

# Shaping Trade Stability: WTO Rulings on Export Restrictions and Business Confidence in Supply Chains

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January 12, 2026

## Abstract

An effective international legal system resolves disputes and deters violations. Once the strongest area of international law, the WTO has been weakened by internal conflicts, trade wars, and supply chain disruptions. This paper examines whether WTO rulings still bolster confidence in the rules-based trade order, focusing on business perceptions of supply chain stability. Using a 2022 survey experiment of Japanese firm managers, we assess how WTO rulings shape expectations about trade reliability. Respondents were randomly assigned to receive varying information regarding a WTO ruling that found China's export restrictions on raw materials violated WTO rules, modeled on an actual case. We analyze how legal rulings and policy changes affect confidence in securing input supplies and compare perceptions of China's supply chains versus other countries. Results show that learning about a WTO ruling against China lowers confidence in China's supply chain reliability. However, further learning about China's compliance with the ruling significantly restores confidence—more than similar policy changes without multilateral enforcement. These findings suggest that while highlighting violations may weaken trust, compliance strengthens confidence in global trade stability.

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# 1 Introduction

An effective international legal system not only resolves specific disputes, but also deters future violations. Once seen as the strongest area of international law, the World Trade Organization (WTO) has been weakened by internal disagreements, trade wars, and supply chain disruptions. Do market actors still believe that WTO rules matter? We study the extent to which WTO rulings increase confidence in the rules-based trade order. Focusing on the business perspective on the stability of supply chains, we argue that multilateral enforcement shapes confidence in the stability of trade. Specifically, we examine two sets of questions. Do WTO rulings change expectations of business actors? How does information on multilateral enforcement compare to information about unilateral policy changes?

A primary goal of the rules-based trading order is to support the stability of trade. Even before liberalizing, states must agree on procedures for setting and negotiating trade regulations. The WTO rules for most-favored-nation and schedule of concessions establish a structured process to discuss whether and how to lower barriers, but they do not require tariffs to fall to any specific level. This framework accommodates wide variation among members about the speed and depth of liberalization, while prioritizing the business need for certainty. Conducting trade requires investment and contracts based on available information. Price volatility caused by arbitrary government intervention hinders decision-making about sourcing inputs and targeting market opportunities. Therefore, although trade flows are often used to evaluate WTO effectiveness, we instead examine how its rules sustain business confidence in the stability of trade.

The recent swings in trade policy triggered by the Trump administration have shattered any sense of predictability in the global trading system. As the world's largest economy uses its economic leverage without regard for established rules and as other governments retaliate in response, businesses struggle to adapt. Such moves make the

WTO appear less relevant. But they also fuel skepticism toward government-led trade policy. Emerging from this period of increased uncertainty will be difficult, as policy commitments now carry less credibility. Yet it is precisely in this context that understanding the role of the WTO becomes more urgent. Our paper examines the types of signals that can help restore business confidence in the stability of trade.

The trade order depends on enforcement to ensure that businesses do not face arbitrary hikes of tariffs or regulatory barriers. The enforcement process can be decomposed into the legal ruling on a policy and the compliance with the legal ruling. Rulings alone may reduce confidence by publicizing violations or increase confidence by demonstrating the strength of monitoring. Compliance, when a government changes a policy to align with a legal recommendation, removes the barrier and signals support for the rule-based order. By examining the two steps separately, we allow for the possibility that monitoring and compliance information may have a different impact on confidence in supply chains. We also consider whether the impact of compliance arises from the removal of the barrier or the context of changing policy to comply with a legal ruling.

We examine the impact of multilateral enforcement on trade stability through business managers' perceptions of WTO rulings and related policy reforms. Attention to each stage of the process, from a violation ruling to the implementation of policy changes that bring national practices into alignment with WTO decisions, highlights the central role of compliance. A comparison of compliance with WTO rulings and unilateral policy reforms highlights the added value of multilateral enforcement. To test our hypotheses, we conduct a survey experiment of Japanese firm managers to evaluate whether WTO rulings increase confidence in supply chain reliability.<sup>1</sup> The experiment provides respondents with varying levels of information about the WTO ruling in an actual dispute, China – Raw Materials (DS394), and examines how this information shapes expectations regard-

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<sup>1</sup> The analysis presented here focuses on one component of a larger pre-registered survey experiment.

ing access to critical input supplies.<sup>2</sup> Additionally, we explore whether these effects are specific to trade with China or extend to perceptions of supply chain stability with other trading partners.

We select the WTO dispute concerning Chinese restrictions on the export of raw materials as a key case to understand the stability of the trade system. Given the deep integration of supply chains, each component represents a critical input between countries. The concentration of these nodes creates vulnerability, which is worsened by the weaponization of interdependence (Farrell and Newman, 2019). China's role as a manufacturing hub and a source of raw materials gives it a position to use leverage over access to materials to favor domestic producers and force multinational firms to move more of their production to China. Accusations that China restricted access for Japanese firms to critical minerals during a maritime confrontation in 2010 drew significant attention in Japan. More recently, the trade war between the United States and China has seen China employ export restrictions as part of its retaliation against U.S. measures. In January 2026, the Chinese government again threatened to impose export controls against Japan in reaction to a controversial remark about Taiwan made by the Japanese prime minister during a parliamentary debate. Our survey was conducted in May 2022, during an interval between the two episodes of escalatory export control restrictions imposed by China. Both the 2010 incident and 2012 adoption of the final WTO ruling against China in the case modeled in our survey occurred a decade before data collection, so we believe the survey prompts will prime the attention of respondents as relatively fresh information. At the same time, recent events have renewed attention to export controls and the vulnerability of supply chains with China.

The sample of Japanese firm managers is a salient population for evaluating business confidence in supply chains. The Japanese economy has a large export sector and deep

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<sup>2</sup> The complaint was filed in June 2009, the panel report was circulated in July 2011, and the Appellate Body report was adopted in February 2012. See [https://www.wto.org/english/tratop\\_e/dispu\\_e/cases\\_e/ds394\\_e.htm](https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds394_e.htm).

interdependence with China and East Asia in regional production networks. Their exposure to risk from Chinese export restrictions is very high. At the same time, the Japanese government has engaged in less disputes in the WTO and firms may have lower information about WTO disputes. The survey prompts managers who are already involved in business decisions to share their expectations about supply chains as a general question. We do not ask about a firm-level decision outcome. Rather, we assess whether the information about WTO rulings shifts perceptions when we ask their opinion about supply chain stability.

Examining how WTO rules apply to China addresses one of the organization's greatest challenges: integrating a large non-market economy into a liberal trade order. There is considerable debate over whether trade rules can effectively constrain China, given its distinct political and economic system (Wu, 2017; Mavroidis and Sapir, 2021). However, early assessments during China's first decade in the WTO suggested that the country had a strong record of compliance with dispute settlement rulings (Kennedy, 2012). As the United States has grown increasingly critical of the WTO and adopted more protectionist measures, China—at least in its official rhetoric—has positioned itself as a defender of the rules-based trade order. In this context, we examine whether WTO rulings against China serve as credible signals for business actors when assessing the stability and reliability of the trade environment.

We first discuss in the next section the importance of trade law for business, and then introduce the case study and our hypotheses for the survey experiment. We then present our analysis and findings, which reveal two opposing effects of dispute settlement. First, information about a violation ruling against China reduces expectations for the stability of future imports of critical supplies from China. However, when respondents also learn that China has implemented policy reforms to comply with the ruling, this offsets the negative effect of the violation. In fact, the full treatment prompt—which includes both the violation and compliance information—generates an overall increase in optimism about

the stability of future trade with China. Most importantly, the boost in confidence from multilateral enforcement (WTO compliance) is significantly stronger than the effect of simply telling respondents about a unilateral policy change by China. Finally, our conclusion discusses the broader implications of these findings for understanding the ongoing debate and the future of the WTO dispute settlement process.

## 2 Trade Law and Business Confidence

Trade agreements offer mutual benefit to governments that seek to expand economic exchange. Reciprocity underlies the tariff bargaining process, and formal commitments with enforcement procedures raise the costs for violating the negotiated terms (e.g. Bagwell and Staiger, 1999; Hoekman and Mavroidis, 2000). The multilateral trade rules constrain arbitrary interventions by governments to favor their own firms or discriminate among trading partners. The regime also establishes procedures for when states can intervene and how to manage disputes. The use of courts to resolve commercial disputes provides a path to restoring order (Milgrom, North and Weingast, 1990; Maggi, 1999; Davis, 2012).

These functions serve business needs. For industries to expand investment in productive capacity to take advantage of world markets, they need assurance of continued access and transparency. Constantly changing tariff rates and arbitrary regulatory standards can turn profits to loss for the firm caught on the wrong side of policy changes. Whether comparative-advantage specialization or lengthy global supply chains for integrated production, interdependence brings efficiency — but this also opens up vulnerability to disruption. The risk of hold-up could easily stop firms and governments from taking the path to free trade (McLaren, 1997; Carnegie, 2014). Joining the trade regime has a positive impact on trade flows (Felbermayr et al., 2024).<sup>3</sup> Another perspective on

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<sup>3</sup> Although there are different findings across modeling specifications (e.g. Rose, 2005; Goldstein, Rivers and Tomz, 2007; Esteve-Pérez, Gil-Pareja and Llorca-Vivero, 2020).

the value of agreements comes from business interest lobbying behavior. Large export-oriented firms have been key advocates for the negotiation of trade agreements (Milner, 1988; Kim, 2017; Blanga-Gubbay, Conconi and Parenti, 2024).

