Chapter 3: A Typology of AI Governance: Regulating Actors through Formal and Informal Rules

Abstract

As AI policies addressing ethics and human rights proliferate globally, the absence of clear conceptual and analytical frameworks makes it difficult to understand this complex phenomenon. How do countries regulate AI differently? Why do they regulate different actors in different ways? This paper proposes a typology of AI governance along two key dimensions: the targets of regulation (primarily private firms and government agencies) and the legal status (formal versus informal governance). Countries vary significantly across these dimensions, both in their regulatory priorities and the mechanisms they employ. I argue that countries with strong high-tech sectors are more likely to adopt informal governance, while regime type is central in determining whether countries regulate government use of AI. Drawing on the OECD dataset of national AI policies, I hand-coded attributes capturing combinations of regulatory targets and legal status to operationalize the outcomes of interest. The analysis shows that AI capacity is the strongest predictor of the adoption of informal rules, particularly with respect to firms. Regime type, specifically freedom of expression, is significantly associated with the regulation of government use of AI. This paper offers a novel theoretical framework and new empirical evidence on cross-national variation in AI governance, contributing to the debates on regulatory forms and priorities.

3.1 Introduction

AI brings both high risks and high rewards for firms and governments alike. While firms pursue innovation and maximize profits, governments also use AI to enhance their own capabilities, from chatbots on public websites to facial recognition in city streets. Countries exhibit substantial variation in the degree to which they have adopted policies to protect citizens from AI threats. Regulators around the world face challenging tasks to strike a balance between economic and social objectives. Who should be regulated, and through what kinds of rules? The purpose of this paper is to, first, describe the patterns in which countries regulate different actors and in different governance instruments, and examine the determinants of policy outcomes on these dimensions.

Under what conditions do governments choose different types of AI regulation? First, domestic institutions matter. Democratic leaders are more accountable to the public and more responsive to issues like fairness and discrimination. Another factor is a country's regulatory orientation and the power of private sectors in shaping government regulation. Liberal market economies tend to favor market and competition, while coordinated market economies emphasize coordination between government, industry, and societal actors (Hall and Soskice 2001). Firms generally prefer informal governance and self-policing due to greater flexibility and lower compliance costs. To explore these dynamics, this paper introduces a two-dimensional typology of AI governance. I focus on two key dimensions: target actors (private firms and government agencies) and legal status (informal to formal governance). Firms are the primary developers and deployers of AI technologies, and government agencies increasingly use AI in high-risk sectors such as law enforcement and welfare allocation. The choice between informal and formal regulation also reflects the stringency and compliance costs associated with these rules. Why do some countries regulate AI more than others, and why do they regulate different actors in different ways?

First, I argue that countries with a greater presence of high-tech industries are more likely to adopt informal rather than formal governance. From a functionalist perspective, informal rules offer greater speed and flexibility in times of regulatory uncertainty, whereas formal rules can impose high administrative and compliance burdens. From a power distribution perspective, tech firms hold strong positions in both market and politics, and their preferences for voluntary, non-binding rules may likely translate to their desired policy outcome. Second, I argue that regime type plays

an important role in regulating government use of AI. Democracies face greater public scrutiny regarding transparency and the rule of law. Institutions such as independent oversight agencies, human rights commissions, and judicial branches tend to provide checks and balances on the proper use of AI in the public sector. On the other hand, autocracies are less incentivized to restrain their use of AI, given its growing relevance for surveillance and control of citizens.

To define the outcomes of interest, I hand-coded a set of variables based on OECD datasets of national AI policies. At the policy level, I coded the target of regulation (firms, governments, academia, and the public) and the continuum of governance from formal to informal mechanisms (laws, regulations, organizations, guidelines, plans, programs, and partnerships). I use aggregate policy counts to capture four areas of regulation related to ethics and human rights protections: firm–formal, firm–informal, government–formal, and government–informal. In addition, I coded four binary country-level outcomes reflecting the same categories, cross-checking the original policy documents with the OECD datasets. EU countries did not report EU-level regulations as part of their national AI policies. I account for it in the binary outcomes, as the most recent AI Act is mandatory for all EU member states. I present both descriptive trends and regression analyses to estimate the effects of the tech sector and regime type on these policy outcomes.

The descriptive trends suggest that countries are more likely to regulate firms rather than government agencies. Informal governance is also preferred over formal governance. The regression analysis shows that AI capacity is positively associated with more informal governance, especially for firms. Liberal democracy and freedom of expression are associated with more policies regulating government agencies. Interestingly, smart policy, which measures the presence of AI in law enforcement, is associated with a higher likelihood of regulating government with informal governance yet lower likelihood of formal governance.

This paper develops a theoretical framework for understanding AI policy along two key dimensions: regulation targets and legal status. By imposing clear analytical boundaries, it offers a new systematic approach to describe and investigate cross-national variation in this important policy area. In addition to its theoretical contribution, the paper utilizes hand-coded data to provide rich empirical evidence on AI governance worldwide. Together, this paper sheds light on the mechanisms of AI policymaking, specifically the conditions under which countries rely on

informal rules and regulate government use of AI.

3.2   Background: regulation targets and legal status

The wide array of national AI rules and initiatives can appear unintelligible and fragmented. Therefore, it is useful to develop a conceptual framework to systematically analyze them. To capture the scope and intensity of AI policies, I focus on two key dimensions: regulation targets (private industry and government agencies) and legal status (ranging from formal to informal governance). The regulation targets of AI systems consist of two types: developers and deployers. Private firms lead in AI development and integrate AI systems into a range of business operations. Among AI deployers, government agencies also raise growing concerns due to their consequential impacts. By directing AI policies toward either government entities or private firms, countries reveal differing priorities between social and economic objectives. Regarding legal status, I categorize AI policies along a continuum from informal to formal governance. Informal governance includes guidelines, action plans, programs, and partnerships, while formal governance includes laws, regulations, and institutional bodies. The following section presents the definitions and descriptive evidence for these dimensions, which guide the manual coding of variables using the OECD dataset.

3.2.1   Regulation targets: private firms vs. government agencies

AI governance involves a variety of stakeholders. Local, provincial, and national governments increasingly integrate AI into daily operations. Political parties and other political organizations may be threatened by AI-generated misinformation during elections.[1]. Civil society groups, including NGOs and labor unions, advocate for a range of issues surrounding AI. Universities and research institutes are also periodically reviewing their guidelines for the ethical use of AI. Firms and governments are the primary focus of this paper due to their central role in developing and deploying AI technologies in professional settings. By labeling AI policies according to their target actors, this approach offers insight into how countries identify the different risks and benefits of AI and how they navigate trade-offs among competing policy priorities. As the primary developers,

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[1]Ali Swenson and Kelvin Chan, 'Election disinformation takes a big leap with AI being used to deceive worldwide', *Associated Press*, March 14, 2024

firms determine the design and functionality of AI models. Large tech firms, in particular, exert significant influence over the industry and regulation. Microsoft, Alphabet, Amazon, and Meta have reported combined spending on AI of \$246bn in 2024 and are forecasted to spend more than \$320bn in 2025.[2] Big tech firms are frequently fined by EU regulators for data breaches and abuse of dominant market positions.

Firms also deploy AI in diverse sectors. Finance is a common area that caught regulators' attention. AI is widely used in credit and insurance underwriting and algorithmic trading, raising concerns in risk management, transparency, and consumer protection. The EU's AI Act defines two high-risk cases related to the financial sector: AI systems used to evaluate a person's creditworthiness and for risk assessments and pricing for life and health insurance.[3] To protect consumers from illegal discrimination, the U.S. Consumer Financial Protection Bureau (CFPB) issued guidance on credit denials by lenders using AI.[4]. A number of policies also target employment, placing requirements on the use of AI in hiring decisions and workplace surveillance.

Moreover, AI is widely used in government, including policing, welfare programs, and administrative tasks. Many countries have programs that use AI to improve the quality of services, such as adding a chatbot on government websites, digitalizing public administration, or releasing an open data project that facilitates data availability and transfer. However, as governments have increasing capabilities and handle highly sensitive personal information, there has been insufficient oversight on the misuse of AI by government agencies. Some countries released algorithmic impact assessments for government use of AI, either voluntary or mandatory.[5] Denmark published guidelines on the transparent use of algorithms in the public sector, and France released a report proposing a regulatory framework for facial recognition.[6]

While some countries regulate the private and public sectors under separate legal frameworks, others take a more comprehensive approach. For example, the EU's AI Act targets both

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[2]Stephen Morris and Rafe Uddin, "Big Tech lines up over \$300bn in AI spending for 2025", *Financial Times*, February 6, 2025.

[3]See EU's AI Act.

[4]Consumer Financial Protection Bureau. CFPB Issues Guidance on Credit Denials by Lenders Using Artificial Intelligence. September 19, 2023.

[5]Government of Canada. Algorithmic Impact Assessment tool.

