chief>; OVD-Info and Collective Action Brussels Think Tank (CABT), “Transnational Repression by the Russian Federation: Threats, Tendencies, Solutions,” Accessed: 2025-12-03, May 2025, <https://reports.ovd.info/en/transnational-repression-russian-federation-threats-tendencies-solutions>; Dana M Moss, “Transnational repression, diaspora mobilization, and the case of the Arab Spring,” *Social Problems* 63, no. 4 (2016): 480–498.

⁷J. Patrice McSherry, *Operation Condor: the cold war conspiracy that terrorised South America*, <https://www.theguardian.com/news/2020/sep/03/operation-condor-the-illegal-state-network-that-terrorised-south-america>, The Guardian; accessed 2025-12-03, 2020.

broaden in scope across targeted social groups and more advanced in tactics.⁸

Targets of TR now include not only political opponents and exiled dissenters who openly speak against authoritarian regimes, but also activists and journalists.⁹ In some cases, ethnic minorities are repressed simply for maintaining contact beyond national borders. For instance, in China's Xinjiang Province, a highly securitized ethnic minority region in mainland China, Uyghur residents who visit Central Asia or simply communicate with their outside diaspora in Central Asia are automatically deemed as security threats to be neutralized.¹⁰

The autocrats also now carry out more sophisticated executions of TR, and they do so strategically to avoid detrimental global repercussions, contingent upon the political characteristics of the host states (i.e., the state in which the targets reside and TRs take place). In addition to high-profile cases of arrests, detentions, kidnappings, physical assaults, and outright assassinations, the majority of TR project threats are made through proxies. Much attention has been paid to threats against TR targets' families and loved ones in home states.¹¹ Modern telecommunication technologies, although celebrated for their libertarian potential, are ironically an integral part of autocrats' TR arsenal. For example, abuses of the CCP's digital panoptic surveillance in Xinjiang haunts overseas Uyghur communities, who are cut off from communication lines and harassment on social media. These practices contributed to a "transnational space of insecurity."¹² In 2018, many started to notice that authoritarian regimes exploit Red Notices issued by Interpol, a global policing agency that is supposed to bolster international security, to legitimize the process of extraditing political opponents and dissidents back to their home states.¹³ Abusers of Interpol resources and intelligence infrastructure include not only wealthy and influential international powers like China and Russia, but also regionally contained actors like Venezuela, Turkey, and Tajikistan.¹⁴

An even more covert and intractable form of TR practice involves mobilizing sectors of diaspora communities and turning them against their own peer expatriates, either through coercion or co-option. TR events like these are likely perpetrated by non-state actors or state proxies, which obscures the state's involvement and implication in the crimes. China, once again, emerges as an illuminating case. Ethnographic research suggests that the PRC has cultivated "repressive nationalist diasporas" to implant internal divisions among political activists from Hong Kong, Tibet, Xinjiang, Taiwan, and mainland China.¹⁵ On American campuses, international students loyal to Beijing have often been mobilized through civic channels like student and scholar associations.¹⁶ Chinese securities agencies have also intimidated the Uyghur diaspora overseas, encouraging members to

⁸Ihsan Yilmaz and Bulent Kenes, "Transnational Repression: Theoretical Framework, Concepts, and Global Cases," in *Hybrid Transnationalism and Repression: Turkey's Diaspora Under Authoritarian Islamist Siege* (Springer, 2025), 35–64.

⁹Yana Gorokhovskaia, Nate Schenkkan, and Grady Vaughan, "Still not safe: Transnational repression in 2022," *Freedom House Washington, DC Accessed August 30*, no. 2023 (2023): 2023–04.

¹⁰Leibold, "Surveillance in China's Xinjiang region: Ethnic sorting, coercion, and inducement."

¹¹Dana M Moss, Marcus Michaelson, and Gillian Kennedy, "Going after the family: Transnational repression and the proxy punishment of Middle Eastern diasporas," *Global Networks* 22, no. 4 (2022): 735–751; Moss, "Transnational repression, diaspora mobilization, and the case of the Arab Spring"; Gorokhovskaia, Schenkkan, and Vaughan, "Still not safe: Transnational repression in 2022."

¹²Lacin Idil Oztig and Abdurresit Celil Karluk, "Theorizing the spatiality of ICT-mediated transnational repression: Evidence from China's repression of Uyghurs in Türkiye," *Environment and Planning C: Politics and Space* 43, no. 5 (2025): 972–989.

¹³Lemon Edward, "Weaponizing Interpol," *Journal of Democracy* 30, no. 2 (2019): 15–29.

¹⁴Edward, "Weaponizing Interpol."

¹⁵Kennedy Chi-Pan Wong, "Sowing hate, cultivating loyalists: Mobilizing repressive nationalist diasporas for transnational repression by the people's republic of China regime," *American Behavioral Scientist* 68, no. 12 (2024): 1655–1678.