Business demand for rule of law is evident across a range of issues. Investment flows favor states with property rights and rule of law. Agreements with stronger provisions for legal enforcement attract more trade and investment. Within the trade regime, firms pair with governments to bring forward dispute cases (Shaffer, 2003). They also use arbitration to defend their interests from foreign expropriation – when domestic law is insufficient, private arbitration substitutes to support the need for legal protection (Allen, 2023).

In the area of trade enforcement, research highlights the public as an audience supporting compliance with rules (Chaudoin, 2014; Pelc, 2013), and industries as a stakeholder lobbying their own government for or against specific measures (Davis, 2012; Yildirim, 2018; Brutger, 2024). But business also represents an audience watching the behavior of other states toward international economic law.

Within the context of specific disputes, legal enforcement can have opposing effects. On the one hand, prosecutions demonstrate a robust monitoring of rules that would build confidence in the law. On the other hand, they also advertise criminal acts that raise fear of disorder. We evaluate separately the two stages of ruling and compliance.

The WTO relies on government actions to enforce the agreement by bringing forward complaints, which are evaluated through the dispute settlement process. The violation ruling shows the system is holding a country accountable, and could increase confidence in future behavior. The credibility of a legal system grows through repeated use that builds the normative basis for rule of law (Alter, 2014; Sikkink, 2011). But a ruling does not assure compliance for any given case and provides a negative cue about behavior. When a government violates trade rules, it could damage its reputation.<sup>4</sup> Survey analy-

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<sup>4</sup> Reputations matter to the extent that beliefs about actor traits may shape the expectations of other states and actors toward future behavior. See Brewster (2009); Brutger and Kertzer (2018).

sis has shown that people react negatively to information about violations (Tomz, 2007). Reference to third party court judgments are especially harmful in the eyes of the public (Elsig and Spilker, 2024). From a business perspective, there is concern about the immediate costs and also future behavior. Rule violators are less reliable, and can be seen as likely repeat offenders. This leads one to expect that news about a government violating WTO rules could harm business confidence in the reliability of the government. In the context of export control policies, this would shake confidence in supply chains. We test these two opposite reactions to the news about a violation ruling.

Multilateral enforcement strengthens trade stability by ensuring that policy changes are legally binding and widely recognized. Bringing a violation into conformity with the law offers a twofold benefit: it removes trade restrictions and signals a commitment to a rules-based trade order. Although direct economic benefit is dependent on removal of the barrier, legal compliance through multilateral mechanisms fosters long-term stability and predictability. Businesses assess both specific policy changes and broader adherence to the rule of law, which shapes their confidence in future market conditions. In contrast, unilateral reforms can ease trade restrictions but lack the credibility and legal obligation that multilateral enforcement provides. Their success ultimately depends on domestic implementation, rather than on the institutional guarantees of a multilateral framework.

We evaluate these expectations with the following hypotheses:

- 1. Violation rulings increase/decrease business confidence**
- 2. Compliance to change policy in line with WTO rules will increase business confidence**
- 3. Multilateral Enforcement will increase business confidence more than unilateral policy reform**

We also consider varying scope conditions for the impact of enforcement. In its strongest form, a legal system supports cooperation between all members. Each compliance suc-



cess could boost confidence beyond the countries and products in a given dispute case. Kucik and Pelc (2016) provide evidence of such spillover effects from WTO disputes. A narrower impact, however, may limit reputational gains to the country demonstrating compliance. Additional variation could stem from firms' exposure to risk and market engagement. Businesses with direct stakes in a disputed country or product may respond differently. We explore these dynamics as we examine how firms perceive international trade law.

### **3 The Case: Export Restraints on Raw Materials**

Although import barriers are the leading form of trade protection, export restraints represent an important intervention in markets. Governments impose them for a multitude of reasons from stockpiling for domestic use to depriving material to others for either commercial or strategic gain. For countries that produce essential raw materials, export controls represent a source of leverage. The OPEC oil embargo in the early 1970s witnessed major economic turmoil resulting from oil exporters imposing restrictions on which countries they would export to based on policies toward the Arab-Israeli conflict, with response by the U.S. and other governments to restrict their own energy exports to preserve for domestic use in the face of shortages. As in the oil embargo, export restrictions are one type of economic sanction; the Carter administration imposed a wheat embargo on the USSR after its invasion of Afghanistan, and more recently the United States and Europe restricted exports to Russia after its invasion of Ukraine. They may also play a role in industrial policy to preserve access to material for strategic industries.

Export restrictions harm the economic interests of other participants in the global economy. Their direct impact can raise global prices through restriction of supply, while also providing an unfair advantage to domestic producers who benefit from favorable conditions to access inputs. Expansive value chains make firms vulnerable to limits

placed on inputs at any stage in production. The consequences are especially severe for natural resources. Many countries have come to rely upon imports for food, energy, and other essential materials. Export restrictions that lower certainty for access to necessary goods generate demand for stockpiles or inefficient domestic production. Indeed, export restriction may trigger a reaction among other states to impose their own export restrictions (Bown, 2025). At the most fundamental level, the specialization for comparative advantage trade and interdependence relies upon a credible commitment by governments not to impose arbitrary restrictions on exports.

WTO rules govern the use of both export and import restrictions. Provisions to prohibit quantitative restrictions (Article XI:1), require most-favored-nation treatment for duties, and to require transparency for regulatory measures all cover export policies.<sup>5</sup> As with many policies, there can be waivers to allow for restrictions and regulations designed to address health, environmental protection, or international emergency. Yet the interpretation of when such exemptions apply sets some limits, as in the case with import barriers that could serve valid domestic health, environment, or security purposes. Although the case law on import barriers has grown over decades with hundreds of cases, there has been very little enforcement action taken in the area of export restrictions.<sup>6</sup>

The increasing use of export controls for a variety of reasons has been widely noted. Speaking in December 2023 to the WTO Trade Policy Review Body, Director General Okonjo-Iweala warned that new export restrictions had been implemented in the context of the COVID-19 pandemic and the war in Ukraine and focused on those related to food: “ Let me once again urge Members to re-examine and roll back these export restric-

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<sup>5</sup> Marceau (2016) notes that in addition to the limits on quantitative restrictions of exports contained in Article XI:1, most experts believe that the MFN principle would equally apply to the implementation of export duties, and some countries including China accepted additional restraint on export duties as part of their accession agreement.

<sup>6</sup> Prior to the 2009 dispute examined in this paper, there is one WTO dispute, “Argentina – Hides and Leather” (DS155 with panel report adopted in February 2001), which addressed problems in the implementation of export duties. During the 1980s, a GATT panel ruled against fishery export restrictions, “Canada — Measures Affecting Exports of Unprocessed Herring and Salmon.” In both cases, the panels ruled that the export restrictions were a violation of Article XI:1.

tions, which contribute to making food prices more volatile — and therefore to making life harder for poor people around the world.”<sup>7</sup>

Some of the criticism about China acting against WTO rules includes claims that China imposes export restrictions on inputs across a range of items necessary for high technology manufacturing as part of an industrial policy strategy to promote domestic production (Wu, 2017). Growing concern about such export restrictions by China led the EU, US and Mexico to file complaints against China in 2009. They argued that China was using quotas and taxes on export sales of key materials for metal and chemical industries to provide an advantage to their domestic manufacturers who would have cheaper inputs than their foreign competitors. Governments viewed this as a significant case since the export restrictions could make a difference in costs for finished products from aircraft to steel pipes.<sup>8</sup>

The WTO dispute, “China–Measures Related to the Exportation of Various Raw Materials,” represented an important precedent for the application of WTO law to export restraints.<sup>9</sup> It addressed restrictions by China on export of several minerals commonly used as inputs for the steel and chemical industries. The panel and the Appellate Body ruling, which was adopted in February 2012, established a clear interpretation that quotas, licensing requirements, and other barriers that China imposed to restrict exports were inconsistent with GATT Article XI prohibiting quantitative restrictions. The ruling offered a narrow interpretation of the provisions allowing exceptions in the case of critical shortages and rejected the Chinese argument that its measures could be justified as environmental protection (Marceau, 2016). Citing the absence of restrictions on use of the raw materials by domestic users, the panel ruled that the export restrictions did not constitute an effective environmental protection policy.

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<sup>7</sup> World Trade Organization, “Trade Policy Review Body — WTO Trade Monitoring Report Remarks by DG Okonjo-Iweala,” [https://www.wto.org/english/news\\_e/spno\\_e/spno42\\_e.htm](https://www.wto.org/english/news_e/spno_e/spno42_e.htm) accessed 12 March 2025.

<sup>8</sup> “WTO set to rule on China raw material exports,” *Financial Times*, 5 July 2011.

<sup>9</sup> There are three disputes, DS394, DS395, DS398 associated with this case filed by the United States, EU, and Mexico.