[6]See https://cnnumerique.fr/regulation_reconnaissance_faciale

private firms and government agencies. Many high-risk AI systems identified in the AI Act fall under the authority of government agencies, particularly in areas such as law enforcement and essential public services. For the private sector, the Act classifies employment, healthcare, and education as high-risk areas subject to more stringent regulation.[7]

3.2.2 Legal status: informal to formal governance

AI governance ranges from voluntary guidelines to legally binding rules, reflecting varying degrees of government intervention and compliance costs. The distinction between hard law and soft law is not binary. Compared to hard law, soft laws have more than one weakened legal arrangement in precision, obligation, or delegation (Abbott and Snidal 2000). Depending on the specific context, governments make trade-offs between the credibility and enforcement power associated with hard law and the flexibility and lower negotiation costs offered by soft law (Abbott et al. 2000). In the realm of AI policy, I categorize seven governance instruments along this continuum, with laws, regulations, and organizations as forms of formal governance and guidelines, plans, programs, and partnerships as forms of informal governance.

Regarding informal governance, **guidelines** refer to a range of informal policies that are voluntary and non-binding, including standards, proposals, principles, recommendations, white papers, guidance, opinions, reports, and analyses. Governments often issue voluntary guidelines and advisory recommendations to guide the development and use of AI without imposing legal mandates. These measures can signal regulatory intentions and may later evolve into formal laws. For governments wary of market intervention, guidelines encourage best practices and set the direction for firms' self-regulation.

For example, in Australia, guidelines are issued by multiple government agencies based on their respective mandates. The Department of Industry, Science and Resources released the AI Ethics Principles.[8] Additionally, the department commissioned Standards Australia, an independent NGO, to produce a report with recommendations on AI standardization.[9] As an independent

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[7]See https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai
[8]See Australia's AI Ethics Principles.
[9]Standards Australia. "Standards Australia sets priorities for Artificial Intelligence. March 12, 2020.

organization that investigates human rights complaints, the Australian Human Rights Commission released several reports on the human rights impacts of AI, the legal accountability of government and private sector use of AI, and recommendations for effective regulation. It has also partnered with financial institutions, including the National Australia Bank, to develop guidance in banking and insurance.[10] Moreover, the separation of powers between the executive branch and parliament provides an additional layer of checks and balances. The Joint Committee of Public Accounts and Audit has released a report on the use of AI in the public sector, offering recommendations for a governance framework and potential mandatory rules in the future.[11]

In addition to guidelines, countries release action plans and programs to govern AI. **Plan** outlines AI strategies or action items aimed at digital transformation and AI development. National strategies often set out roadmaps and outline strategic focus areas, while programs tend to be specific. **Program** refers to more concrete initiatives than plans or guidelines, such as AI-related research funding, the use of AI in the public sector, and networking forums. For example, several countries have adopted regulatory sandbox programs, which provide a controlled testing environment where businesses can collaborate with regulatory authorities to identify risks and develop policy solutions for new technologies.[12] The Norwegian Data Protection Authority has launched an AI sandbox aimed at clarifying data protection requirements for AI systems that process personal data.[13] Lastly, **partnership** involves bilateral, multilateral initiatives, and international organizations. For instance, France established the Global Partnership on AI with Canada, participated in a French-Japanese-German research project on AI, and co-designed regulatory projects with the World Economic Forum.

In contrast, formal governance imposes mandatory requirements and creates measures to address potential violations. **Laws** include legislation, amendments, and court decisions. Privacy and data protection laws are widely adopted across countries. Other types of legislation involve intellectual property, facial recognition, and employment. For example, New York City law requires automated employment decision-making tools to undergo a bias audit. Similarly, the Illinois

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[10]See HRIA Tool: AI in banking
[11]Parliament of Australia. Audit Committee recommends whole of government framework for AI use.
[12]See official websites of the UK and Germany.
[13]The Norwegian Data Protection Authority. The Sandbox Page

Artificial Intelligence Video Interview Act requires employers to disclose the use of AI analysis for recorded video interviews. Executives or the judiciary may issue guidance and decisions on the applicability of existing laws to AI. The U.S. Department of Housing and Urban Development released guidance on how to apply the Fair Housing Act to prevent discriminatory uses of AI in tenant screening and the online advertising of housing opportunities.[14] A Dutch court ruled that using AI in welfare programs is unconstitutional.[15] While not codified in law, **regulations** establish mandatory requirements for public sector entities and businesses. They are typically issued by the executive branch and may impose obligations related to self-driving vehicles, fintech innovation, or algorithmic bias. Examples include resolutions, directives, provisions, and executive orders.

Another form of formal governance is **organizations**, which refers to institutional bodies and agencies that monitor, review, advise, implement, and enforce AI standards and regulations. Examples include committees, task forces, working groups, and expert commissions, where they follow institutional procedures for policy-making. Many countries have established organizations specific to AI, such as councils, advisory committees, and national commissions. This category does not include organizations set up for realizing the benefits of AI, such as research centers and public-private partnerships. Established through formal procedures, institutional bodies may function through both formal and informal channels. Some of them monitor and advise, while others investigate and penalize. For instance, the UK's Alan Turing Institute for Data Science and AI (2015) provides expert recommendations on data ethics. Meanwhile, privacy protection authorities assess recent developments in AI systems and impose fines on firms for noncompliance.

3.3 Theory
3.3.1 A typology of AI governance

The central question of this paper is: Why do countries regulate AI differently? Why do some countries regulate AI more than others, and why do they regulate different actors in different ways? To capture variations across countries, I propose a typology of AI governance based on

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[14]See https://archives.hud.gov/news/2024/pr24-098.cfm

[15]Jon Henley and Robert Booth, "Welfare Surveillance System Violates Human Rights, Dutch Court Rules," The Guardian, February 5, 2020

two dimensions: (1) legal status - whether governance is informal (guidelines, plans, programs, partnerships) or formal (laws, regulations, organizations); (2) the targets of regulation - whether AI policies are directed at private firms or government agencies. This typology provides a conceptual foundation for understanding how states approach AI governance and how economic, political, and social conditions shape their regulatory priorities.

Table 3.1: A typology of AI governance

Legal Status / Target Actor	Formal Governance	Informal Governance
Private Firms	- Data protection legislation - Online safety act - Intellectual property amendment to AI - Applicability of the Equality Act	- AI ethics framework - Guidance on algorithmic fairness - AI governance testing framework and toolkit for companies - AI safety standards
Government Agencies	- AI advisory committee - Mandatory algorithmic impact assessment - Binding prohibitions against the use of AI in social welfare - Legislation on AI transparency	- Federal data strategy - Impact analysis guide - Guidelines for AI procurement - Report on AI use in federal administrative agencies

Table 3.1 categorizes AI policies based on their target actors and legal status, providing examples related to privacy and equal rights. Regulators may first determine which actors to regulate and then choose whether to apply informal or formal rules. For policies targeting firms, the most common form of formal governance includes data protection laws and the EU AI Act. In contrast, informal rules for firms are more diverse. Singapore has been a leader in regulating the private sector, having released ethics principles, testing toolkits for companies, self-assessment

guidelines, and partnerships with the industry to develop frameworks for financial institutions.

With respect to government regulation, countries also rely on informal governance to foster checks and balances. For example, executive agencies may publish informal guidance to guide the use of AI in the public sector, particularly concerning data use and algorithmic impact. Canada and the United Kingdom have both published AI resource lists and procurement guidelines for government agencies, offering recommendations on qualified AI suppliers. Formal governance of the public sector imposes mandatory obligations, such as disclosure requirements and impact assessment reports. Formal organizations, including advisory committees or independent expert groups, can monitor the use of AI in government agencies and propose policy solutions.

Along the first dimension of regulation targets, countries are more likely to impose regulations on firms than on government agencies. Firms are seen as the main sources of innovation and risks, while the government may be reluctant to constrain their own use of AI on surveillance and security. After identifying the regulation targets, countries then determine whether to apply formal rules or rely on informal governance mechanisms. In the case of firms, particularly countries with dense high-tech sectors, I argue that they tend to prefer informal governance arrangements over strict formal regulation. The distinction is moderated by a country's regulatory orientation and the power of private actors to influence and shape government regulation. For government agencies, however, the presence and extent of regulation are strongly influenced by regime type, with democratic and authoritarian regimes differing in whether and how they regulate government use of AI. Democracies are more likely to be willing to set limits on their own government institutions. In the following sections, I will dive into the theoretical mechanisms underlying these core arguments.

3.3.2 Firm preferences and informal governance

When firms are the primary targets of AI regulations, informal governance may appear more prevalent due to both the functional advantages of informal rules and the market and political power of the tech industry. States strategically build in flexibility provisions to cope with uncertainty (Koremenos 2005). AI technologies move extremely fast, and the regulatory uncertainty surrounding AI makes formal governance less attractive. Informal mechanisms are increasingly common in global governance, especially when formal regulations are unclear or lag behind technological in-

novation (Newman and Bach 2014). Informal governance tends to emerge in high-tech sectors due to the constant evolution of standards (Timmermans and Epstein 2010). When formal rules are ambiguous or impose high regulatory burdens, the flexibility of informal governance offers greater speed and efficiency, as well as lower contracting costs (Westerwinter, Abbott and Biersteker 2021). Additionally, weak institutions may rely on informal governance to fill gaps where there is limited capacity to enforce formal rules (Helmke and Levitsky 2006). The growth of information and communications technologies has weakened domestic regulatory regimes due to its effects on capital mobility and global value chain networks (Mansfield and Rudra 2021).