¹⁶Miles Maochun Yu, "Enabling the Dragon: The Dangers of China's Academic Outsourcing to the United States," Accessed: 2025-12-03, November 2024, <https://www.hoover.org/research/enabling-dragon-dangers-chinas-academic-outsourcing-united-states>.

spy on each other, even though many of them have already secured non-Chinese citizenship.¹⁷ In 2017, Vietnamese nationals living in Europe assisted Vietnam's secret service in the kidnapping of a former Vietnamese politician in Berlin under broad daylight.¹⁸

A strong relationship between like-minded home and host states is key for successful TR executions, since the systematic arrests, detentions, and subsequent unlawful extraditions all hinge on the close cooperation between both states.¹⁹ In a recent study, authoritarian leadership researchers Marcus Michaelsen and Kris Ruijgrok quantitatively assessed the influence of host-country politics on TR perpetration and found that TR perpetrators are more likely to collaborate with autocratic host states that follow similar models of governance, while engaging in more direct assaults in democratic ones.²⁰

Lastly, it is worthwhile to highlight the systematic, continuous efforts by some of the most capable TR perpetrators to penetrate overseas societies. The extent to which they can repress targets almost at their free will has been deeply unsettling. Chinese agents had been able to operate from secret police outposts in Manhattan until an FBI raid in 2023.²¹ Assisted by domestic police forces, they have also built a formidable TR network spanning the entire Southeast Asia.²² In 2020, Iranian proxies planned to kidnap Masih Alinejad, an Iranian journalist, from her Brooklyn apartment in broad daylight.²³ As the world becomes increasingly insecure by autocrats determined to extend their iron grip abroad,²⁴ it is ever more imperative for the intellectual community to dissect the anatomy of TR.

This article builds on rich insights from case studies by NGO's, human rights organizations, and investigative journalism, endeavoring to advance a large N quantitative analysis which focuses on source states. Despite the abundance of reports, TR, viewed in totality, is a rare political event; we contribute to existing analytical strategies in the hopes of better modeling the data-generating process. Our empirical results invite further research and theorization on how domestic authoritarian politics condition TR initiation and intensity.

TR Datasets and Replication Study

Although case studies of TR based on interviews and historical analysis abound, systematic, data-driven, and quantitative approaches to TR research are still in their early phase.²⁵ Currently, there are four major databases that capture the character of TR incidents: Central Asian Political Exiles Database (CAPE), Authoritarian Actions Abroad Database (AAAD), Transnational Repression Database, Freedom House, and China's Transnational Repression of Uyghurs (CTRU) Dataset.

¹⁷David Tobin and Nyrola Elimä, *"We Know You Better Than You Know Yourself": China's Transnational Repression of the Uyghur Diaspora*, technical report, Accessed: 2025-12-03 (University of Sheffield, School of East Asian Studies, 2023).

¹⁸BBC News, "Germany jails Vietnamese man for 'Cold War' kidnapping," Accessed: 2025-12-03, July 2018, <https://www.bbc.com/news/world-europe-44958530>.

¹⁹Marcus Michaelsen and Kris Ruijgrok, "Autocracy's long reach: explaining host country influences on transnational repression," *Democratization* 31, no. 2 (2024): 290–314.

²⁰Michaelsen and Ruijgrok.

²¹Alexander Mallin, *Man pleads guilty to operating secret Chinese police station in NYC: The FBI called it an example of China's "audacious activities" on U.S. soil*, <https://abcnews.go.com/US/guilty-plea-expected-secret-chinese-police-station-case/story?id=116907684>, ABC News, accessed 2025-12-03, 2024.

²²Echo Hui, Elise Potaka, and Dylan Welch, "China's secret spy," Accessed: 2025-12-03, May 2024, <https://www.abc.net.au/news/2024-05-13/china-spy-secret-police-agent-tells-all-four-corners/103826708>.

²³Nicholas Schmidle, "Iranian Operatives Planned to Kidnap a Brooklyn Author, Prosecutors Say," Accessed: 2025-12-03, July 2021, <https://www.nytimes.com/2021/07/13/nyregion/iran-masih-alinejad-kidnapping.html>.

²⁴Gorokhovskaia, Schenkan, and Vaughan, "Still not safe: Transnational repression in 2022."

²⁵Alexander Dukalskis et al., "Transnational repression: Data advances, comparisons, and challenges," *Political Research Exchange* 4, no. 1 (2022): 2104651.

It is important to note that all these data projects overwhelmingly depend on journalist reports as well as NGO sources.²⁶

The AAAD was chosen for this study because of its wide time coverage (1991–2019) of 1177 discrete events perpetrated by a total of 35 authoritarian regimes. Conversely, the Freedom House project only started in 2014, and the CAPE and CTRU dataset only contain incidents involving the PRC and the 5 Central Asian states.²⁷

Each unit of analysis in AAAD is a TR event happening to one or more targets at one time. Based on the data, the most active TR source states between 1991 and 2019 include Uzbekistan (199), China (162), North Korea (151), Turkey (163), and Russia (74).²⁸ Although reliable information about TR is difficult to obtain through any database, the AAAD's comprehensive coverage is a great resource to leverage. Next, we turn to a recent quantitative study that seeks to establish linkages between domestic politics and TR perpetration, using the AAAD dataset. In the following sections, we first replicate this study's main findings and then make several extensions based on our critique of their statistical modeling.