The release of the ruling received media coverage across leading news outlets. The editorial page of the *New York Times*, welcomed the decision as a “warning to others about these protectionist tools,” and it went on to highlight the use of export restraints on food by other governments that undermine confidence in food markets.<sup>10</sup>

The complainant governments encouraged an expansive application of the ruling beyond the specific products and policies identified in the case. In announcing the U.S. victory in the dispute, USTR Ron Kirk declared “Today’s decision ensures that core manufacturing industries in this country can get the materials they need to produce and compete on a level playing field.”<sup>11</sup> The U.S. government claimed that China upheld export restrictions on 350 other products, which should also be removed as part of broad compliance with the ruling. The European Union representative to the Dispute Settlement Body meeting that adopted the ruling argued that the Appellate Body findings “have an effect beyond the products at issue in this dispute,” and urged China to “revisit its overall export restrictions regime.”<sup>12</sup> As part of the strategy to compel China to remove its export restraints across a wide range of products, the United States went ahead to file a related complaint on another set of products that represent inputs in high-technology products. The ruling in this subsequent case, “China–Measures Related to the Exportation of Rare Earths, Tungsten and Molybdenum,” reinforced the interpretation of WTO rules for export restraints. Japan joined the US and EU to file a complaint for this dispute, marking its first challenge to China in the WTO dispute settlement process.

Looking at the 2009 Raw Materials case (DS394) offers an opportunity to assess business perceptions of WTO dispute settlement activity. The dispute was the first to address the Chinese export restrictions, and so offered attention both to the barriers imposed by China and highlighted the WTO rules to constrain export restrictions. Since the case was brought by the US, EU, and Mexico we can avoid introducing the Japanese government

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<sup>10</sup> “Nobody Should be Fooled. It’s Protectionism,” *New York Times*, 18 July 2011.

<sup>11</sup> “China Loses Trade Appeal Over Its Curbs on Exports,” *Wall Street Journal* 31 January 2012.

<sup>12</sup> “U.S. Presses China on Raw Materials, Criticizes South Korea on Zeroing,” *Inside U.S. Trade*, 24 February 2012.

position as part of the survey treatment description of WTO actions. At the same time, the importance of the Chinese market to Japanese firms meant that they were sensitive to the ramifications of its policy measures for downstream users. In 2010, escalation of tensions between Japan and China over a territorial dispute led to a sudden restriction by China of rare earth mineral exports that were critical to many Japanese industries (Vekasi, 2019). That incident exposed Japanese business to the risk of export restrictions for supply chains. China is Japan's largest trading partner and a destination for substantial investment by Japanese multinational firms. A Japanese government report released in 2022 highlighted the vulnerability for Japan attributed to high concentration of imports from a single country, pointing to the fact that China supplies over 50% of imports for a large number of goods.<sup>13</sup> Therefore we expect that Japanese business managers are sensitive to the possibility for export restriction policies to impact their supply chains.

We first examine the release of a ruling and the notification of compliance as two steps in multilateral enforcement. Each condition is compared to a different baseline.<sup>14</sup> The release of a violation ruling serves to highlight the inconsistent policy of one member, in this case China, relative to the general knowledge about the policy commitments made by all member states. This could serve as a positive signal about surveillance. Japanese business actors may take assurance from the news that other governments are taking action to enforce rules by filing a complaint against China (at that time the Japanese government had not yet brought any WTO dispute against China).

**H1. Violation Ruling (positive effect):** Respondents will have *more* confidence in the stability of access to critical inputs from China if they learn that the WTO has issued a violation ruling on China's export restrictions, compared to only learning that export restrictions violate WTO principles.

Alternatively, violation ruling may reduce confidence by informing them of the act of

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<sup>13</sup> *Nihon Keizai Shimbun* 10 July 2024.

<sup>14</sup> Rather than a control group, we compare alternative sets of information among multiple treatment groups.

violation. Previous research has shown that WTO disputes may function as an alarm for acts of violation (Chaudoin, 2014; Brutger and Strezhnev, 2022). We present this as an alternative hypothesis as follows.<sup>15</sup>

**H1'. Violation Ruling: (negative effect):** Respondents will have *less* confidence in the stability of access to critical inputs from China if they learn that the WTO has issued a violation ruling on China's export restrictions, compared to only learning that export restrictions violate WTO principles.

The second step is when a government notifies that it has brought the policy into compliance with the ruling. This offers assurance that the barrier has been removed and that the government is willing to comply with the ruling. We are interested to compare how information about compliance with a ruling differs from only hearing about the violation ruling.

**H2. Compliance:** Respondents will have *more* confidence in the stability of access to critical inputs from China if they learn that China has removed export restrictions in compliance with the WTO ruling, compared to only learning that the WTO has issued the ruling.

How does the removal of a barrier through multilateral enforcement compare with removal of a barrier through unilateral policy change? If business managers focus on policy environment, the two scenarios would seem to be equivalent as both have the same outcome. But they differ on the dimension of multilateral or unilateral decision. To the extent that the multilateral enforcement brought the change it could raise confidence in a broader rule-based order that brings trade stability. On the other hand, such reforms occur after legal action and external enforcement. The unilateral reform offers a signal about the Chinese government taking a voluntary action toward market-oriented policies. Therefore we expect that multilateral enforcement will increase confidence in supply chains through the mechanism of rules. If business only cares about the policy or

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<sup>15</sup> Note that only H1 was pre-registered, and H1' is an exploratory hypothesis.

state reform preferences, there would be no impact or negative impact from hearing that the reforms were made in the context of compliance with a WTO dispute.

**H3. Multilateral Enforcement:** Respondents will have *more* confidence in the stability of access to critical inputs from China if they learn that China has removed export restrictions in compliance with the WTO ruling, compared to only learning that China voluntarily removed export restrictions.

In further analysis we examine whether the information about China’s compliance increases confidence with regard to other trading partners or is limited to perceptions of China. For this comparison, we look at Indonesia as another emerging market and the United States as an advanced industrial democracy. Both represent alternative markets for Japanese business. We also consider whether the characteristics of the respondents’ firms shape their beliefs. In particular, we assess how the industry profile and international market stakes of the respondent firm moderate the impact of information about Chinese compliance behavior.<sup>16</sup>

## 4 Research Design

We use a block-randomized experimental design to examine how information on rulings and compliance under international trade law influences business managers’ expectations regarding future trade policy. In our experiment, we vary the level of information provided about legal actions taken against a policy that violates WTO rules. The key outcome is managers’ expectations about supply chain stability. By manipulating the information provided, we aim to identify the causal effects of WTO rulings and compliance on manager-level evaluation of the business environment.

We target business managers in Japan, focusing on individuals who meet three pre-defined criteria: industry, firm size, and managerial positions. Participants are employed

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<sup>16</sup> Please see Appendix A.1 for details about the pre-registered hypotheses.

in either the manufacturing, construction, mining, or utility sectors — industries that are particularly sensitive to changes in international trade policy. We focus on medium and large firms, and respondents must hold branch manager or higher positions, as these roles are likely to involve decision-making and strategic planning influenced by trade policy changes. In Japanese firms, they are commonly expected to have worked in the same company for a substantial amount of time (Ono, 2010). In our sample, 85% of the respondents had worked at their current company for at least 10 years, with 64% for more than 20 years, ensuring substantial knowledge of their firm's business operations.

We recruited respondents through Nikkei Research, a leading Japanese survey company, which provides access to a national panel of pre-screened respondents. The survey company distributed the experimental survey link to individuals who met our selection criteria. The study collected 2,100 valid responses.

Respondents were randomly assigned to one of the four treatment groups below. Each group was asked to read one of the following descriptions:

#### **Treatment 1: WTO Ruling**

*The US, the European Union and Mexico brought a case to the WTO, which alleged that China's policy of restricting the exports of certain industrial raw materials, including bauxite, magnesium, zinc, and silica was in violation of WTO rules. The plaintiffs argued that China's policies gave domestic firms that use these commodities an unfair competitive advantage, while also reducing the world supply of these inputs and causing their prices to soar. The WTO's dispute-settlement body found China's policies to be inconsistent with WTO rules.*

#### **Treatment 2: WTO Ruling + China Removes Export Restrictions**

(Following the same text as Treatment 1:) *In line with WTO rules, the Chinese government has withdrawn the policy restriction on the export of raw materials.*



### **Treatment 3: China Removes Export Restrictions**

*China is a leading producer of industrial raw materials, including bauxite, magnesium, zinc, and silica. In past years, China has restricted the exports, which gave domestic firms that use these commodities an unfair competitive advantage, while also reducing the world supply of these inputs and causing their prices to soar. The Chinese government has withdrawn the policy restriction on the export of raw materials.*

### **Treatment 4: WTO Bans Export Restrictions**

*The imposition of export duties on industrial raw materials like bauxite, magnesium, zinc, and silica is in violation of WTO rules. Countries that restrict the exports of raw materials would give domestic firms that use these commodities an unfair competitive advantage, while also reducing the world supply of these inputs and causing their prices to soar. The WTO rules ban export restrictions of raw materials.*

After reading the vignette, the respondents were asked to answer the following question: “To what extent do you think a stable supply can be expected for key raw materials imported from the following countries? China / Indonesia / the United States.” The outcomes are measured on a six-point scale, from “Cannot expect at all” to “Can be highly expected.” We collapse this outcome into a three-point scale for the main analysis.<sup>17</sup> We estimate the average treatment effects using ordinary least squares (OLS) regression. We control for firm-level characteristics, including firm size (measured by the number of employees), sales volume, years since establishment, headquarters location (major cities or elsewhere), foreign ownership of shares, and whether the firm engages in international sales. We also control for individual characteristics, including their position (rank) in the firm, whether they are college educated, and their age. Additionally, we include indus-

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<sup>17</sup> We include in category 1 “Cannot expect at all” and “Cannot expect.” We include in the middle category 2 “Rather unlikely to be expected” and “Rather expected.” The high category 3 combines “Expected” and “Can be highly expected” responses.

try group fixed effects. See Appendix table A.3 for the descriptive statistics of covariate balance.