From the perspective of power and regulation theory, firm preferences may shape regulatory outcomes (Stigler 2021). Private sector actors often favor informal rules that enable self-regulation over formal rules that impose compliance obligations. Studies on financial regulation have demonstrated that the private sector has a strong interest in shaping policy outcomes and reducing regulatory oversight (Underhill and Zhang 2008; Baker 2010). Companies frequently exert political influence over trade policy outcomes (Kim and Osgood 2019). The largest and most productive multinational corporations benefit disproportionately from economic policies, such as preferential trade agreements and bilateral tax treaties (Baccini, Pinto and Weymouth 2017; Arel-Bundock 2017). In the AI domain, powerful tech firms often push for informal governance in AI policy to maintain regulatory flexibility and avoid binding constraints.

Moreover, economic traditions or styles of government regulation help explain the choices of informal versus informal governance in AI. The varieties of capitalism approach identifies liberal market economies (LMEs) and coordinated market economies (CMEs) as two major types of capitalist systems. LMEs emphasize market competition, and CMEs are characterized by strategic coordination or collaborative approach to economic activity (Hall and Soskice 2001). For example, legal status and scope of regulation are the primary areas where the U.S. and the EU diverge. The EU's AI legislation seeks to create a comprehensive, risk-based framework for regulating AI systems. By comparison, AI policies in the U.S. are relatively informal and decentralized, relying on a sector-specific approach and self-regulation by the private sector. Federal agencies are cautious of any regulations that might create unnecessary barriers to the development of AI, thereby

stifling growth and innovation.[16] In addition, the U.S. does not have national privacy legislation. Instead, it has a combination of laws that target distinct data types in specific circumstances, as well as legislation at the state level. This type of economy aligns with the interests of the U.S. tech industry, which actively resists formal laws and promotes informal rules to maintain market dominance and minimize compliance costs.

3.3.3 Regime type and the regulation of governments

The literature has established a connection between democracy and human rights (Donnelly 1999; Davenport 2007). The spread of democracy is associated with the expansion of human rights protection (Simmons 2009). Human rights principles are foundational to democratic constitutions, while mechanisms and procedures for safeguarding human rights are essential components of democratic governance.

Most democracies privilege individuals' rights to privacy, as opposed to authoritarian regimes, where privacy is not necessarily a priority. Political leaders in democracies often contrast the protection of individual rights with mass surveillance in authoritarian regimes. Discrimination and unequal representation are likely to threaten the legitimacy of democratic governance. Flawed algorithms can lead to declining trust in government and increase the likelihood of social unrest. In an increasingly polarized world, regulators frequently rely on the legitimating power of a human rights framework to sustain domestic stability and promote social cohesion. A survey experiment conducted in the U.S. and Sweden finds that gender equality generates reputational benefits and enhances the perception of democracy (Bush and Zetterberg 2021).

In democratic countries, public opinion may serve as a strong predictor of future policy change. Democratic leaders are more responsive to public opinion than their counterparts in autocracies, so the voices of citizens can be effectively translated into policy outcomes. As the public becomes increasingly aware of AI's negative consequences, politicians are more likely to respond to the demands of their constituents. Therefore, democracies are more likely to regulate the use of AI in the public sector. They face greater public scrutiny and stronger pressures for transparency, given established norms around the rule of law and accountability. Civil society groups also play

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[16]See https://www.whitehouse.gov/wp-content/uploads/2022/09/M-22-18.pdf

a key role in advocating for safeguards. In addition, democratic institutions, such as independent oversight bodies and courts, provide checks and balances through the separation of powers, reinforcing constraints on government use of AI.

In summary, I test the following hypotheses in this chapter:

H1: *Countries with stronger high-tech sectors are more likely to adopt informal governance.*

H2: *Democracies are more likely to regulate government use of AI, rather than focusing solely on firms.*

In the following section, I turn to the data, the descriptive trends, as well as research design for hypothesis testing. An initial analysis of AI policy reveals a preference for informal rules over formal governance and a focus on targeting private firms rather than government entities.

3.4 Data, descriptives, and methods

As conceptualized in the typology of AI regulation, legal status (formal vs. informal) and target actors (firms vs. governments) represent two key dimensions for analyzing AI policies. Using the OECD dataset of national AI policies, I hand-coded variables for nearly 900 policies. To examine variations in ethics and human rights protections, I manually coded the regulation targets and the continuum from informal to formal governance. Additionally, I coded several policy attributes, including regulatory intention, priority, scope, and specificity. I begin by presenting descriptive patterns on regulation targets and legal status, followed by an explanation of how I operationalize these variables to test my main hypotheses.

3.4.1 Regulation targets: private firms vs. government agencies

I coded four binary variables to capture the target actors of each policy: government agencies, the private sector, academia, and the public. Some policies may be directed at more than one actor. I focus specifically on policies addressing ethics, privacy, and non-discrimination. I also coded each policy's intention as either promoting or regulating AI and for this analysis, I include only those intended to impose restraints on AI use. The trends are shown in Figures 3.1. The size

Figure 3.1: Annual trends in regulating government agencies
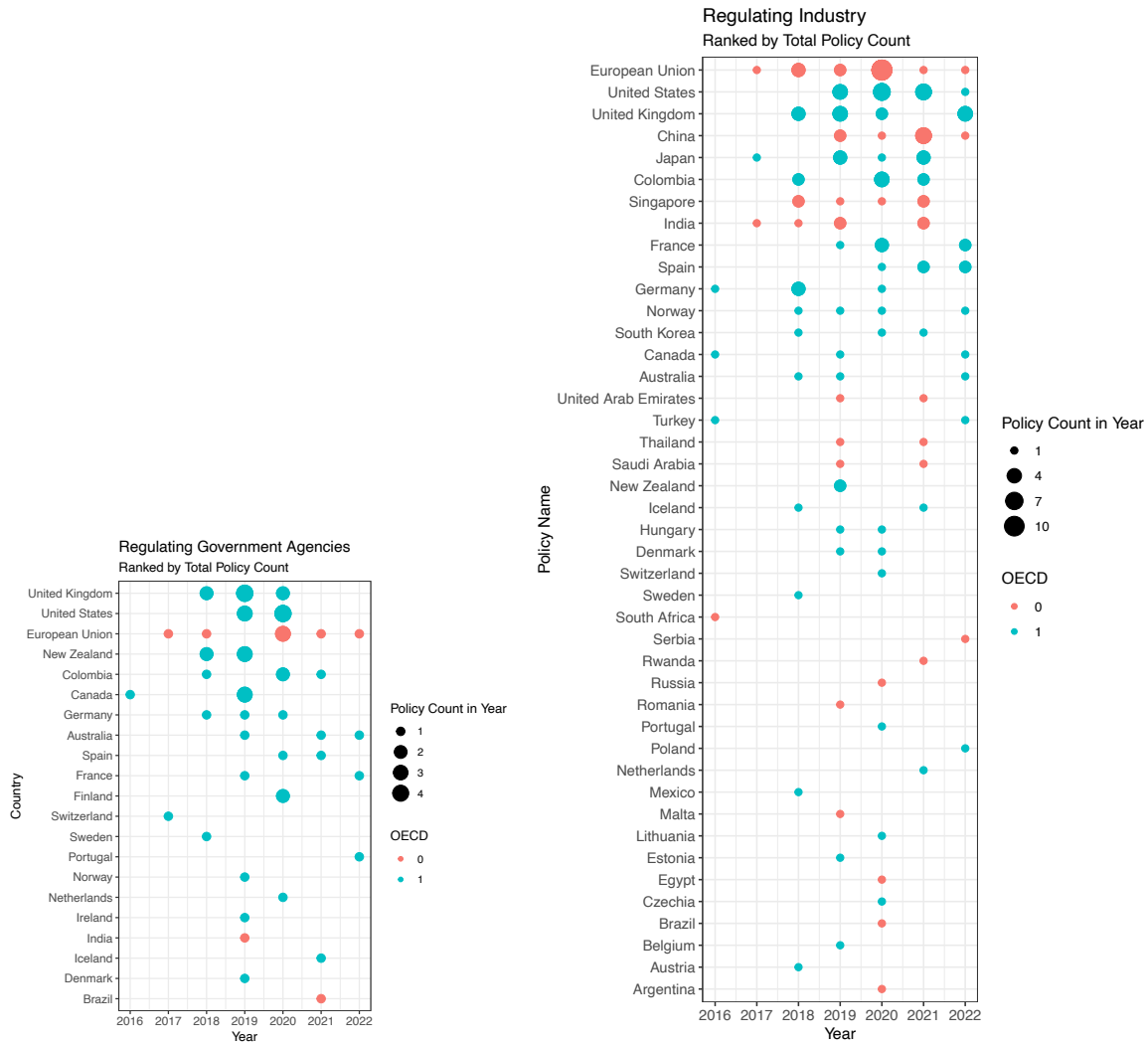
of the points represents the number of policies in a given year, while the color indicates the OECD membership status.

Countries are more likely to regulate the private sector than government use of AI. The number of AI policies regulating the private sector nearly doubled compared to those regulating government agencies. Leading countries in AI investment and capabilities, such as the U.S., the UK, EU, China, and Singapore, are at the forefront of regulating firms. Firms are both drivers of economic benefits and potential sources of harm. AI regulations are often adopted to address

market failures, such as data breaches, bias, and misinformation.