Replication of Dukalskis et al.'s Study

In their study *The Long Arm and the Iron Fist: Authoritarian Crackdowns and Transnational Repression*, Dukalskis et al. are among the first to investigate the domestic drivers (in the source states) of repression overseas.²⁹ In particular, their main theoretical contribution is the notion that domestic repression is positively correlated with the abundance of TRs.³⁰ The mechanism for how domestic repression drives transnational repression is twofold. Firstly, increasing crackdowns within authoritarian state borders crowds out dissidents, political activists, victims, and other targets perceived as a regime threat.³¹ In other words, TR intensity is proportional to the political threats and challenges dictators face. Secondly, domestic repressive actions and campaigns could reveal networks that link domestic political opposition with citizen groups overseas.³² Based on this theoretical framework, it is safe to exclude established democratic regimes from the risk pool of TR perpetrators; the nature of democratic governance obviates these two proposed linkages, since an incident is defined as a TR only if the source state is repressing its *own* citizens, as defined earlier.³³

To test their theory empirically, Dukalskis et al. adopt a logit model to examine the likelihood of an authoritarian state perpetrating more than one TR in a given year (i.e., the dependent variable).³⁴ The main variable of interest is *domestic repression*, operationalized by (lagged) Civil Liberties Index (CLI) from the Varieties of Democracy (V-Dem) Project, which measures the “absence of physical violence committed by government agents and the absence of constraints of private liberties and political liberties by the government.”³⁵ In addition, a vector of covariates are controlled for, including whether or not an election took place during the previous year, how long an incumbent ruler had stayed in power before the occurrence of a TR event, regime type (captured

²⁶Dukalskis et al.

²⁷Dukalskis et al., “Transnational repression: Data advances, comparisons, and challenges.”

²⁸Alexander Dukalskis, *Making the world safe for dictatorship* (Oxford University Press, 2021); Alexander Dukalskis et al., “The long arm and the iron fist: Authoritarian crackdowns and transnational repression,” *Journal of Conflict Resolution* 68, no. 6 (2024): 1051–1079.

²⁹Dukalskis et al., “The long arm and the iron fist: Authoritarian crackdowns and transnational repression.”

³⁰Dukalskis et al.

³¹Dukalskis et al., “The long arm and the iron fist: Authoritarian crackdowns and transnational repression.”

³²Dukalskis et al.

³³Dukalskis et al.

³⁴Dukalskis et al.

³⁵Dukalskis et al.

by Polity), GDP per capita, population, state capacity index, party and military dimension index, and diplomatic representation abroad. Country and year fixed effects are also added to absorb unaccounted-for confounders. Different model specifications are tested for robustness, including Poisson, Negative Binomial, and OLS, by using the raw count of TR incidences perpetrated by a state in each year as the dependent variable.

Their main results are replicated successfully and tabulated in Table 1, which serves as the benchmark for later model comparisons. Observe that the estimates, their standard errors, and their statistical significance are consistent with the findings reported in the original study.³⁶ In Models 3 and 4, the authors also added interaction terms to examine the heterogeneity in the effect of domestic repression, but the main model of interest to our extension study is Model 2. Based on Table 1, the coefficient for domestic repression is positive and statistically significant at all conventional levels, and its magnitude remains consistent when a series of controls are added. We see a state's capacity index is a statistically discernible determinant of the likelihood of TR perpetration. Also, there is marginal evidence that the longer the leader's tenure, the less likely the state is to perpetrate one or more TR operations overseas. Although the authors did not provide any interpretation in their original study, a plausible explanation is that the autocrats may have limited incentive to mobilize costly resources against perceived threats overseas when they enjoy a longer time in office.

Modeling Rare Political Events

International Relations (IR) is a field that produces rich research on rare political events, such as wars, conflicts, massacres, assassinations of leaders, and formations of alliances. The topic of interest in this article, TR events, is no exception. From numerous news reports and witness interviews discussed in the Introduction, it is evident that TR operations require a tremendous amount of both financial and human resources to be successfully executed, as agents must penetrate societies in sovereign states far from their home bases. Figure 1, constructed based on the AAAD dataset, shows that the distribution of TR events is strongly skewed to the right, indicating their low frequency throughout the 1991–2019 window.

Modeling these rare-event encounters poses a few statistical challenges, including model misspecification, selection bias, and bias in model estimates due to variance overdispersion or relaxation of model assumptions. In the late 1980s and throughout the 1990s, researchers attempted to resolve these issues by designing optimal statistical methods for rare political events. Most of this work was spearheaded by Professor Gary King.³⁷ This literature established that the underlying data-generating process (DGP) for the occurrence of these rare events is best modeled by a family of distributions associated with discrete non-negative integer counts, typically specified by an Exponential Poisson Regression (EPR). Specifically, the DGP is assumed to follow a Poisson distribution of the form:

$$Y_t \sim f_p(y_t | \lambda_t) = \frac{e^{-\lambda_t} \lambda_t^{y_t}}{y_t!},$$

where y_t is a non-negative integer that records the number of events and λ_t is the rate parameter, assuming all observational periods are of the same length (years, months, etc.).³⁸ King has proven

³⁶Dukalskis et al., “The long arm and the iron fist: Authoritarian crackdowns and transnational repression.”