## 5 Survey Results for Perceptions of WTO and Supply Chains

We first present the average responses across the different treatment branches for views toward China, Indonesia, and the US. Table 1 shows that respondents have less confidence in the stability of critical input supplies from China (1.6 on a 3-point scale) compared to Indonesia (1.98) or the United States (2.17). Given Japanese firms' experience with geopolitical interventions by China, this pattern aligns with prior perceptions of baseline risks.

**Table 1:** Distribution of respondents' confidence by treatment branch

Treatment	China	Indonesia	US
Treatment 1 (WTO Ruling)	1.56	1.99	2.21
Treatment 2 (WTO Ruling + China Removes Export Restrictions)	1.65	1.97	2.16
Treatment 3 (China Removes Export Restrictions)	1.58	2.01	2.15
Treatment 4 (WTO Bans Export Restrictions)	1.60	1.96	2.15
<b>Average</b>	<b>1.60</b>	<b>1.98</b>	<b>2.17</b>

The table shows the raw distribution of respondents' confidence in the stability of critical input supplies by treatment branch. The values represent the average confidence in supply chain stability, measured on a 3-point scale, where 1 is the lowest and 3 is the highest confidence. The final row presents the average across all treatments for each column.

Notably, within the first column measuring confidence in China's supply chain stability, the highest evaluation appears in Treatment 2, where respondents were informed of both a WTO violation and China's compliance in removing export restrictions. In contrast, the lowest evaluation is found in Treatment 1, where respondents were only told about the WTO violation. Surprisingly, information about China's policy reform without any mention of the WTO (Treatment 3) does not significantly increase confidence in supply stability. This pattern suggests that the WTO has a dual-sided impact—it can both

harm and enhance a country's reputation in global trade.

Next, we will further examine this preliminary finding using regression analysis and test our hypotheses by comparing different treatment combinations.

Figure 1 illustrates the effects of WTO treatments on firm managers' expectations about the stability of critical input supplies from China.<sup>18</sup> First, the results indicate that learning about WTO legal rulings has a negative effect on managers' confidence (H1').<sup>19</sup> Informing the manager about a WTO violation ruling against China's export restrictions decreases expectations for the stable supply of critical input minerals from China by 0.05 [95% CI: (-0.13, 0.03)], compared to simply being informed of the general WTO rules that ban export restrictions on raw materials. The results do not achieve statistical significance, but suggest a weakly negative impact. Learning about legal disputes involving China is more likely to trigger concerns about supply chain uncertainty than offer assurance about monitoring of international law.

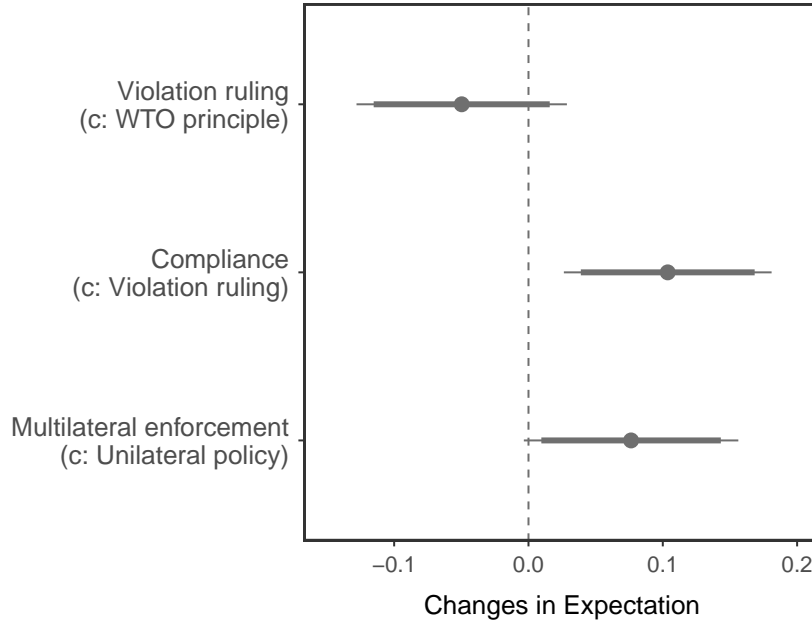
We find clear support for the compliance hypothesis (H2). Our analysis reveals that managers gain greater confidence in the stability of trade when the information about WTO rulings comes with the news that the defendant complied with the rulings. The respondents' expectation for the stable supply of critical inputs from China increased by 0.1 [95% CI: (0.03, 0.18)] when learning that China complied with the WTO ruling, compared to only being informed about the ruling itself. This is a small but meaningful change, as the 0.1 point increase represents 5% of the total 3-point scale. The negative effect of 0.05 from learning about the violation ruling is outweighed by the positive effect of 0.1 from adding information about China's compliance. This underscores the importance of observing compliance with rulings to achieve trust in legalized trade.

In the eyes of business managers, does compliance with WTO rulings provide added value beyond merely learning about China's decision to lift export restrictions? Our re-

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<sup>18</sup> The results compare two groups, i.e. the first row shows estimates for the Treatment 1 WTO ruling of violation against China compared to the Treatment 4 WTO bans export restrictions.

<sup>19</sup> This supports our exploratory hypothesis H1', and rejects our pre-registered hypothesis H1.



**Figure 1: Estimated effects on expectations over stable supplies from China.** The figure displays the estimated effects of WTO rulings on firm managers' confidence in the stability of critical input supplies from China. Estimates are based on OLS regressions with industry-group fixed effects. Thicker and thinner horizontal lines indicate 90% and 95% confidence intervals, respectively, calculated using robust standard errors.

sults suggest that it does. The positive expectations of the respondents for the stability of China's critical input supply increased by 0.08 [95% CI: (-0.003, 0.16)] when they learned that China had removed export restrictions following the WTO ruling, compared to only being informed of China's action to remove export restrictions. This supports hypothesis 3 to demonstrate that multilateral enforcement goes further to build confidence than unilateral policy reforms. The substantive findings are robust across alternative model specifications when we estimate the outcome on the original six-level scale using OLS or model a dichotomous outcome using logistic regression, although statistical significance weakens under some of these alternative specifications (Appendix Figure A.4 and Figure A.5).

These findings imply that while a WTO ruling alone may sound a negative alarm about states' behaviors violating the WTO principles, information about states' compli-

ance with the rulings effectively builds confidence in a stable trade system. The differential impact of multilateral enforcement over unilateral reform highlights how rule of law carries more value for certainty in the trading system. Despite growing concerns over WTO dysfunction, the concept of rule-based enforcement retains credibility among business managers. The findings also emphasize the importance of considering the counterfactual. Absent multilateral enforcement, governments may undertake reforms but not get credit for such voluntary actions because business managers will not believe in lasting impact on future behavior.

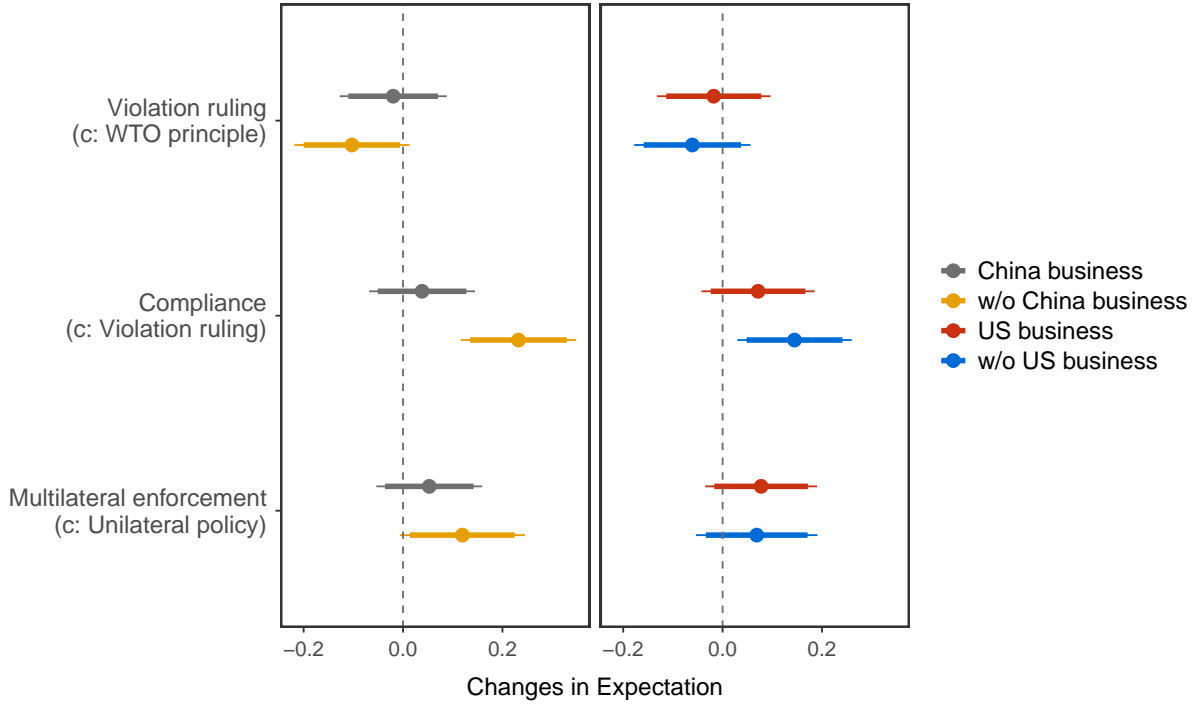
Next, we examine whether information about WTO actions against China is associated with changes in firm managers' confidence in the stability of critical input supplies from countries other than China. Using the same analysis and survey treatment prompts, we find limited evidence of spillover effects on perceptions of Indonesia or the United States (see Appendix Figure A.1). Negative news about China in the form of a WTO violation ruling appears to modestly shift respondents toward more optimistic views of alternative suppliers.<sup>20</sup> By contrast, providing positive information that China removed export restrictions to comply with the WTO ruling does not meaningfully affect managers' views of other countries. Overall, these results offer little support for the argument that multilateral enforcement produces broader spillover effects, suggesting instead that respondents primarily update their beliefs about China itself.