Democratic countries show significant variation in how they monitor and restrain the use of AI in public administration. Governments also benefit from the enhanced capabilities that AI provides and are less incentivized to regulate themselves, particularly in areas related to national security. Yet, among the countries that do impose such restrictions, the majority are democracies. Industry-focused regulations tend to gain traction across various regime types, whereas authoritarian regimes are less likely to constrain their use of AI for censorship and mass surveillance purposes. A notable example of formal governance targeting firms is the data protection law. For instance, China, Turkey, and Saudi Arabia have introduced policies for data protection targeting private firms but have not adopted regulations targeting government agencies. The laws are designed to limit firms' access to data while expanding the government's reach into citizens' private lives.

3.4.2 Legal status: informal to formal governance

Table 3.2: The continuum from formal governance to informal governance

Type	Intention - Regulate (%)	Priority - Society (%)	Total (%)
Law	76.47	45.1	5.78
Regulation	84.62	38.46	2.95
Organization	39.62	33.96	12.02
Guideline	81.25	51.88	18.14
Plan	5.26	12.5	17.23
Program	1.99	25.57	39.91
Partnership	2.86	5.71	3.97

Note: "Intention" (regulate or promote) and "priority" (economy or society) are two binary variables.

I coded legal status along a continuum from formal to informal governance, reflecting the extent to which governments are willing to bear the costs of regulation. Formal governance includes legislation, regulations, and organizations, indicating the establishment of official procedures and

mechanisms to ensure implementation and compliance. In contrast, informal governance—such as guidelines, programs, plans, and partnerships—is voluntary and nonbinding. The coding criteria are discussed in Section 3.2.

I also coded two additional variables: priority and intention. Priority is a binary variable indicating whether the primary focus of a policy is on economic objectives (market efficiency, competition, innovation) or social objectives (equity, safety, privacy, transparency). Intention is a binary variable indicating whether a policy primarily aims to promote or restrict AI. Although certain policies pursue both, I code them according to their predominant focus based on the policy's content and stated goals. Table 3.2 presents the percentage of AI policies that 'intend to regulate' and 'prioritize society' across seven policy types. Most AI policies fall under informal governance, with guidelines comprising 18 percent of the total and around 60 percent consisting of plans, programs, and partnerships. While informal rules are useful for cultivating norms and building consensus, without mandatory obligations, they may be insufficient for safeguarding individual rights.

Figure 3.2 examines regional patterns based on policy subjects and legal status. I limit the analysis to AI policies that address issues related to ethics, privacy, and non-discrimination. Europe and North America demonstrate the most diversified approaches, employing a mix of formal and informal governance. East and South Asian countries show a higher reliance on informal rules and place less emphasis on protecting specific human rights. While many countries adopt aspirational ethical principles, they often lack targeted formal measures to protect fundamental rights. Despite the scale of potential harm, policies addressing bias and discrimination remain significantly fewer than those focused on ethics and data privacy.

3.4.3   Research design: hypothesis testing

This paper investigates national AI policies in two dimensions: (1) why some countries prefer informal governance while others formalize rules on AI and (2) why countries differ in their regulation targets. As a fast-moving, high-risk, and high-reward technology, AI presents unique regulatory challenges worldwide. Yet states vary significantly in whom they should target primarily and how they institutionalize these rules. To systematically compare how countries address these

Figure 3.2: Regional policy count by subjects and legal status

Policy Count by Region and Instrument
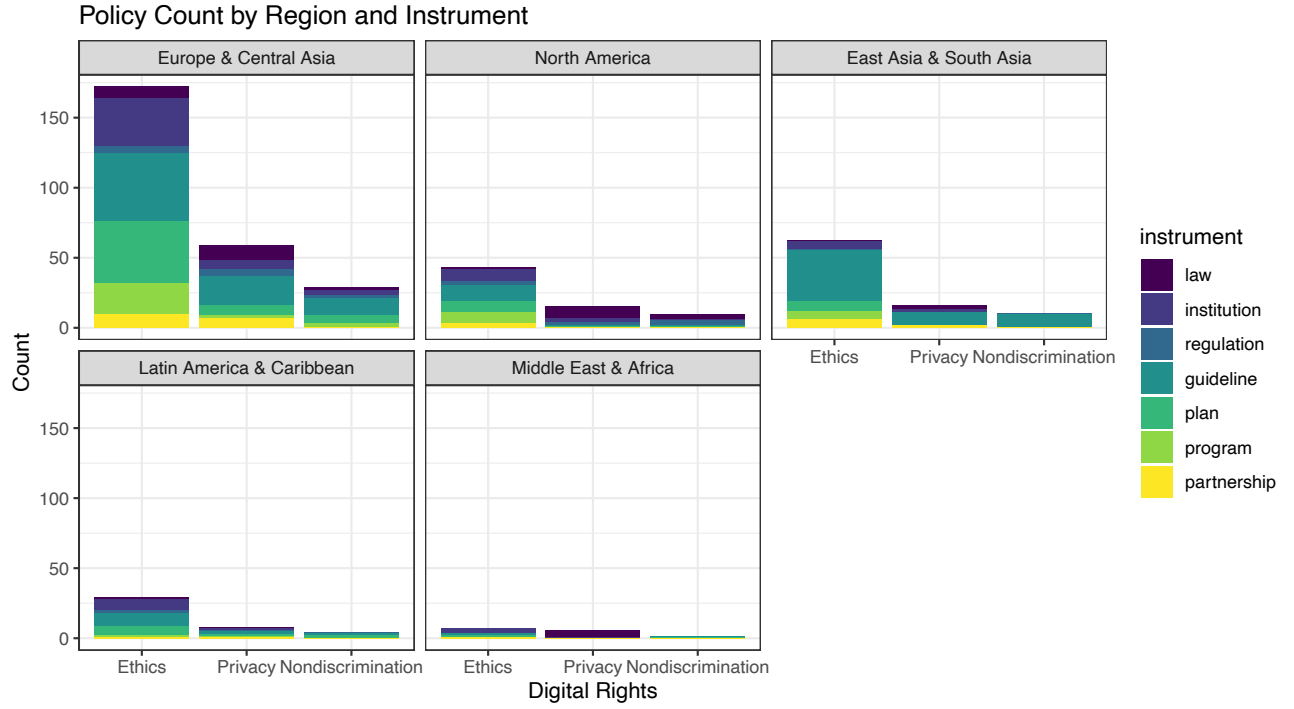
fundamental rights, I developed a coding framework based on two dimensions: regulation targets (firms or governments) and legal status (informal or formal governance). Accordingly, I define four variables indicating whether there are policies that (1) regulate firms with informal rules, (2) regulate firms with formal rules, (3) regulate governments with informal rules, and (4) regulate governments with formal rules.

First, I use numeric values to capture these four variables. Based on the hand-coded policy-level attributes, I limit my analysis to policies that mention ethics, privacy, and non-discrimination in policy objectives and those with the intention to regulate. I then aggregate the policy counts at the country level, calculating the number of policies that regulate firms or governments through either informal or formal governance. Moreover, I coded several AI governance indicators, including the level of institutional functions (monitoring, advising, or investigating) and policy implementation (guidelines, action plans, or compliance mechanisms). These indicators may serve as alternative measures by weighing various institutional features of AI policy. The detailed coding criteria are

specified in the Appendix C.1.

In addition to numeric measures, I coded binary outcomes for the same categories. The scope of AI policies is often vague and general, and aspirational ethical principles may not effectively protect individual rights. As a result, country-level coding focuses on concrete written rules, either mandatory or voluntary, that specifically address privacy and non-discrimination protections relevant to AI. Informal rules include policies such as guidance on AI and data protection, bias mitigation recommendations, toolkits and questionnaires, and algorithmic impact assessments. Similar measures may be mandatory in other countries, such as through disclosure obligations or audit requirements. Furthermore, countries in the OECD dataset did not include EU-level regulations as part of their national AI policy. To account for this, the binary measure incorporates the most recent AI Act as a formal governance indicator for EU member states, providing an indirect way to examine the EU's de facto governance. I present the summary statistics in Table 3.3 and 3.4, where each row represents the combination of regulation targets and legal status at the country level.

Table 3.3: Summary statistics of numeric outcomes

Targets	Legal Status	Mean	St. Dev.	Min	Max
Firm	Formal	0.67	0.96	0	4
Firm	Informal	1.21	2.26	0	11
Government	Formal	0.30	0.60	0	3
Government	Informal	0.43	1.23	0	7

I employ logistic regression to estimate the likelihood of adopting specific policies, as well as OLS regression to assess the effect on the frequency of policies. To test the hypothesis regarding the predictors of regulation targets, I use liberal democracy and freedom of expression as measures of regime type, drawing from the V-Dem dataset (Coppedge et al. 2023). In particular, I use freedom of expression to examine its effect on the regulation of government use of AI. The freedom of expression index measures government censorship efforts, media freedom, the freedom of ordinary people to discuss political matters, and the freedom of academic and cultural expression. It reflects the degree to which citizens, media, and civil society can openly criticize government actions and

Table 3.4: Summary statistics of binary outcomes

Targets	Legal Status	N (countries)	N (countries) Accounting for EU
Firm	Informal	21	
Firm	Formal	18	39
Government	Informal	13	
Government	Formal	13	34

Note: Total number of countries is 70.

demand accountability. To test the hypothesis concerning the effects of informal and formal governance, I focus on the strength of the high-tech sector. Specifically, I include the indicator from the World Bank using the percentage of high-tech exports out of total manufactured exports[17], as well as the AI capacity measure provided by the Tortoise.[18] The Global AI Index measures six dimensions: talent (15%), infrastructure (11%), operating environment (4%), research (22%), development (18%), government strategy (8%), and commercial ecosystem (22%). Most government strategy indicators focus on AI spending and public infrastructure. If there is any theoretical overlap with the dependent variable, it accounts for less than three percent of the total score.[19] This index is measured on a scale from 0 to 100, where the U.S. is scored 100, and China is second with a score of 53.88, while the majority of countries are clustered around 0 to 30. Since the AI capacity score is highly skewed, I used the log of AI capacity in the regression analysis.