³⁷Gary King and Langche Zeng, “Explaining rare events in international relations,” *International Organization* 55, no. 3 (2001): 693–715; Gary King, “Event count models for international relations: Generalizations and applications,” *International Studies Quarterly*, 1989, 123–147.

³⁸King, “Event count models for international relations: Generalizations and applications”; King and Zeng, “Ex-

	Model 1	Model 2	Model 3	Model 4
Domestic repression	1.09*** (0.20)	0.83** (0.26)	0.88** (0.28)	-0.24 (0.42)
Polity score		-0.10 (0.08)	-0.09 (0.08)	-0.10 (0.08)
Elections		0.09 (0.29)	0.09 (0.29)	0.20 (0.30)
Leader tenure (log)		-0.37* (0.18)	-0.36 (0.18)	-0.56** (0.21)
Military dimension index		-0.35 (1.32)	-0.30 (1.32)	-1.21 (1.36)
Party dimension index		0.28 (1.34)	0.25 (1.35)	0.45 (1.26)
Population (log)		-0.78 (2.18)	-0.90 (2.19)	-1.31 (2.44)
GDP per capita (log)		-0.66 (0.38)	-0.67 (0.39)	-0.92* (0.40)
State capacity index		0.20*** (0.05)	0.11 (0.19)	0.21*** (0.06)
Repression × State capacity			0.01 (0.03)	
Diplomatic representation abroad				-0.24 (0.44)
Repression × Diplomatic representation				0.15** (0.05)
Deviance (Null)	982.60	747.39	747.39	743.63
df.null	856	730	730	722
Log Likelihood	-261.20	-191.51	-191.52	-185.73
AIC	644.39	513.02	515.03	505.47
BIC	934.35	811.65	818.26	812.56
Deviance	522.39	383.02	383.03	371.47
DF Resid.	796	666	665	656
nobs	857	731	731	723

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; $p < 0.1$

Table 1: Replicated Logit regression results.

that EPR tends to be superior both asymptotically (in large samples) and empirically (in finite samples), in contrast to the Ordinary Least Squares (OLS) and logged normal specifications that use continuous distributions.³⁹

In addition, King has conducted extensive research on adjusting for potential variance dispersion from various sources.⁴⁰ For a Poisson-distributed variable Y_t , $E[Y_t] = \lambda_t = \text{Var}[Y_t]$, but this analytical result rarely holds in reality, and an extra dispersion parameter ϕ is introduced into the variance specification: $\text{Var}[Y_t] = \phi\lambda_t$. King was able to derive a generalized distribution that works for both over and under-dispersion in the dataset.⁴¹

plaining rare events in international relations.”

³⁹Gary King, “Statistical models for political science event counts: Bias in conventional procedures and evidence for the exponential Poisson regression model,” *American Journal of Political Science*, 1988, 838–863.

⁴⁰Gary King, “Variance specification in event count models: From restrictive assumptions to a generalized estimator,” *American Journal of Political Science*, 1989, 762–784.

⁴¹King.

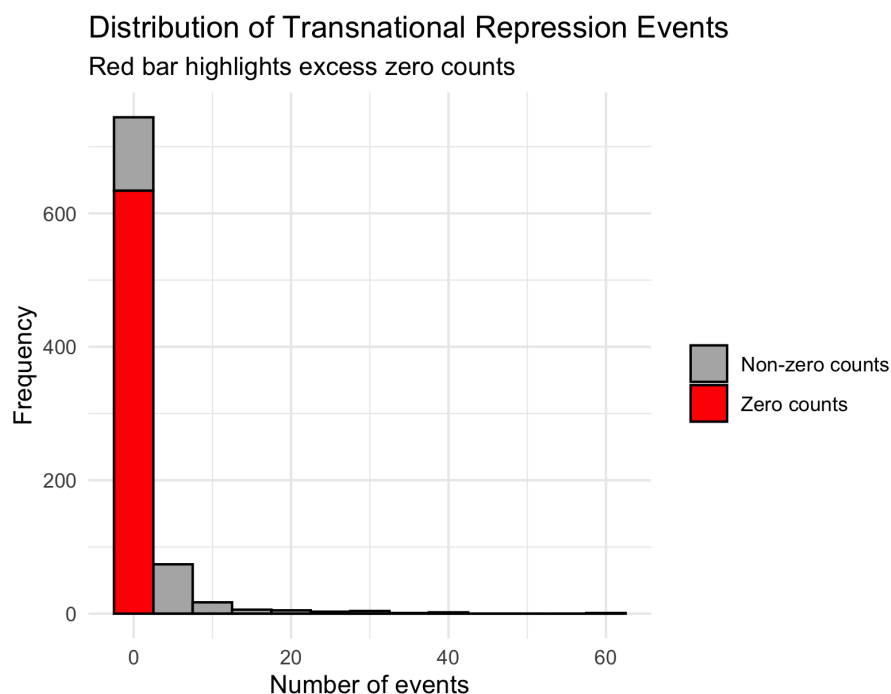


Figure 1: Distribution of counts of Transnational Repression in AAAD dataset. Note the abundance of zeros colored in red.

This study contributes to this literature by specifically examining the overdispersion in IR count data resulting from an excess of zero observations.

