

Geopolitical Tension and Firm Scope

Abstract

This paper examines whether firms contract their product-market scope when their exposure to geopolitical risk rises. We construct a novel revenue-weighted firm-level geopolitical risk measure using country-level geopolitical risk indices and firms' geographic revenue decomposition. We link firm-level geopolitical risk to the text-based scope metrics from the firm's 10-K filings. We find that higher geopolitical risk is associated with a smaller firm scope, driven by fewer market entries and more market exits. The relationship is stronger among firms with greater foreign dependence and more geopolitically sensitive business lines. A difference-in-differences design around the U.S.-China trade war yields consistent evidence. Overall, our results suggest that geopolitical risk leads firms to redesign their internal boundaries by curbing expansion and accelerating contraction.

Keywords: Firm scope; Geopolitical risk; Market entries; Market exits; Trade war

1. Introduction

Geopolitical tensions have become a defining feature of the global business environment. Trade conflicts, sanctions, export controls, and technology restrictions increasingly shape the conditions under which firms operate across borders. For firms, these developments do not merely raise background volatility, but they can abruptly change the feasibility of cross-border transactions, constrain technology transfer, and intensify compliance obligations (Henisz et al., 2010; Luo & Van Assche, 2023; Meyer et al., 2023; Witt, 2019). As a result, geopolitical risk has emerged as a first-order concern for corporate decision-making. Recent management scholarship also emphasizes that research on war, security, and defense remains underdeveloped relative to the scale of the phenomenon. This motivates a need for systematic theorizing and evidence on how organizations adapt their strategies and structures under geopolitical turmoil (Hallgren et al., 2025; Joseph et al., 2025).

Existing research provides important insights into how geopolitical conflict and political instability shape cross-border strategy, including foreign market exit and the fragility of interorganizational cooperation. For example, multinational enterprises may withdraw from host countries when war transforms valuable locations into vulnerabilities (Dai et al., 2017), and national animosity and conflict history can reduce the probability and intensity of cross-border alliance formation (Arikan & Shenkar, 2013). Related work examines how sanctions reshape international business constraints and how techno-geopolitical competition reorients the movement of critical technologies across borders (Luo & Van Assche, 2023; Meyer et al., 2023). Yet comparatively little is known about how geopolitical risk reshapes firms' internal boundaries, namely the scope of product-market activities they choose to internalize and coordinate. Our paper uses product-market scope and decomposes adjustment into reduced entry and increased exit

across industries. Our paper is closely related to the boundary-of-the-firm and scope literature (Hart & Holmström, 2010; Hoberg & Phillips, 2010, 2016, 2025). It provides a micro-foundation for de-scaling as an internal re-optimization margin rather than only an external (country) relocation or exit margin.

In this paper, building on theories of firm scope and boundary choices (Hart & Holmström, 2010), we examine how firm-level geopolitical risk exposure affects firms' scope, market entry, and market exit. In other words, this paper examines how firms translate geopolitical risk into concrete reconfiguration decisions that shrink scope by reducing entry and increasing exit. We develop the argument that geopolitical risk affects firm scope precisely because scope is a governance choice made under incomplete contracting. When key coordination and adaptation decisions cannot be fully specified *ex ante*, ownership and authority allocate residual control rights, thereby shaping *ex post* adaptation (Grossman & Hart, 1986; Hart & Moore, 1990). At the same time, a broader scope can amplify internal frictions: centralized decision-makers may underweight unit-specific private benefits, creating shading and reduced cooperation when business units perceive outcomes as falling short of what they are entitled to (Hart & Holmström, 2010; Hart & Moore, 2008). Geopolitical risk is a particularly salient source of such uncertainty because it can abruptly alter the rules governing cross-border operations through sanctions, export controls, trade disruptions, and compliance burdens. As geopolitical risk rises, expected returns from operating in exposed markets decline while the fixed and variable costs of maintaining a broad footprint increase, making extensive scope less attractive. From a real-options perspective, heightened uncertainty also increases the value of waiting, discouraging firms from committing to irreversible entry into new markets while increasing the likelihood of exit from marginal or riskier ones (Bloom, 2009). These forces imply a de-scaling response in which firms reduce overall scope through both

reduced entry and increased exit. Moreover, because these costs and uncertainties are inherently cross-border, the scope contraction is predicted to be stronger for firms with greater foreign exposure, more complex geographic footprints, and higher foreign business sensitivity.