For control variables, I include GDP per capita to account for economic development (The World Bank 2024). Regulating firms is often linked to a country's regulatory capacity and its efforts to create a business-friendly environment. I incorporate the Ease of Doing Business rankings from the World Bank as it captures the regulatory best practices in an economy. As Hall and Soskice (2001) suggests, distinct regulatory orientations of a state often shape policy outcomes. Yet regulatory orientation is not directly observable. The ease of doing business measure can serve

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[17]https://data.worldbank.org/indicator/TX.VAL.TECH.MF.ZS
[18]https://www.tortoisemedia.com/data/global-ai
[19]https://www.tortoisemedia.com/_app/immutable/assets/AI-Methodology-2409.BGTLUPC-.pdf

as a proxy for these latent traits.[20] Additionally, for policies regulating government, I include smart policing, a binary measure indicating the presence of AI in law enforcement (Carnegie Endowment for International Peace 2019). Data-driven analytic technologies can support investigations and improve police response, with some systems using algorithms to predict future crimes. The more prevalent AI becomes in public administration, the more likely democratic governments are to issue guidelines aimed at preventing misuse.

3.5   Results and discussion

My main hypotheses are that the high-tech sector is associated with greater informal governance, and democracies are more likely to regulate government use of AI. I ran logistic and OLS regression on four outcomes: regulating firms with formal rules, regulating firms with informal rules, regulating government with formal rules, and regulating firms with informal rules. The coefficient plots are shown in Figures 3.3 and 3.5. The regression tables are reported in the appendix C.2 and C.3.

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[20]The indicators include the ease of starting a business, dealing with construction permits, getting electricity, registering property, paying taxes, trading across borders, and enforcing contracts. It also measures the protection of getting credit, minority investors, and resolving insolvency. See methodology at https://archive.doingbusiness.org/en/data/doing-business-score

Figure 3.3: Coefficient estimates for regulating firms

Regulating Firm: Linear Regression
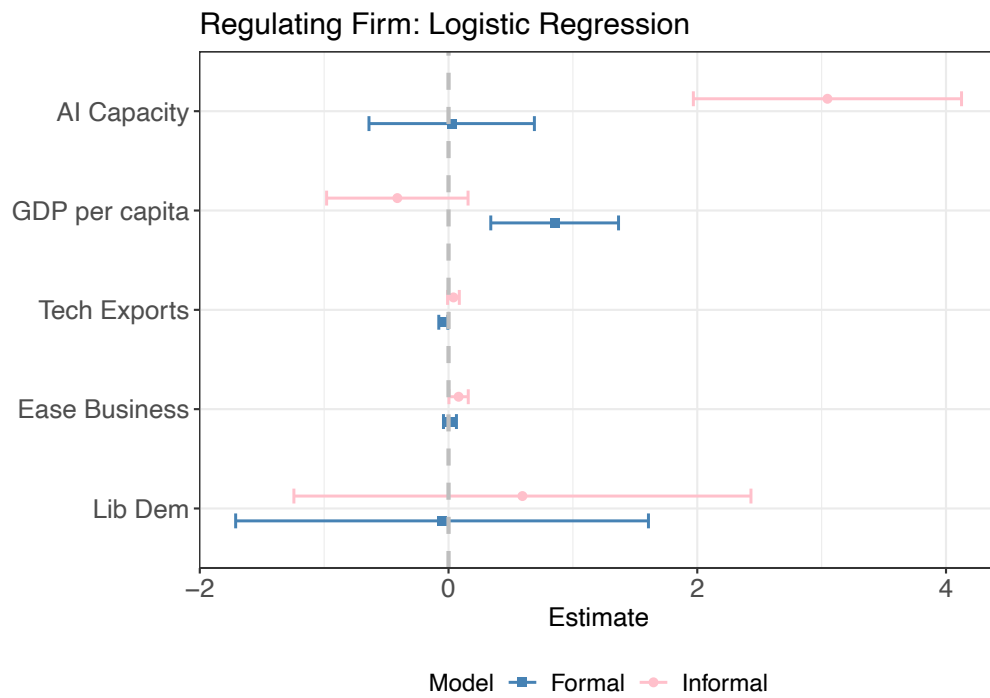

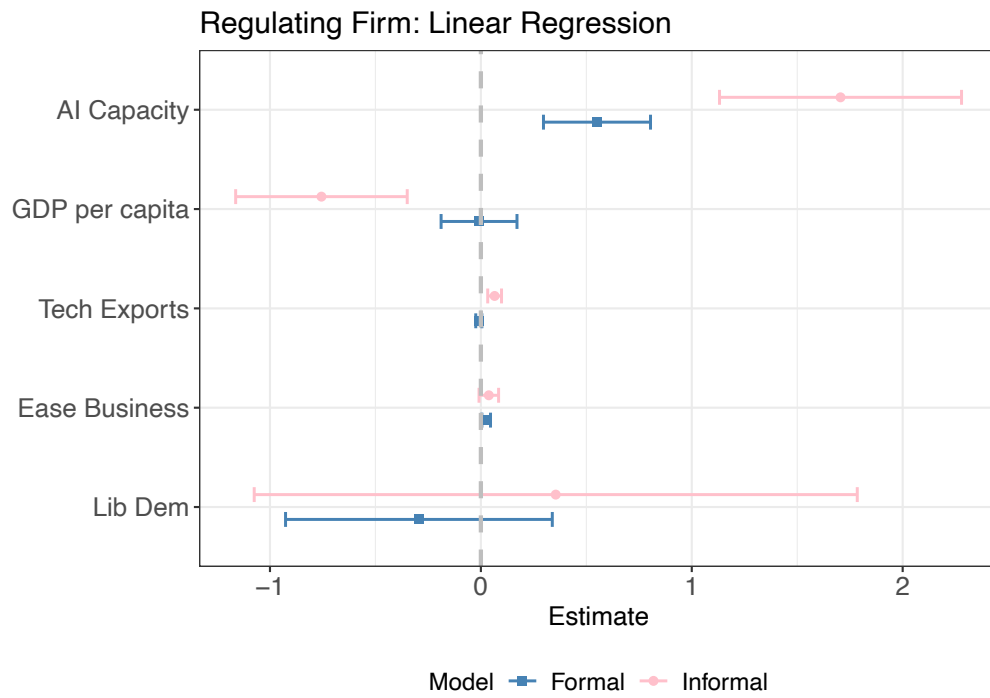### Regulating Firm: Logistic Regression

Figure 3.3 shows results for regulating firms, with the top panel using linear regression and the bottom panel using logistic regression. The blue error bar indicates formal governance, and the pink error bar indicates informal governance. AI capacity indicates statistically significant results over greater informal governance compared to formal governance in both logistic and linear models. In the OLS model, AI capacity also has positive significant results across all types of policies, since countries with high AI capacity tend to utilize a combination of formal and informal governance to balance competing priorities.

Figure 3.4: Marginal effects

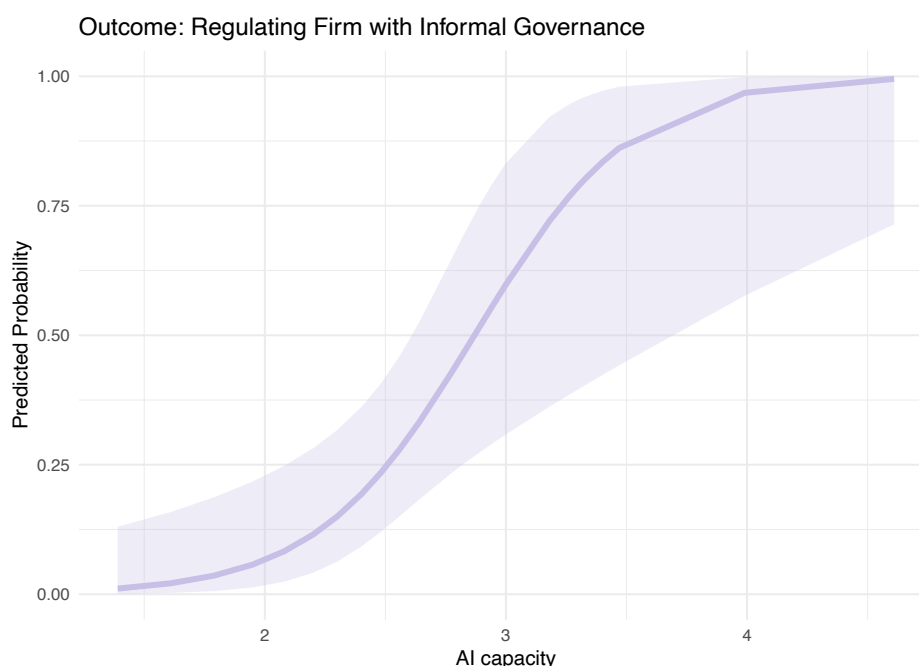Outcome: Regulating Firm with Informal Governance

Figure 3.4 displays the marginal effects of AI capacity on the likelihood of policies regulating firms with informal governance. The AI capacity variable is log-transformed. The countries with high AI capacity have stronger AI sectors and more R&D and investment and may prefer flexible and non-binding rules to avoid barriers to innovation. For fast-moving sectors like AI, informal rules are lower in cost and provide greater flexibility for advanced economies. GDP has a significant effect on formal governance in logistic models but not in OLS. This may suggest that countries with higher GDP per capita have a greater capacity to adopt any formal rules. High-tech exports do not show

significant effects in either model, indicating that regulation may be more closely tied to the AI sector specifically.