Situated in this methodological literature on rare events, the modeling in Dukalskis et al.'s study comes with some limitations that warrant adjustments.⁴² The models they base their conclusions on are logistic regression models, which treat the intensity of TR in a given country-year as dichotomous. I contend that this practice is insufficient, both technically and substantively.

Logistic regression, when applied to rare events data, typically does not perform well, as it significantly underestimates the probability of rare events in finite samples due to the bias of selecting on the dependent variable and crude measures of predictors common in the IR literature.⁴³ Although there are ways to correct for finite sample and rare event bias, inconsistency of standard error, and selection bias, I argue these methods suffer from their common practice of dropping a sizable amount of zero observations, under the assumption that 1's are more insightful than non-events (0's).⁴⁴ In the context of TR, I contend that the data-generating process of zero can be useful in understanding the initiation, instead of the intensity, of TR.

This is where my modeling strategy departs from this literature, and I advance the argument that for some IR events, zero observations can still be insightful, and dropping them leads to the omission of key substantive insights regarding the occurrence of rare events. The TR study is a case

⁴²Dukalskis et al., "The long arm and the iron fist: Authoritarian crackdowns and transnational repression."

⁴³Gary King and Langche Zeng, "Logistic regression in rare events data," *Political analysis* 9, no. 2 (2001): 137–163.

⁴⁴King and Zeng, "Explaining rare events in international relations"; King and Zeng, "Logistic regression in rare events data."

in point. Among the over-abundance of zero counts in a typical TR dataset, as evidenced in Figure 1, there are reasons to surmise that those zeros could be either *structural* zeros or *sampling* zeros. The former indicates that some autocratic regimes, for whatever reasons, might simply choose not to repress overseas at all, while the latter belong to the true “risk” pool of TR operations and can be presumably modeled as a function of domestic political determinants. Although the rare-event logit model developed by King and Zeng provides credible strategies to correct for biases in coefficients and probability estimates computationally, it does not necessarily help with our understanding of the underlying DGP and substantive interpretation.⁴⁵ I posit that TR initiation and TR frequency could emerge from different mechanisms and, hence, different DGPs. Therefore, modeling the DGP of zeroes separately using systematic components could lend richer theoretical insights for TR events themselves.

In particular, I argue that regime type, reflected by the Polity score, and other political determinants examined in Dukalskis et al.’s study capture two fundamentally different aspects of autocrats’ decisions in engaging in TR.⁴⁶ To address this issue, we advance a Zero-inflated Poisson (ZIP) model, which features a mixture of Bernoulli and Poisson distributions that was first proposed by statistician Diane Lambert to model manufacturing defects.⁴⁷ The technical details will be developed more fully in the following section.

Model Specification and Estimation Strategy

As mentioned above, the data-generating process (DGP) of our outcome variable stems from a mixture distribution. Let $Y_i \in \{0, 1, 2, 3, \dots\}$ be the raw counts of TR events. Assume there is a binary latent variable $Z_i \in \{0, 1\}$ that functions as a sorting device to assign an autocratic state into the “risk pool” of TR perpetrators. In other words, $Z_i = 1$ if state i observes a structural zero count, meaning it is inherently unlikely to repress its citizens overseas, and $Z_i = 0$ otherwise. Let X_i denote a vector of controls that are associated with the probability of $Z_i = 1$. More formally, we let $P[Z_i = 1 | X_i] = \pi_i$ and $P[Z_i = 0 | X_i] = 1 - \pi_i$, where π_i is estimated from a logistic regression model

$$\pi_i = \Lambda(X_i' \gamma) = \frac{e^{X_i' \gamma}}{1 + e^{X_i' \gamma}}.$$

Then, we model sampling zeros and strictly positive integer counts of TR events as if they come from a Poisson distribution. Denoting another vector of controls W_i , which could, but does not necessarily have to, be the same as X_i , we model the counts as $Y_i | (Z_i = 1, W_i) \sim \text{Pois}(\mu_i)$, where the rate parameter is estimated from a Poisson regression:

$$\mu_i = e^{W_i' \beta}.$$

Combining the two distributions, we fully specify the conditional probability mass function of the discrete outcome variable Y_i :

$$P[Y_i = y | X_i, W_i] = \{ \pi_i + (1 - \pi_i)e^{-\mu_i}, y = 0; (1 - \pi_i)\mu_i^y e^{-\mu_i} y!, y \geq 1 \}$$

This translates to the parametric assumption that all strictly positive integer counts and sampling zeros of TR events are assumed to come from a Poisson distribution with probability $1 - \pi_i$,

⁴⁵King and Zeng, “Logistic regression in rare events data.”

⁴⁶Dukalskis et al., “The long arm and the iron fist: Authoritarian crackdowns and transnational repression.”

⁴⁷Diane Lambert, “Zero-inflated Poisson regression, with an application to defects in manufacturing,” *Technometrics* 34, no. 1 (1992): 1–14.

while structural zero counts are assumed to arise from a Bernoulli distribution with probability π_i . The conditional first and second moments are derived to be the following:

$$\begin{aligned} E[Y_i | X_i, W_i] &= (1 - \pi_i)\mu_i \\ \text{Var}[Y_i | X_i, W_i] &= (1 - \pi_i)\mu_i(1 + \pi_i\mu_i). \end{aligned}$$

Observe that in () the overdispersion induced by zero observations is explicitly accounted for in the variance structure, and the dispersion parameter is exactly $(1 + \pi_i\mu_i)$.