Figure 2 presents our analysis of heterogeneous effects by market salience, measured by whether firms have business ties with China or the United States. Business ties include importing inputs, exporting outputs, maintaining foreign subsidiaries, or outsourcing part of the production process.<sup>21</sup> We compare firms with business ties to China ( $N = 1,079$ ) and those without ( $N = 970$ ) in terms of their confidence in the stability of Chinese

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<sup>20</sup> Specifically, confidence in U.S. supply stability increases marginally by 0.06 [95% CI:  $(-0.01, 0.13)$ ], while the estimated effect on confidence in Indonesian supply stability is small and statistically insignificant at 0.02 [95% CI:  $(-0.05, 0.09)$ ]. The direction of these estimates is consistent with our pre-registered hypothesis H4.

<sup>21</sup> Firms engaged in any of these activities in a given country are considered to have business ties with that country.



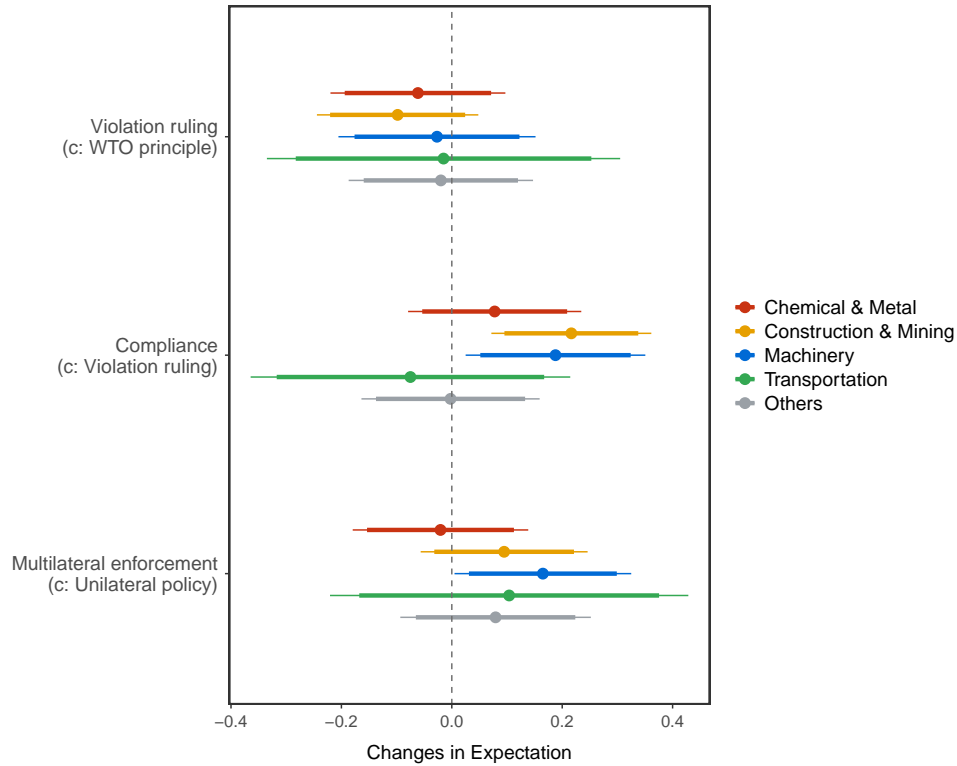
**Figure 2: Estimated effects on expectations over stable supplies from China, by market salience.**

The figure shows the heterogeneous effects of market salience of WTO treatment on firm managers' confidence in the critical input supply stability from China. The left panel shows the effects for firms with and without trade with China on their confidence in the stability of critical input supplies from China, whereas the right panel shows the effects for those with and without trade with the US, also on their confidence in the stability of supplies from China. The effects are estimated using OLS regressions with industry group fixed effects. Thicker and thinner horizontal lines indicate 90% and 95% confidence intervals, respectively, calculated using robust standard errors.

input supplies (left panel). We conduct a parallel comparison for firms with business ties to the United States ( $N = 876$ ) and those without ( $N = 985$ ) (right panel). Across both panels, estimated treatment effects are small, and differences between groups are limited.

Contrary to our pre-registered expectation, both the negative effect of information about a WTO violation ruling against China and the positive effect of information about China's subsequent compliance are somewhat larger among firms without business ties to China or the United States.<sup>22</sup> For the violation ruling treatment, the estimated effects are  $-0.10$  [95% CI:  $(-0.22, 0.01)$ ] and  $-0.09$  [95% CI:  $(-0.18, 0.06)$ ], respectively. One possible

<sup>22</sup> These patterns run counter to our pre-registered hypothesis H7.



**Figure 3: Estimated effects on expectations over stable supplies from China, by industry.** The figure shows the heterogeneous effects of WTO rulings on firm managers' confidence in the critical input supply stability from China. The effects are estimated using OLS regressions for each industry group. Thicker and thinner horizontal lines indicate 90% and 95% confidence intervals, respectively, calculated using robust standard errors.

interpretation is that firms with direct international experience may already be familiar with WTO developments or may be less inclined to infer future supply stability from past rulings or compliance, which could generate a ceiling effect in their responses to the treatment prompts. By contrast, managers at firms without such ties may place slightly greater weight on this information. Overall, the evidence for substantively meaningful heterogeneity by market salience remains limited.

We also test the industry-level heterogeneity in the effects of WTO rulings. Figure 3 shows the estimated effects separately for each industry group.<sup>23</sup> We find no statistically

<sup>23</sup> To ensure similar group sizes, we grouped the industries as follows: chemical & metal, construction & mining, machinery, transportation, and others (including textile, furniture, food and beverages). In these models, industry fixed effects are omitted, and two covariates (foreign ownership and sales volume) are excluded due to limited within-group variation.

significant differences across industries in response to information about a WTO violation ruling against China. However, some industries appear more responsive to information about China's subsequent compliance.

In particular, the positive effect of adding compliance information to the WTO ruling is most pronounced among firms in the machinery and construction industries, with estimated effects of 0.21 [95% CI: (0.07, 0.36)] and 0.19 [95% CI: (0.03, 0.35)], respectively. In contrast, there is no significant effect within the chemical and metal industry, which is the sector most directly downstream from the specified raw material inputs (bauxite, magnesium, zinc, and silica).<sup>24</sup> Given the small sample sizes within each industry subgroup, we cannot make strong inferences about these results. Nonetheless, the estimates suggest that sectors further downstream may be somewhat more sensitive to compliance information than those most directly connected to the inputs.

The size of the respondent's firm does not significantly change the pattern of results. When comparing treatment effects between small companies less than 300, medium companies and large companies with more than 5000 employees, the direction of effect is similar, although significance levels are low for estimates in these smaller subgroups (Appendix Table A.2).

## 6 Conclusion

The WTO dispute settlement process has come under criticism for its slow pace and claims of judicial activism. But looming over the system is a broader dissatisfaction. The widespread perception about low compliance with the rules has led to an erosion of support for the system as a whole.

Nevertheless, our findings suggest that the signaling role of the WTO continues to hold potential value. Our survey, targeting Japanese business managers, demonstrates

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<sup>24</sup> This conforms to our pre-registered hypothesis on general industry spillover (H6) instead of narrow industry spillover (H5).



that they take information about WTO compliance seriously. Indeed, China's unilateral policy reform does very little to change expectations about its future trade policies, while the same reforms boost confidence when described as measures taken to comply with WTO rules.

Such positive findings may not be enough to restore confidence in the trade order. One problem is that news about violations gains more attention than news about compliance. A search of English-language news (factiva) and Japanese-language news reveals a significantly more coverage during the month after the Appellate Body ruling than during the month after China notified the WTO that it had brought its measure into compliance with the ruling.<sup>25</sup> Our study highlights that the violation ruling serves as an alarm about bad behavior. If the counterbalancing positive effect of compliance comes a year later with little attention, even good behavior may go unrewarded. The unintended consequence may be a skewed perception that states routinely violate the rules, along with an underestimation of the system's capacity to induce compliance.