With respect to policies regulating government use of AI, Figure 3.5 visualizes the coefficient estimates for both linear and logistic regressions. Freedom of expression indicates statistically significant results for predicting the likelihood of formal government regulation in the logistic model. A higher freedom of expression index is also associated with a higher count of policies regulating government agencies in both formal and informal ways, while the effect size is larger for informal governance. Freedom of expression is a core component of democracies and is highly correlated with the index of liberal democracy. Countries with higher freedom of expression are significantly more likely to impose rules on government use of AI. Greater public oversight may increase the demand for accountability in democracies. The marginal effects of freedom of expression are included in the appendix C.3.

Figure 3.5: Coefficient estimates for regulating government agencies
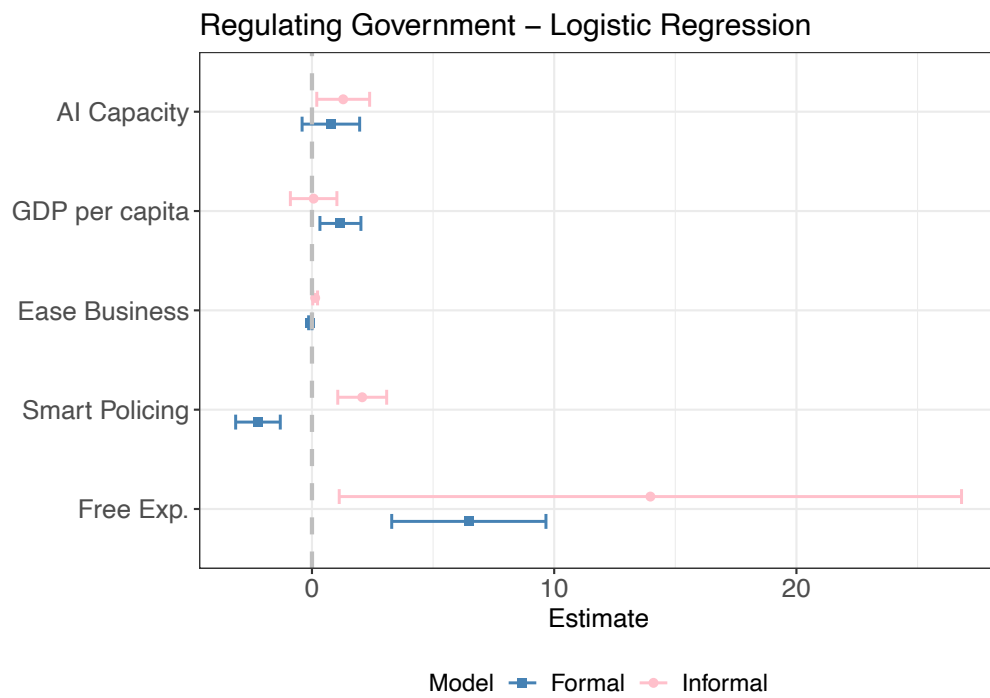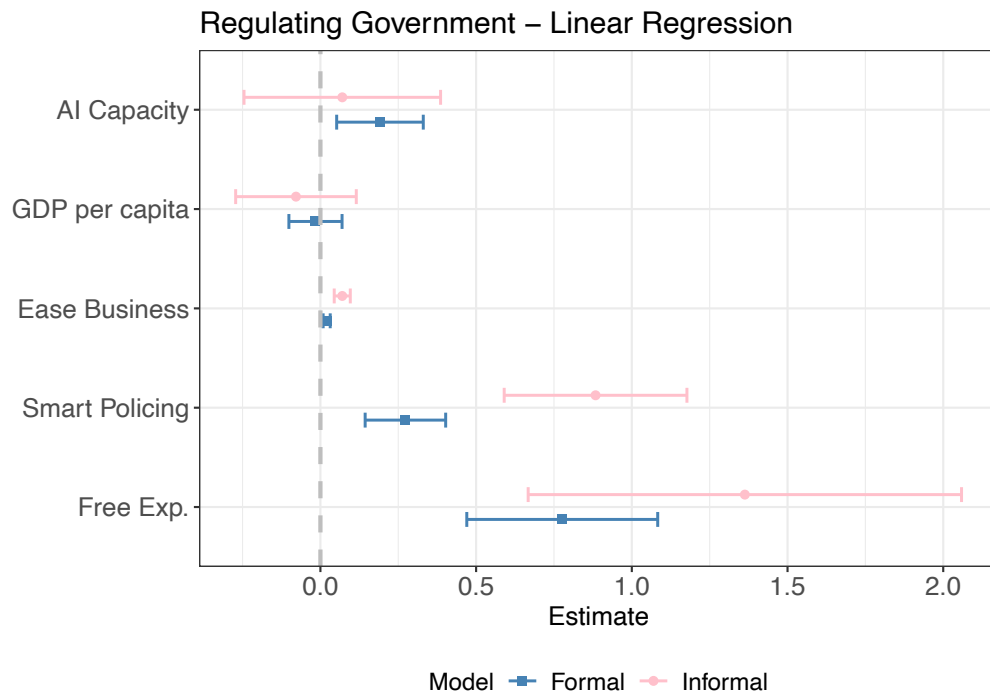
In OLS models, the presence of smart policing is associated with a 0.639 increase in the number of informal rules governing the public sector, and the coefficient is not significant for formal rules. The smart policing variable shows opposite effects in logistic regression, where the presence of smart policing correlates with a higher likelihood of informal governance and a lower likelihood of formal rules to regulate government agencies.

The marginal effects are presented in Figure 3.6. One key distinction between the binary and numeric outcomes is that the binary measure accounts for EU-level regulation by incorporating the EU AI Act across its member states. Among the 13 countries adopting informal governance to regulate government AI use, 9 have implemented smart policing, while 4 have not. As a result, the predicted probability of countries without smart policing adopting informal rules is close to zero. In contrast, among countries with smart policing, 22 lack formal governance, while only 10 have adopted formal rules (six of them are EU countries).[21] This pattern suggests that the higher predicted probability of formal regulation may be driven largely by EU regulation, where many member states do not actively deploy AI in law enforcement. This may also suggest that the EU's push for legislation on government use of AI might face relatively less resistance from member states, in part because few have widely implemented AI in law enforcement. However, the analysis is limited by the variation in sample size, given that formal rules on government AI use are relatively uncommon. As the OECD dataset only includes 70 countries, future research could investigate the relationship between smart policing and the adoption of formal governance beyond the EU context.

3.6 Conclusion

Without adequate safeguards, firms and governments may violate the privacy rights of consumers and citizens or discriminate against minority groups in essential public and private services. These policies can be either mandatory or voluntary, reflecting substantial variation across countries. Official policy documents often emphasize de jure regulations. Future research could explore alternative methods to assess the de facto protection of human rights, including actual implemen-

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[21]These 10 countries include Australia, Brazil, Canada, Denmark, France, Germany, the Netherlands, Malta, Mexico, and Spain.

Figure 3.6: Marginal effects of smart policing on regulating government
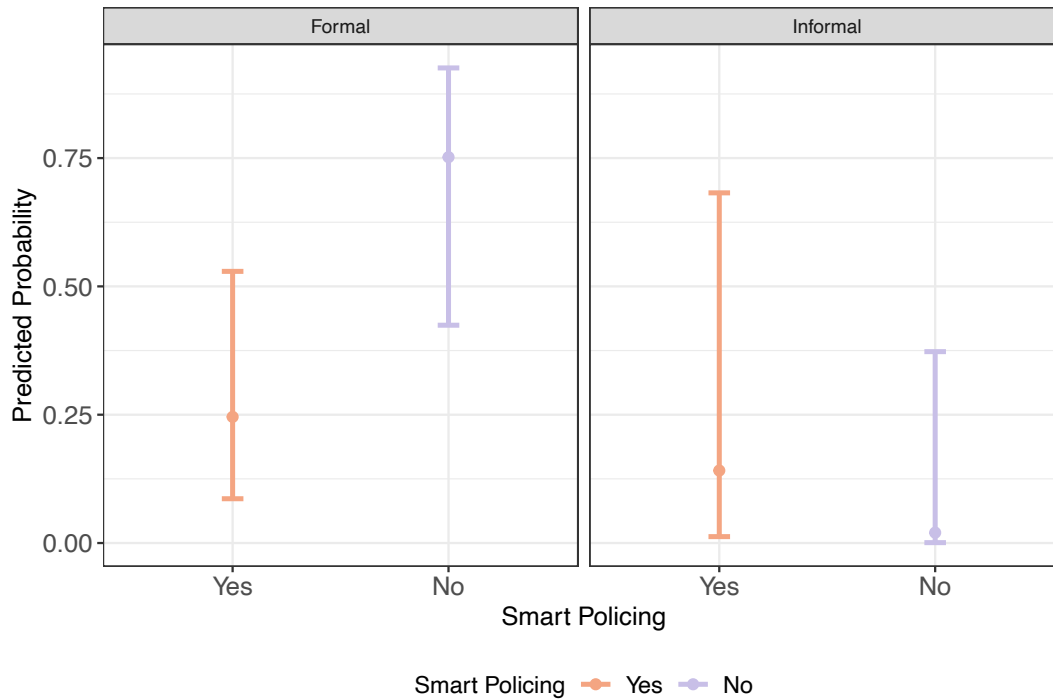
tation and the enforcement of privacy legislation. Another promising direction is to investigate the political influence of large tech companies and whether they shape the state's capacity to enforce new rules. Additionally, examining the interactions between the network structures of multinational tech corporations and domestic institutional arrangements may provide insights into the bargaining dynamics between tech MNCs and host governments, particularly regarding corporate leverage and access to policymaking in foreign jurisdictions.