Further, given the structure of the AAAD dataset, where measurements are recorded for each authoritarian state during each year, there exists potential within-unit correlation and between-unit heterogeneity. Following the standard procedure used in past studies, we account for these effects by including random effects (intercepts) on the country level in both stages.⁴⁸ We condition our estimates on those random effects as well. Letting $u_i \sim N(0, \sigma_u^2)$ and $v_i \sim N(0, \sigma_v^2)$, we estimate:

$$\begin{aligned} \pi_{it} &= \Lambda(X'_{it}\gamma + u_i), \\ \mu_{it} &= e^{W'_{it}\beta + v_i}. \end{aligned}$$

The conditional first and second moments are:

$$\begin{aligned} E[Y_{it} | X_{it}, W_{it}, u_i, v_i] &= [1 - \pi_{it}(u_i)] \mu_{it}(v_i), \\ \text{Var}[Y_{it} | X_{it}, W_{it}, u_i, v_i] &= [1 - \pi_{it}(u_i)] \mu_{it}(v_i)(1 + \pi_{it}(u_i)\mu_{it}(v_i)). \end{aligned}$$

Utilizing the AAAD dataset and modifying model specification by Dukalskis et al. with the mixture distribution specified above, my main estimation strategy amounts to a Zero-inflated Poisson model.⁴⁹ The main estimating equations are the following.

Stage 1: Zero inflation (logit) model: $\Pr(Y_{it} = 0) = \pi_{it}$,

$$\log \frac{\pi_{it}}{1 - \pi_{it}} = \gamma_0 + \gamma_1 \text{RegimeType}_{i,t-1} + u_i.$$

Stage 2: Poisson count model: $Y_{it} \sim \text{Poisson}(\mu_{it})$,

$$\log(\mu_{it}) = \beta_0 + \beta_1 \text{DomesticRepression}_{i,t-1} + \beta_2 \text{StateCapacity}_{i,t-1} + \mathbf{X}'_{i,t-1}\theta + v_i,$$

where

$$(u_i, v_i)' \sim N\left(\mathbf{0}, \begin{pmatrix} \sigma_u^2 & \rho\sigma_u\sigma_v \\ \rho\sigma_u\sigma_v & \sigma_v^2 \end{pmatrix}\right).$$

In Stage 1, we fit a parsimonious logistic model where the major determinant of the probability of structural zero counts of TR event is country i 's regime type in the previous year ($t - 1$), which I dichotomize into **Autocracy** and **Anocracy** based on a partition of Polity score into intervals: $[-10, -6] \cup [-5, 10]$. As the V-Dem project suggests, it is conventional to regard authoritarian regimes with a Polity score of -6 or lower as closed autocracies, and those with a Polity score $\in [-5, 5]$ as mixed polities, or semi-democracies. After the probability of structural zero is accounted for, the main determinants of the intensity of TR are the domestic level of repression and state capacity.

In Stage 2, we fit a Poisson count model to the data. The main variables of interest are the level of domestic repression and state capacity, and $X_{i,t-1}$ includes other control variables. $Y_{i,t}$ denotes the raw count of TR events at a given country year. Lastly, random intercepts are included in both stages to capture different baseline propensities to engage in TR for each state.

Diagnostic analysis was conducted to ensure the Poisson stage does not suffer from the potential overdispersion, as we expect the Poisson distribution to have equal expectation and variance. Using

⁴⁸Daniel B Hall, "Zero-inflated Poisson and binomial regression with random effects: a case study," *Biometrics* 56, no. 4 (2000): 1030–1039.

⁴⁹Dukalskis et al., "The long arm and the iron fist: Authoritarian crackdowns and transnational repression."

estimates of $\hat{\mu}_{it}$, $\hat{\pi}_{it}$, u_i , and v_i based on () and (), we checked whether $\hat{E}[Y_{it} | X_{it}, W_{it}, u_i, v_i] = \widehat{\text{Var}}[Y_{it} | X_{it}, W_{it}, u_i, v_i]$ (See Appendix A).

Empirical Results

Panel A: Zero-Inflated Poisson		
	ZIP	
	<i>Poisson stage</i>	
Domestic repression	0.750***	(0.110)
Elections	−0.430***	(0.110)
Leader tenure (log)	−0.250*	(0.100)
Military dimension index	1.040	(0.910)
Party dimension index	−1.980**	(0.690)
Population (log)	0.310	(0.220)
GDP per capita (log)	0.250†	(0.140)
State capacity index	0.120***	(0.030)
	<i>Zero-inflation stage</i>	
Intercept	0.370*	(0.160)
Anocracy	−1.440***	(0.420)
Observations	731	
AIC	1325.06	
Panel B: Two-Way Fixed Effects Models		
	Poisson FE	NegBin FE
Domestic repression	0.608** (0.279)	0.789*** (0.198)
Polity score	−0.076 (0.074)	−0.080 (0.071)
Elections	−0.538** (0.233)	−0.077 (0.200)
Leader tenure (log)	−0.322** (0.138)	−0.343** (0.147)
Military dimension index	−0.115 (1.592)	−0.837 (1.064)
Party dimension index	−0.961 (1.956)	0.688 (1.117)
Population (log)	1.973 (3.322)	3.328** (1.601)
GDP per capita (log)	−0.152 (0.525)	0.000 (0.381)
State capacity index	0.128** (0.053)	0.152*** (0.044)
Observations	549	549
AIC	1518.8	1151.0

Standard errors in parentheses. † $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Models that include country and year fixed effects are clearly indicated.