Of course, the reported compliance itself may not be genuine. In several disputes, ongoing proceedings challenge the declared compliance of a government. Other cases may elicit nominal compliance with a rule change, but not generate new trade opportunities. Indeed, China imposed export restrictions on raw materials and rare earth minerals again starting from 2023, this time with a national security justification. Some evidence has supported the overall positive impact of WTO disputes on trade (Davis, 2012; Bechtel and Sattler, 2015; Shin and Ahn, 2019). More research needs to examine the multiple forms of compliance, including mutually agreed solutions reached prior to a ruling and comparison with disputes not brought before the WTO. As noted by Elsig (2015), "the jury is still out" regarding the compliance record of the WTO. The gap in perceptions

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<sup>25</sup> For the search terms "Raw Materials and (WTO or world trade)", the factiva search shows 280 article hits during the month following the February 2012 adoption of AB report and 133 article hits during the month following January 17, 2013 notification of compliance. In the Asahi Shimbun database using the same search terms in Japanese, no articles were identified in the month after notification of compliance while four articles had discussed the panel ruling, appeal, and circulation of the AB report.

of the system and its actual performance could arise from the focus on violation rulings rather than compliance.

Furthermore, the U.S. blocking of Appellate Body justices has created a situation where violation rulings take place without further action because governments can “appeal into the void” to forestall further actions. This may worsen confidence in trade stability as violation rulings continue without the offsetting compliance. In response, other governments have turned to an alternative venue, the Multi-Party Interim Appeal arbitration arrangement, which shows an early sign of effective dispute resolution (Pelc, 2024). In more time, business actors may come to recognize this alternative form of multilateral enforcement that can guarantee open trade.

As a mechanism for reputation clearing, the WTO can help states reveal that, despite having an inconsistent policy, they are now aligning with international rules. Our study shows the value of this process to restore business confidence. China and other governments may need multilateral enforcement to convince business partners that it is a stable provider of critical inputs. Meanwhile, as the U.S. government launches an array of trade measures seen to violate WTO rules, it risks not only eroding trust in the multilateral trading system but also damaging its own reputation as a reliable partner. Our research highlights the role of multilateral enforcement in building confidence, but this function remains contingent on the behavior of states to comply with rulings.

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## A Appendix

### A.1 Pre-registered hypotheses

- H1. Legal rulings increase confidence in supply chains [ $T1 > T4$ , Outcome: input from China]
- H2 (relabeled as H3 in the main text). Enforcement actions increase confidence in supply chains [ $T2 > T3$ , Outcome: input from China]
- H3 (relabeled as H2 in the main text). Compliance with policy change increases confidence in supply chains [ $T2 > T1$ , Outcome: input from China]
- H4. General country-level spillover effect: Enforcement and compliance regarding China disputes will increase confidence in supply chains with other countries [ $T1 > T4/T2 > T3$ , Outcome: input from the US/Indonesia]
- H5. Narrow industry-level spillover effect: Enforcement and compliance regarding the dispute about China's raw material export restrictions will increase confidence in supply chains with China by firms in the downstream industries that heavily use the products named in the dispute [ $T1 > T4/T2 > T3$  within the affected industry, Outcome: input from China]
- H6. General industry level spillover effect: Enforcement and compliance regarding the dispute about China's raw material export restrictions will increase confidence in supply chains with China by firms in all industries [ $T1 > T4/T2 > T3$  moderated by industry, Outcome: input from China]
- H7. Market salience of business stakes will moderate the effect of information about legal enforcement [ $T1 > T4/T2 > T3$  moderated by having business with China/US, Outcome: input from China/US]

### A.2 Treatment vignettes in Japanese

Treatment 1: 米国・欧州連合(EU)・メキシコは、ボーキサイト・マグネシウム・亜鉛およびシリカを含む特定の工業原料の輸出制限という中国の政策に異議を唱え、WTOに提訴しました。原告の国々の主張は、中国の政策がこれらの原材料を使用する中国国内企業に不当な競争優位性を与えると同時に、これらの原材料の世界的な供給を減らし、価格を高騰させている、というものでした。これを受けてWTOの紛争解決機関は、中国の政策がWTOルールに反しているとの見解を示しました。

Treatment 2: 米国・欧州連合(EU)・メキシコは、ボーキサイト・マグネシウム・亜鉛およびシリカを含む特定の工業原料の輸出制限という中国の政策に異議を唱え、WTOに提訴しました。原告の国々の主張は、中国の政策がこれらの原材料を使用する中国国内企業に不当な競争優位性を与えると同時に、これらの原材料の世界的な供給を減らし、価格を高騰させている、というものでした。これを受けてWTOの紛争解決機関は、中国の政策がWTOルールに反しているとの見解を示しました。WTOルール

に従い、中国政府は原材料の輸出制限を撤回しました。

**Treatment 3:** 中国はボーキサイト・マグネシウム・亜鉛・シリカなどの工業原料の主要生産国です。近年、中国はこれらの原材料の輸出を制限しており、これらの原材料を使用する中国国内企業に不当な競争優位性を与えると同時に、これらの原材料の世界的な供給を減らし、価格を高騰させています。中国政府は原材料の輸出制限を撤回しました。

**Treatment 4:** ボーキサイト・マグネシウム・亜鉛・シリカなどの工業原料に輸出税を課すことは、WTOのルールに反するものです。これら原材料の輸出を制限している国々は、これらの原材料を使用する国内企業に不当な競争優位性を与えます。同時に、これらの原材料の世界的な供給を減らし、価格を高騰させています。WTOルールは、原材料の輸出制限を禁止しています。

**Questionnaire:** 以下の国々から輸入する重要な原材料について、どの程度安定した供給が期待できると思いますか。(中国・インドネシア・アメリカ)

- 全く期待できない
- 期待できない
- どちらかといえば期待できない
- どちらかといえば期待できる
- 期待できる
- 大いに期待できる

### A.3 Descriptive Statistics

**Table A.1:** Number of observations in each industry group

Industry	Treatment	N
Chemical & Metal	Violation ruling	176
Chemical & Metal	Multilateral enforcement	169
Chemical & Metal	Compliance	174
Machinery	Violation ruling	151
Machinery	Multilateral enforcement	147
Machinery	Compliance	143
Construction & Mining	Violation ruling	241
Construction & Mining	Multilateral enforcement	232
Construction & Mining	Compliance	230
Transportation	Violation ruling	49
Transportation	Multilateral enforcement	44
Transportation	Compliance	48
Others	Violation ruling	157
Others	Multilateral enforcement	151
Others	Compliance	149

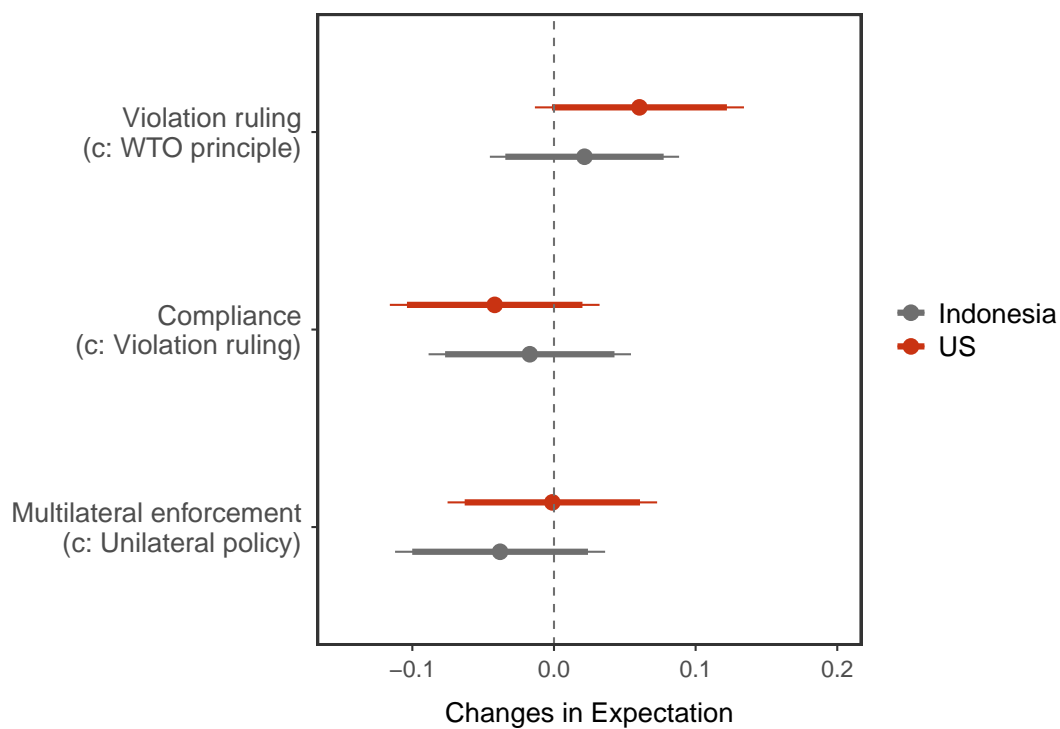
**Table A.2:** Balance Across Industry Group