Table A.1: AI policy count by country in the OECD dataset

Country	Count	Country	Count
Argentina	10	Malta	5
Armenia	2	Mauritius	2
Australia	32	Mexico	6
Austria	9	Morocco	4
Belgium	22	Netherlands	12
Brazil	12	New Zealand	8
Bulgaria	2	Nigeria	2
Canada	14	Norway	19
Chile	11	Peru	9
China	21	Poland	4
Colombia	30	Portugal	11
Costa Rica	7	Romania	3
Croatia	1	Russia	11
Cyprus	2	Rwanda	6
Czech Republic	8	Saudi Arabia	5
Denmark	12	Serbia	18
Egypt	7	Singapore	25
Estonia	9	Slovakia	2
European Union	60	Slovenia	6
Finland	12	South Africa	3
France	34	South Korea	14
Germany	33	Spain	17
Greece	3	Sweden	13
Hungary	14	Switzerland	6
Iceland	4	Thailand	5
India	23	Tunisia	7
Indonesia	1	Turkey	32
Ireland	8	Uganda	3
Israel	8	Ukraine	1
Italy	10	United Arab Emirates	8
Japan	23	United Kingdom	55
Kazakhstan	7	United States	75
Kenya	6	Uruguay	4
Latvia	5	Uzbekistan	3
Lithuania	4	Vietnam	6
Luxembourg	6		

Appendix C: Appendix for Chapter 3

C.1 Governance indicators: coding criteria and cosine similarity

The scope and intensity of AI policy vary based on institutional design features. I code several governance indicators related to AI governance, first to provide alternative measures of AI policy outcomes, and second to construct a systemic framework that may be applicable to assessing other policy areas. Variations in AI policies include whether they aim to balance ethical considerations with economic priorities. Another distinction is the release of technical guidance, such as assessment questionnaires and audit frameworks, which provide practical advice on AI processes and help organizations navigate complex situations. The level of policy implementation also differs. Some guidelines are vague and aspirational, while others outline specific action items.

While the policy design indicators capture the broader procedures and frameworks in place, the institutional and enforcement dimensions emphasize the specific characteristics of AI regulation. The independence of regulatory agencies indicates that regulators are more free to pursue enforcement actions and information dissemination without constraints. Various government agencies also have different functions, such as assessing the impacts of AI systems, advising policymakers, and investigating and penalizing violations. In the OECD dataset, some countries include policies relevant to enforcement actions, such as imposing fines on specific companies. The following section provides the coding criteria for the aforementioned governance indicators.

- **Policy Design**

    - *Balancing ethics with economy*: A binary variable indicating whether ethics are mentioned in policies aimed at promoting AI

    - *Technical expertise*: Indicates if the AI policy initiative involves technical standards such as audit procedures, impact assessments, evaluation qualification, testing methods, certification programs, and standardization codes.

    - *Level of policy implementation*

        1. Only specify guidelines, requirements, or obligations.

2. Action plans or next steps listed for policy implementation and coordination.

3. Formal procedures and frameworks for ensuring compliance.

- **Institutional Characteristics**

  - *Institutional independence*: A binary variable indicating whether the agency responsible for AI policy initiatives is independent.

  - *Level of institutional function*:

    1. Monitor, evaluate, review, and disseminate information

    2. Advise, recommend, or formulate proposals

    3. Oversee compliance, investigate complaints, and penalize violations.

- **Enforcement**

  - *Existing law*: Indicates if new guidance is issued on the applicability of existing laws

  - *Enforcement actions*: Indicates if enforcement actions were taken against violations or complaints

Table C.1: Summary of policy-level governance indicators

Dimension	Variables
Legal Status	- Number of formal governance policies
Target Actor	- Number of policies regulating government agencies
Policy Design	- Level of implementation mechanism - Technical expertise - Balancing Ethics in Economic Policies
Institutional Characteristics	- Level of institutional function - Institutional independence
Enforcement	- Guidance on the applicability of existing law - Enforcement actions

I identify five dimensions to aggregate governance indicators at the country level, as summarized in Table C.1. The scope of the analysis is limited to policies addressing ethics, privacy,

and non-discrimination. For country-level trends, I present cosine similarity using nine hand-coded governance indicators. This process generates a cosine matrix highlighting countries' similarities and differences. Given that cosine similarity scores range from -1 to 1, I derive the cosine distance by subtracting the cosine similarity from one. Figure C.1 displays the cosine distance across G20 countries, where white indicates high similarity, and blue indicates low similarity. The countries are organized by hierarchical clustering, with closeness on the y-axis indicating higher similarity. At the top, similar countries are predominantly regional powers, or G7 countries, including the U.S., UK, EU, France, Germany, and Canada. Figure C.2 displays similar patterns. Among countries in the Global Partnership on AI (GPAI), Countries are more likely to imitate their allies when entering a new policy area. Regional powers tend to cluster together regarding their governance profile while other countries follow.
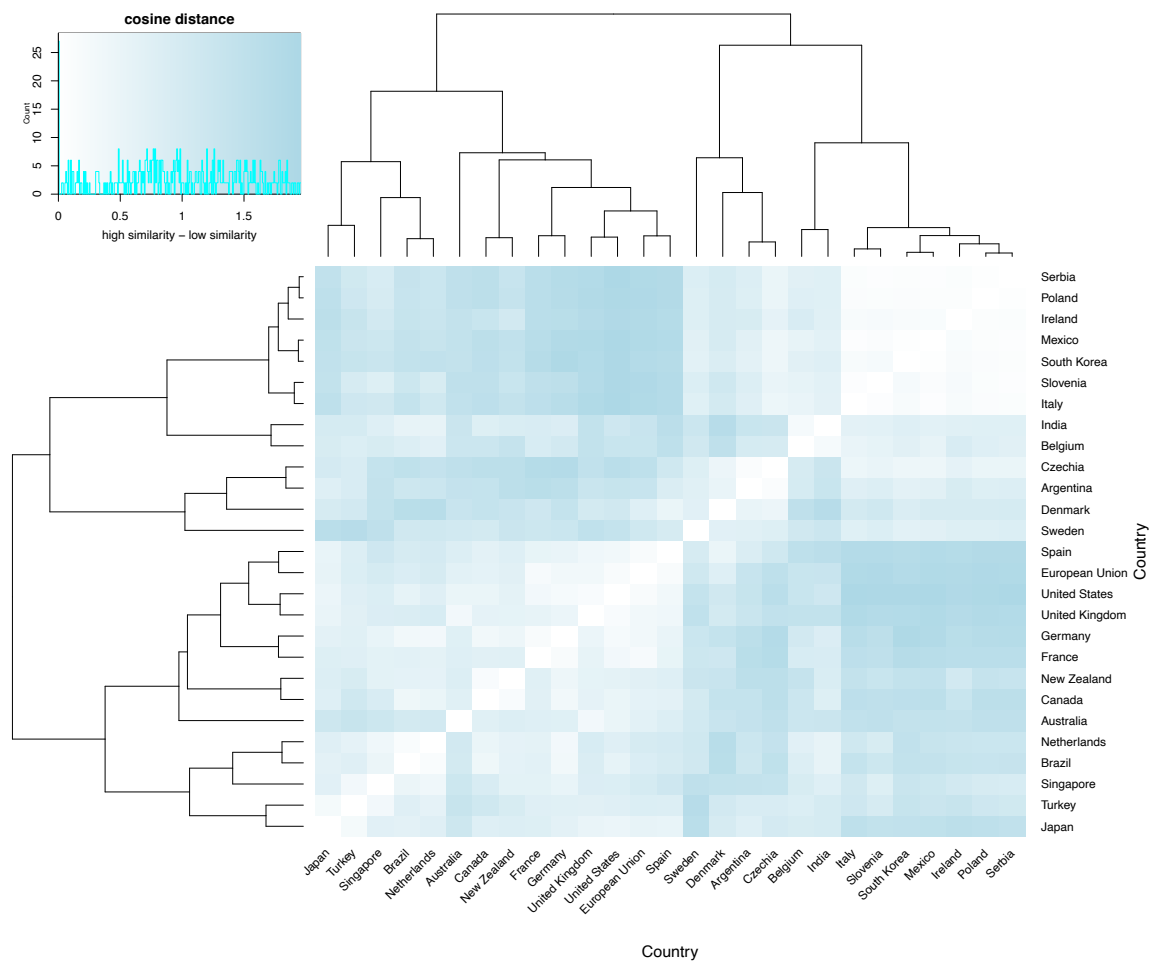
C.2   Regression results