Otherwise, it is a ZIP model with random intercept.

Table 2: Count Models Comparison. Fixed-effect models in Panel B are replicated from the Dukalskis et al.⁵⁰ study.

We first start with some interpretation of the first-stage logit model. As suggested by the last two rows in Panel A in Table 2, mixed polities (Anocracy) are way less likely to register structural zero counts of TR, meaning they are at risk of committing transnational repressions. Thus, their observed zero counts of TR are likely due to sampling. This result is statistically significant at any conventional level, and the numerical effect ($\gamma_1 = -1.44$) is also substantively meaningful. The more interpretable marginal effects of regime type in terms of predicted probabilities estimated from the logit model are illustrated in Figure 2.

The Poisson stage model outputs in Table 2 suggest that, once an authoritarian state is in the TR “risk pool,” domestic repression, state capacity, previous election, leader tenure, and party dimension index are statistically significant determinants of expected TR counts. However, compared

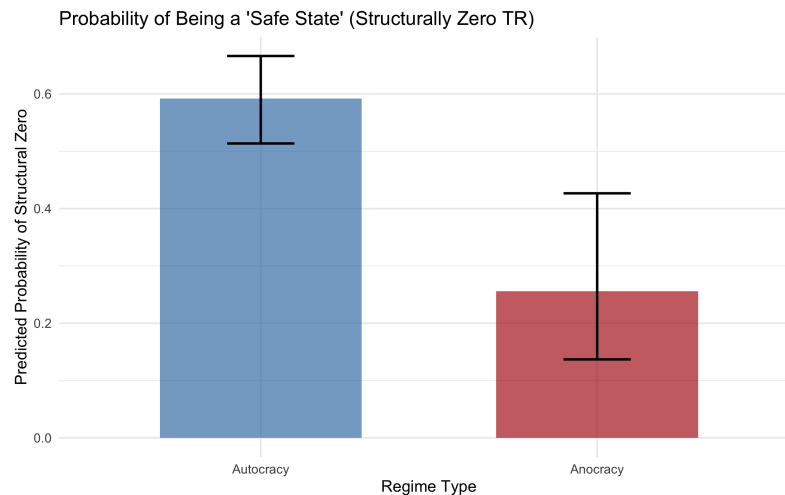


Figure 2: Estimated probability of having a structural Zero TR count. Black bars represent 95% confidence intervals.

to Model 2 in the Dukalskis et al. study, we noticed a sign flip (from positive to negative) in the coefficients for **Election** and **Party dimension index**.⁵¹ It seems that their original logit model mischaracterizes the relationship between these domestic political factors and the intensity of TR operation. These sign flips are also found in Dukalskis et al.'s alternative model specifications using two-way fixed effect Poisson and Negative Binomial (See Panel B in Table 2).⁵²

Lastly, Dukalskis et al.'s study keeps Polity Score as a covariate, which has a statistically insignificant and numerically small effect on TR across all model specifications (see Table 1 and Panel B in Table 2).⁵³ We argue that this finding is because regime type, capturing the overall nature of a regime, is associated with the data-generating process of structural and sampling zeros in TR events, while other domestic political factors drive (or depress) the counts of TR events, as theorized in our mixture distribution. Table 3 provides supporting empirical evidence. When including the same set of covariates in the logit stage, only GDP per capita seems to influence the probability of structural zero counts. The coefficient for regime type loses statistical significance, probably due to the inclusion of many controls, but its numerical estimate is not too different from that in the baseline ZIP model.

By separating the model into two stages, we can uncover a previously overlooked element of TR operations: the heterogeneity *within* the authoritarian regimes. Our model suggests not all autocrats are uniformly prone to repressing their citizens overseas.

Discussion

This study begins with a survey of existing work, both qualitative and quantitative, on transnational repression perpetrated by authoritarian regimes. Although this is by no means a novel phenomenon, these studies find that in the 21st-century, autocrats repress their citizens overseas more blatantly and more sophisticatedly. We then replicate results from a study that postulates

⁵¹Dukalskis et al., "The long arm and the iron fist: Authoritarian crackdowns and transnational repression."

⁵²Dukalskis et al.

⁵³Dukalskis et al., "The long arm and the iron fist: Authoritarian crackdowns and transnational repression."