	China removes (N=484)		WTO + China removes (N=489)		WTO bans (N=490)		WTO ruling (N=492)	
	N	Pct.	N	Pct.	N	Pct.	N	Pct.
Textile & Furniture	22	(4.5)	22	(4.5)	21	(4.3)	24	(4.9)
Food & Beverage	39	(8.1)	39	(8.0)	39	(8.0)	38	(7.7)
Chemical & Metal	107	(22.1)	102	(20.9)	108	(22.0)	103	(20.9)
Machinery	91	(18.8)	95	(19.4)	92	(18.8)	96	(19.5)
Construction & Mining	136	(28.1)	143	(29.2)	141	(28.8)	142	(28.9)
Transportation	35	(7.2)	36	(7.4)	36	(7.3)	35	(7.1)
Others	54	(11.2)	52	(10.6)	53	(10.8)	54	(11.0)

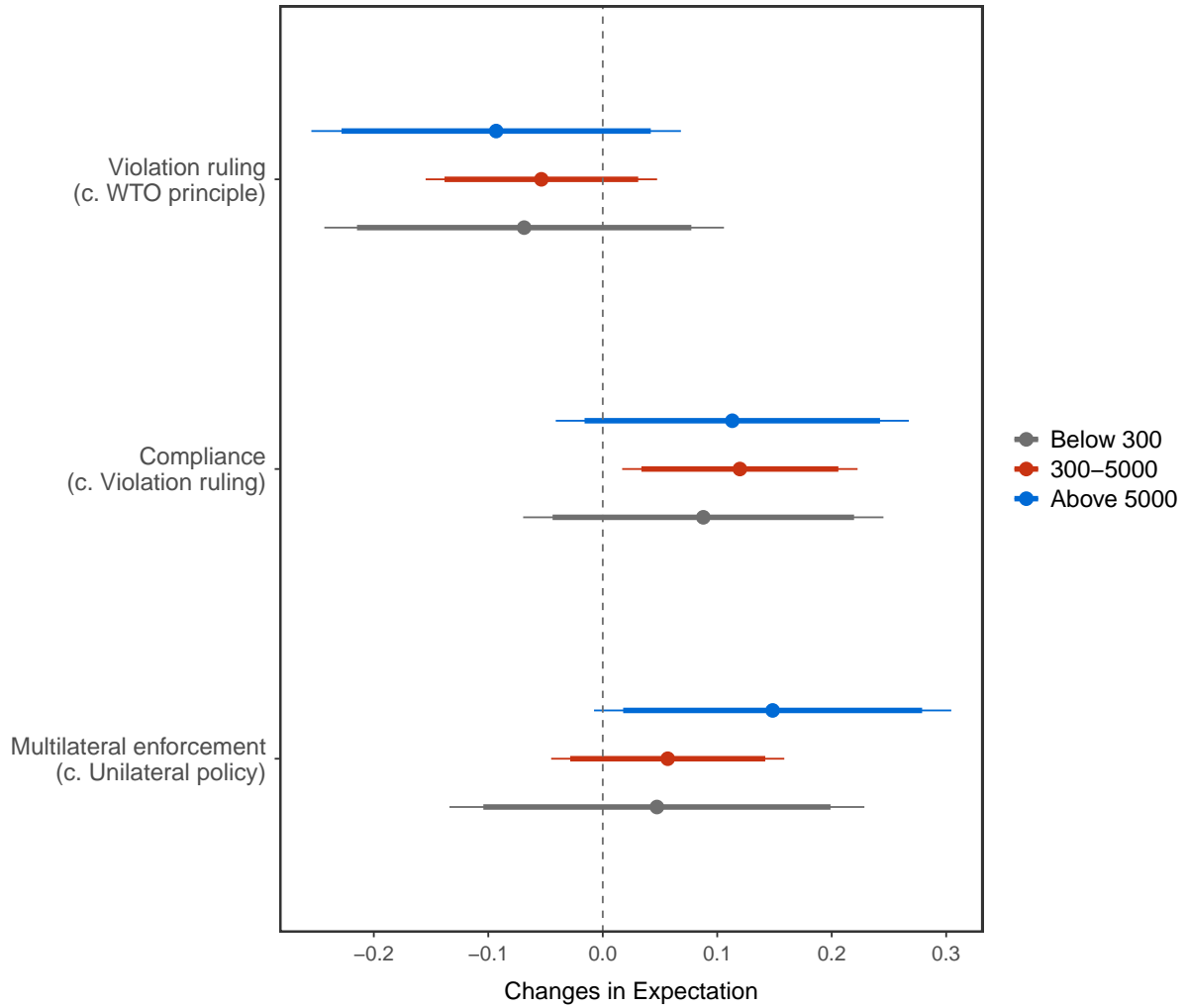


**Table A.3: Covariate Balance Table**

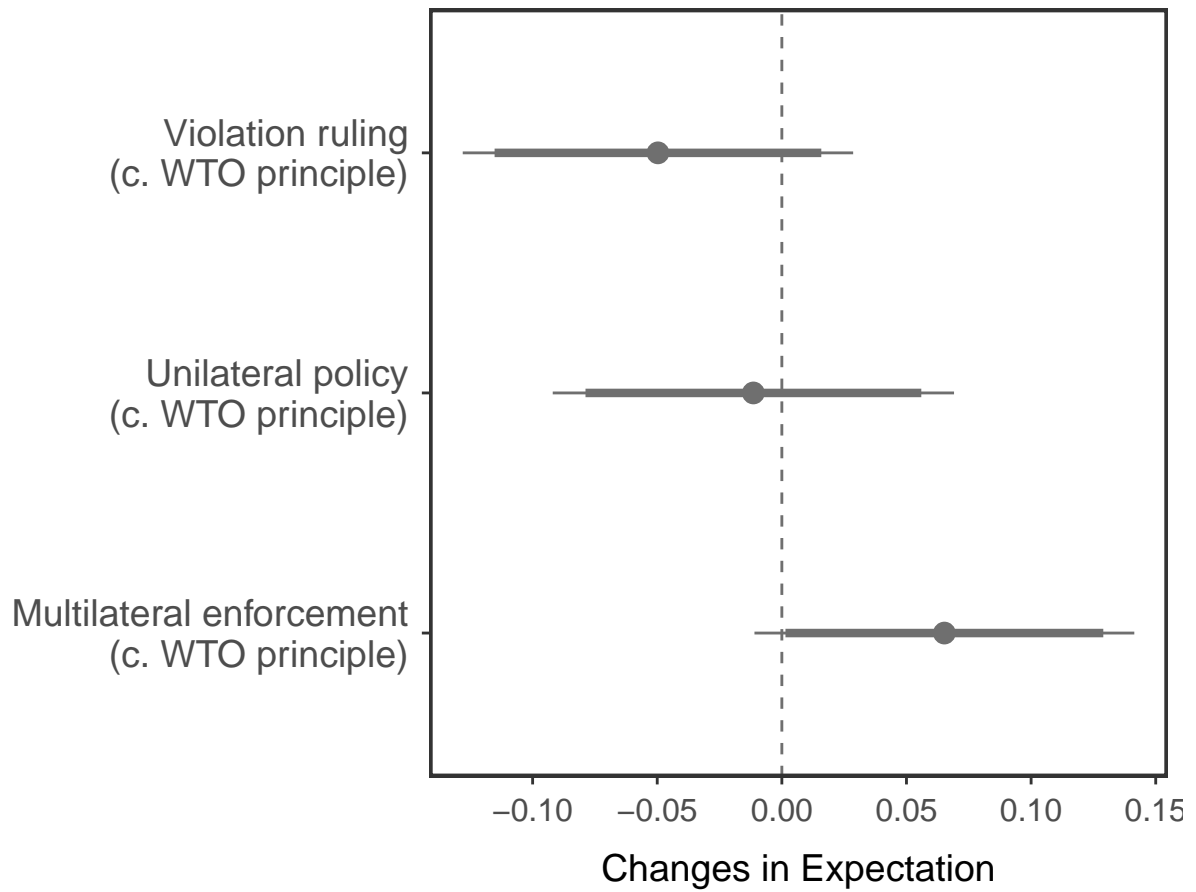
		China removes (N=484)		WTO + China removes (N=489)		WTO bans (N=490)		WTO ruling (N=492)	
		N	Pct.	N	Pct.	N	Pct.	N	Pct.
Position	1	35	7.2	37	7.6	39	8.0	37	7.5
	2	308	63.6	303	62.0	301	61.4	320	65.0
	3	141	29.1	149	30.5	150	30.6	135	27.4
College degree	0	98	20.2	97	19.8	72	14.7	70	14.2
	1	386	79.8	392	80.2	418	85.3	422	85.8
Age	1	46	9.5	48	9.8	54	11.0	55	11.2
	2	336	69.4	329	67.3	337	68.8	332	67.5
	3	102	21.1	112	22.9	99	20.2	105	21.3
Employee	1	93	19.2	99	20.2	96	19.6	119	24.2
	2	267	55.2	290	59.3	291	59.4	262	53.3
	3	124	25.6	99	20.2	102	20.8	111	22.6
Tokyo and Osaka	0	205	42.4	214	43.8	224	45.7	221	44.9
	1	279	57.6	275	56.2	266	54.3	271	55.1
Established year	1	237	49.0	232	47.4	247	50.4	218	44.3
	2	91	18.8	93	19.0	105	21.4	107	21.7
	3	77	15.9	75	15.3	71	14.5	82	16.7
	4	37	7.6	36	7.4	31	6.3	38	7.7
	5	21	4.3	35	7.2	21	4.3	19	3.9
	1	365	75.4	374	76.5	382	78.0	380	77.2
Foreign ownership	2	64	13.2	55	11.2	62	12.7	62	12.6
	3	11	2.3	8	1.6	15	3.1	10	2.0
	4	11	2.3	24	4.9	9	1.8	14	2.8
Sales abroad	1	137	28.3	126	25.8	141	28.8	148	30.1
	2	220	45.5	230	47.0	231	47.1	212	43.1
	3	81	16.7	86	17.6	91	18.6	89	18.1
Sales	4	0	0.0	2	0.4	0	0.0	2	0.4
	1	53	11.0	48	9.8	39	8.0	51	10.4
	2	54	11.2	43	8.8	64	13.1	58	11.8
	3	96	19.8	122	24.9	115	23.5	97	19.7
	4	36	7.4	47	9.6	44	9.0	41	8.3
	5	76	15.7	80	16.4	82	16.7	83	16.9
	6	137	28.3	119	24.3	129	26.3	135	27.4