Figure C.1: AI policy attributes: cosine similarity among G20 countries
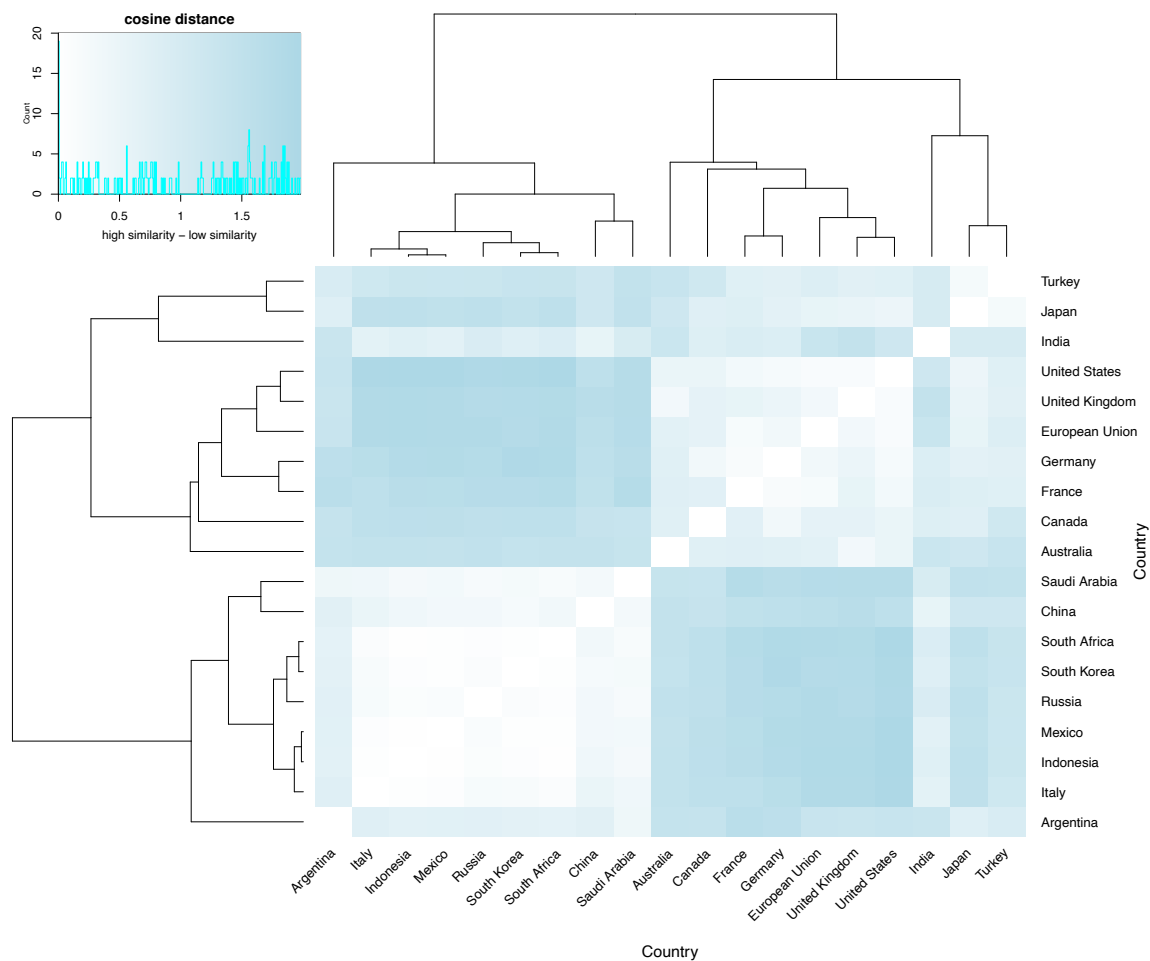
Note: Blue indicates low similarity, and white indicates high similarity.

Figure C.2: AI policy attributes: cosine similarity among GPAI countries

Note: Blue indicates low similarity, and white indicates high similarity.

Table C.2: Logistic regression results

| | Dependent variable: | | | |
| | Firm Formal | Firm Informal | Govt Formal | Govt Informal |
	(1)	(2)	(3)	(4)
GDP per capita	0.853	−0.412	1.175	0.069
	(0.514)	(0.569)	(0.846)	(0.960)
Tech Exports	−0.042	0.039		
	(0.036)	(0.047)		
AI Capacity	0.025	3.047**	0.781	1.289
	(0.665)	(1.078)	(1.188)	(1.091)
Liberal Democracy	−0.052	0.594		
	(1.660)	(1.837)		
Freedom of Expression			6.476*	13.971
			(3.184)	(12.845)
Ease of Business			−2.230*	2.074*
			(0.921)	(1.009)
Smart Policing	0.011	0.081	−0.068	0.132
	(0.052)	(0.078)	(0.069)	(0.099)
Constant	−8.304*	−11.735*	−12.595*	−29.280**
	(3.951)	(5.802)	(5.212)	(10.680)
Observations	59	59	60	60
Log Likelihood	-35.429	-23.778	-23.385	-16.599
Akaike Inf. Crit.	82.858	59.556	58.770	45.197

Note: *p<0.05; **p<0.01; ***p<0.001

Table C.3: OLS regression results

	Dependent variable:			
	Firm Formal	Firm Informal	Govt Formal	Govt Informal
	(1)	(2)	(3)	(4)
GDP per capita	−0.009	−0.756	−0.016	−0.078
	(0.180)	(0.407)	(0.085)	(0.194)
Tech Exports	−0.010	0.065		
	(0.014)	(0.033)		
AI Capacity	0.551*	1.705**	0.191	0.070
	(0.254)	(0.574)	(0.139)	(0.316)
Liberal Democracy	−0.294	0.355		
	(0.632)	(1.430)		
Freedom of Expression			0.777*	1.363
			(0.307)	(0.696)
Ease of Business	0.025	0.038	0.020	0.070**
	(0.021)	(0.046)	(0.011)	(0.026)
Smart Policing			0.273*	0.884**
			(0.129)	(0.293)
Constant	−2.189	0.361	−2.289**	−5.778**
	(1.514)	(3.424)	(0.802)	(1.821)
Observations	59	59	60	60
R^2	0.182	0.300	0.295	0.270
Adjusted R^2	0.104	0.234	0.230	0.203
Residual Std. Error	0.869 (df = 53)	1.964 (df = 53)	0.465 (df = 54)	1.056 (df = 54)

Note: *p<0.05; **p<0.01; ***p<0.001

Figure C.3: Marginal effects of freedom of expression on regulating government

Outcome: Regulating Governments with Formal Governance
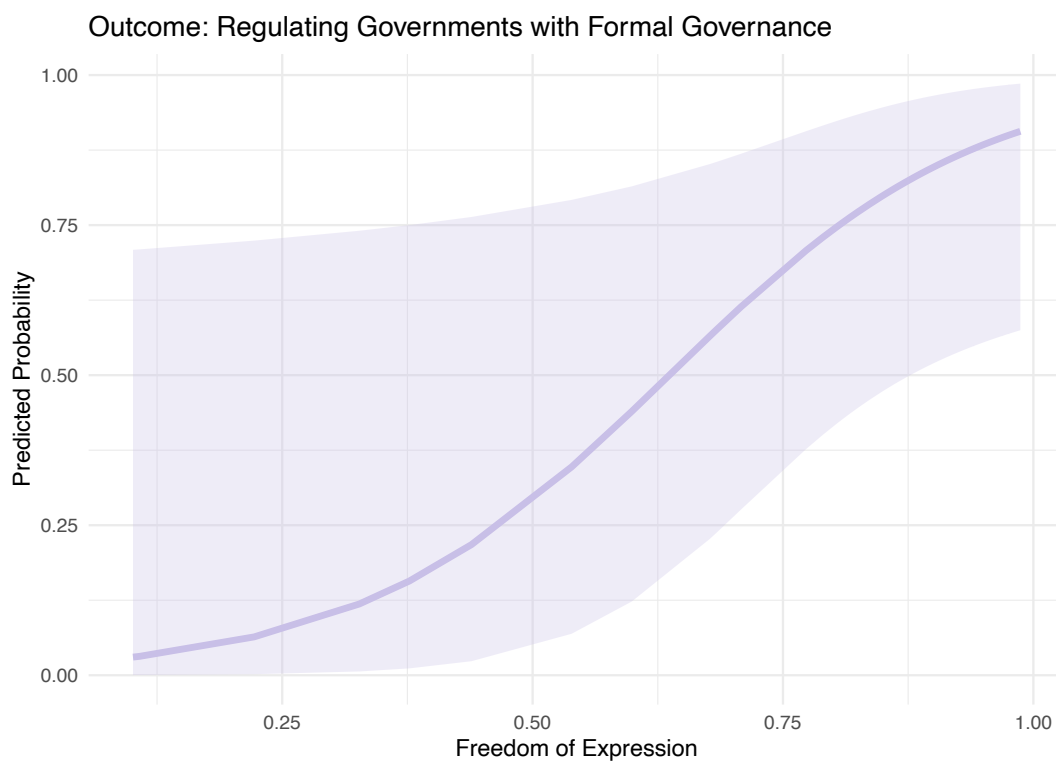
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