	Baseline ZIP	Full ZIP
Poisson Stage		
Domestic repression	0.750*** (0.110)	0.745*** (0.128)
Elections	-0.430*** (0.110)	-0.557*** (0.105)
Leader tenure (log)	-0.250* (0.100)	-0.197 (0.120)
Military dimension index	1.040 (0.910)	1.598 (0.967)
Party dimension index	-1.980** (0.690)	-1.433* (0.702)
Population (log)	0.310 (0.220)	0.215 (0.206)
GDP per capita (log)	0.250 [†] (0.140)	0.087 (0.100)
State capacity index	0.120*** (0.030)	0.116*** (0.031)
Logit Stage		
Intercept	0.370* (0.160)	17.349*** (5.264)
Anocracy	-1.440*** (0.420)	-1.015 (0.628)
Domestic repression	—	-0.162 (0.244)
Elections	—	-0.711 (0.395)
Leader tenure (log)	—	-0.098 (0.237)
Military dimension index	—	1.033 (1.313)
Party dimension index	—	0.505 (1.328)
Population (log)	—	-0.479 (0.293)
GDP per capita (log)	—	-0.911*** (0.262)
State capacity index	—	-0.020 (0.058)
Observations	731	731
AIC	1325.06	1298.42

Standard errors in parentheses. [†] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

The Baseline ZIP in this table is the same as Panel A in Table 2.

Table 3: Baseline and Full Zero-Inflated Poisson Models.

domestic political drivers of transnational repressions. Lastly, we highlight a few drawbacks of existing statistical models, especially the failure to address the abundance of observed zero counts of TR incidents. We argue that such a large number of zeros render conventional Poisson and Negative Binomial suboptimal choices.

Our main contribution is twofold. Methodologically, we build on the classic literature on modeling rare political events in IR studies and advance a Zero-inflated Poisson (ZIP) model to address the possibility of structural zero counts of TR for some authoritarian regimes. This two-stage mixture-distribution model provides a logit estimate of the probability of observing structural zero TR events in a given country-year, as well as a predicted Poisson count of TR events conditional on a vector of covariates that reflect the nature of authoritarian politics within the source states. Our two-stage ZIP model specification and mixture distribution framework can be extended and applied to study other rare political events.

Theoretically, our ZIP model seems to portray a two-stage mechanism of TR perpetration. Based on the first-stage logit model, we postulate that the regime type determines the autocrats' eligibility for landing in the "risk pool" of TR perpetration. In particular, compared to closed autocracies, mixed regimes like Russia and China are significantly less likely to see structural zeros. In the existing repression literature and regime studies, democracies are assumed by default to self-select out of the risk pool of TR perpetrators, given the nature of democratic governance, and authoritarian regimes are defined as the residual category to democracies. However, to our knowledge, our research is the first to highlight the heterogeneity of TR *within* non-democratic regimes. Similar to full democracies, full autocracies also seem to select themselves out of TR practices. This argument is, of course, probabilistic in nature, as they have roughly 60% chance of observing a structural zero count of TR events (see Figure 2).

This new finding opens up future directions of research that could potentially unify the rich study on mixed regimes (e.g., competitive authoritarianism) with transnational repression literature. Why are closed autocracies more likely to refrain from TR operations than their slightly more open-door peers? We propose that authoritarian leaders in mixed regimes respond to changing domestic political TR incentives based on their state's border openness and the intensity of international exchange. Take totalitarian regimes like North Korea. Those regimes see extremely limited transnational movements and possess no quasi-democratic institutions, thus leaving the autocrats with very few targets to repress in the first place.

On the other hand, under competitive authoritarianism, quasi-democratic infrastructures such as elections do exist, and the leaders of these states constantly seek to legitimize their rule through these institutions. To some extent, they respond to public opinions.⁵⁴ This arguably opens up more reasons for the autocrats to interact with oppositional leaders, dissidents, and political activists overseas. Future research could look into, for example, why having elections and a stronger party structure at home seem to be significant constraints on autocrats' TR involvement.

⁵⁴Steven Levitsky and Lucan A Way, *Competitive authoritarianism: Hybrid regimes after the Cold War* (Cambridge University Press, 2010).

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Appendix A. Model Diagnostics

We checked for potential overdispersion in the Poisson stage of our ZIP model. Both the residual plot and conditional mean-variance plot show no signs of serious concerns for overdispersion (See Figure 3).

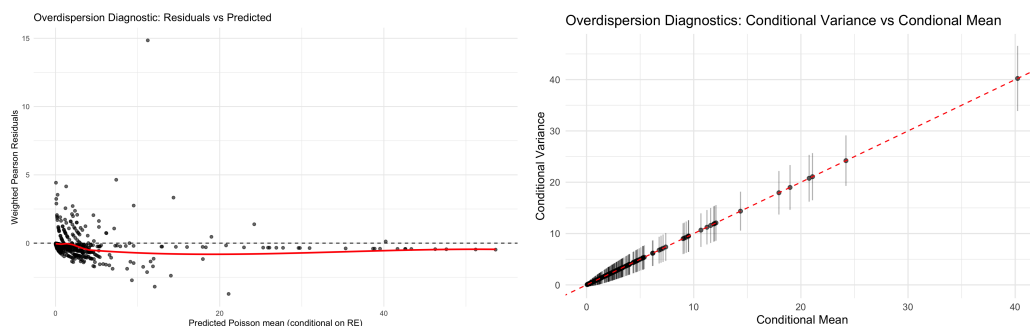


Figure 3: Overdispersion diagnostics for the ZIP model. (a) Residual diagnostics. (b) Mean-variance relationship.