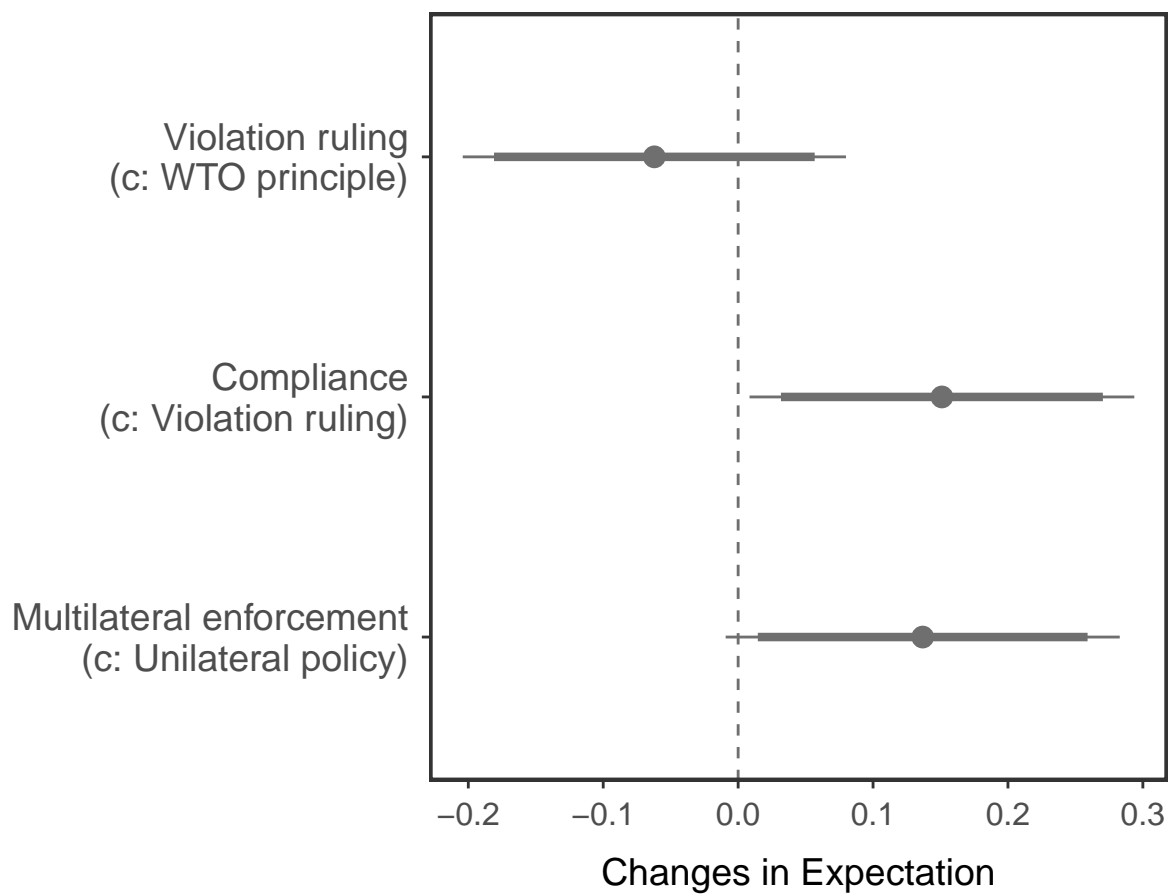
**Figure A.1: Estimated effects on expectations over stable supplies from Indonesia and the US.** The figure shows the general country-level spillover effect of WTO rulings on firm managers' confidence in the critical input supply stability from Indonesia and the US. The effects are estimated using OLS regressions with industry group fixed effects. Thicker and thinner horizontal lines indicate 90% and 95% confidence intervals, respectively, calculated using robust standard errors.



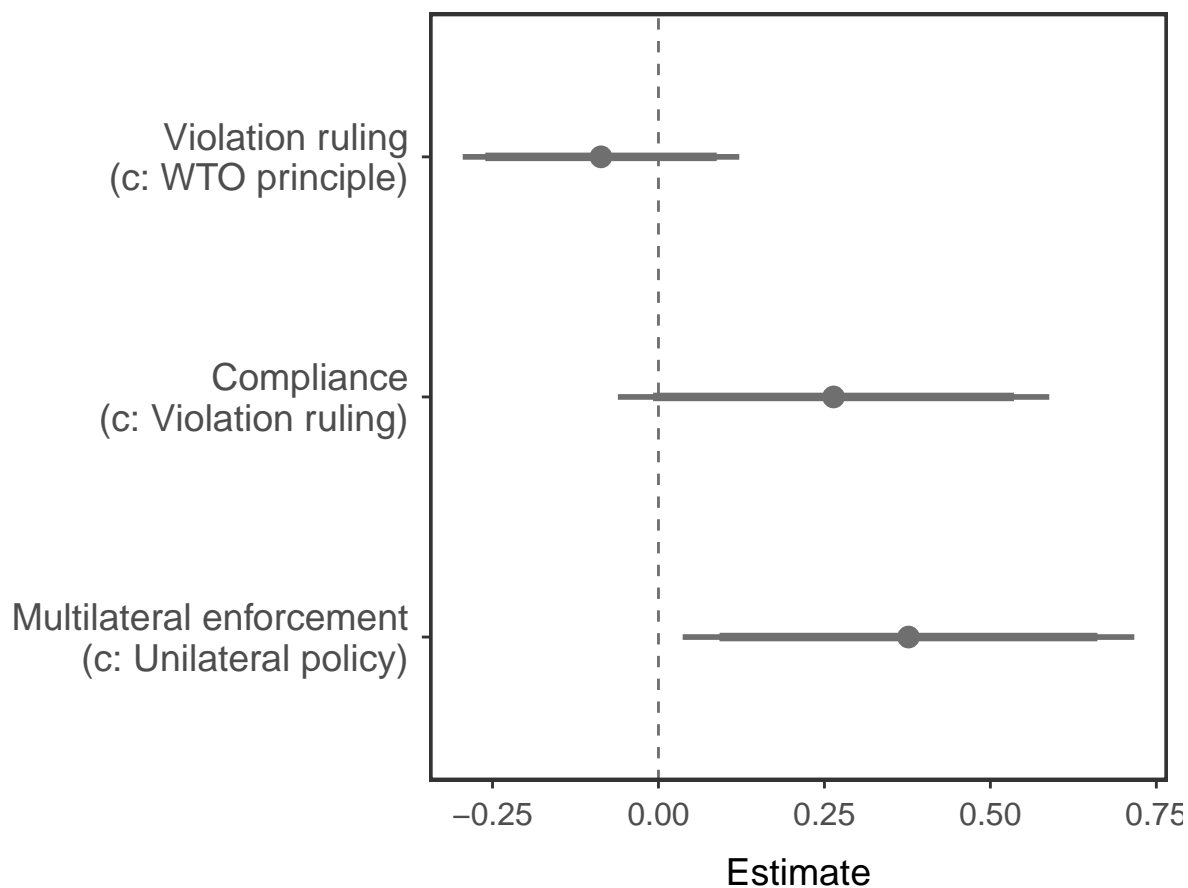
**Figure A.2:** The figure shows the estimated effects of WTO rulings on firm managers' confidence in the critical input supply stability from China, by firm size (measured by the number of employees). The effects are estimated using OLS regressions for each firm size group. Thicker and thinner horizontal lines indicate 90% and 95% confidence intervals, respectively, calculated using robust standard errors.



**Figure A.3:** The figure shows the estimated effects of WTO rulings on firm managers' confidence in the critical input supply stability from China. The effects are estimated using OLS regressions by comparing Treatment 1-3 with Treatment 4. Thicker and thinner horizontal lines indicate 90% and 95% confidence intervals, respectively, calculated using robust standard errors.



**Figure A.4:** The figure shows the estimated effects of WTO rulings on firm managers' confidence in the critical input supply stability from China. The effects are estimated using OLS regressions with 6-level numerical measure of confidence. Thicker and thinner horizontal lines indicate 90% and 95% confidence intervals, respectively, calculated using robust standard errors.



**Figure A.5:** The figure shows the estimated effects of WTO rulings on firm managers' confidence in the critical input supply stability from China. The effects are estimated using logit regressions with binary operationalization of confidence, constructed from the original 6-point scale. Thicker and thinner horizontal lines indicate 90% and 95% confidence intervals, respectively, calculated using robust standard errors.