To test these predictions, we assemble a panel of U.S. public firms from 1996 to 2021 and integrate two measurement innovations. First, we construct a firm-level exposure to geopolitical risk by weighting each firm's time-varying foreign revenue footprint across destination countries by the monthly country-level geopolitical risk (GPR) index (Caldara & Iacoviello, 2022). Second, we operationalize firm scope using Hoberg and Phillips's (2025) text-based industry mapping, which places firms in a high-dimensional product space based on product descriptions in annual reports and identifies each firm's set of active product-market industries. This scope measure is particularly well-suited to the modern firm because it captures fine-grained and valuation-relevant changes in product-market activities that are not well-measured by traditional segment disclosures (Hoberg & Phillips, 2010, 2016, 2025). We construct three key outcomes: the log of firm scope, the log of one plus the number of market entries, and the log of one plus the number of market exits. These variables allow us to distinguish whether changes in scope arise primarily through reduced expansions, increased exits, or both.

Consistent with de-scaling behavior predicted by scope and real-options theories, our baseline results show that firms' geopolitical risk exposure is negatively and statistically significantly associated with firms' scope. The effect is also economically meaningful. A one standard deviation increase in geopolitical risk exposure is associated with a 2.5% decrease in firm scope. Decomposing this effect reveals that geopolitical risk operates through both entry and exit. Specifically, as geopolitical risk increases, firms enter fewer new markets and exit more existing markets. A one standard deviation increase in geopolitical risk exposure is associated with a 5.4%

decrease in market entries and a 2.7% increase in market exits. Together, these findings provide direct evidence that geopolitical risk reshapes firm scopes by discouraging expansion and accelerating withdrawal.

We further investigate the sources of geopolitical risk and show that scope contraction is driven primarily by the foreign component of firms' geopolitical exposure rather than by domestic geopolitical variation. When we decompose firm-level geopolitical risk into foreign and domestic components weighted by firms' foreign and domestic sales, we find that foreign geopolitical risk is strongly associated with reduced scope and increased entry and exit. By contrast, domestic geopolitical risk shows a weaker and less consistent relationship with overall scope. This pattern suggests that geopolitical risk affects firms mainly through inherently cross-border channels, such as sanctions, export controls, logistics disruptions, and exposure to global commodity markets, rather than through purely domestic political conditions.

To address endogeneity concerns, we use the U.S.-China trade war as an exogenous geopolitical shock in a difference-in-differences (DiD) framework. We compare firms with pre-2018 exposure to Mainland China to a propensity-score-matched control group of firms without such exposure, before and after the onset of the trade war. The DiD results show that China-exposed firms experience a sharper contraction in scope, driven by significantly fewer entries and more exits than control firms. The results strengthen the causal interpretation of our baseline findings.

Finally, we examine heterogeneity in the de-scaling response and show that the effects of geopolitical risk are not uniform across firms. Firms with higher foreign sales, more complex geographic footprints, and participation in industries that are particularly sensitive to geopolitical frictions (i.e., defense, semiconductors, telecommunications infrastructure, energy, and global

logistics) exhibit significantly stronger scope contraction. These patterns are consistent with the view that geopolitical risk amplifies operating and compliance frictions most sharply where cross-border exposure and sensitivity are greatest, increasing the incentives for firms to rationalize scope by curbing entry and accelerating exit in exposed industries.

This paper makes three main contributions. First, it advances scholarship on geopolitical tensions and organizational adaptation by identifying firm scope (an internal boundary margin) as a systematic response to geopolitical turmoil. This complements prior emphases on cross-border entry or exit and interorganizational ties (Arikan & Shenkar, 2013; Dai et al., 2017; Meyer et al., 2023). We examine how geopolitical risk translates into redesigns of internal boundaries and footprints within organizations. Our findings imply that geopolitical resilience is partly an organizational design problem. Firms manage geopolitical exposure not only by adjusting locations and external relationships, but also by reshaping the set of activities they internalize and coordinate.

Second, it contributes to the firm-scope and firm-boundaries literature by documenting that geopolitical risk is an economically meaningful determinant of the firm's product-market footprint (Grossman & Hart, 1986; Hart & Holmström, 2010). We show that higher firm-level geopolitical risk exposure is associated with smaller scope, fewer new entries, and more exits, consistent with a de-scaling response that operates through both reduced expansion and active retrenchment.

Third, we bridge theories of firm scope and boundary choices with a new measurement that combines a news-based geopolitical risk index with firms' geographic revenue exposure and text-based product classifications. This approach aligned with calls for management research to address major societal challenges with measurable real-world relevance and impact (George et al., 2016; Wickert et al., 2021). Using the text-based firm scope framework (Hoberg & Phillips, 2025), we

measure firms' product-market footprints directly from 10-K business descriptions and track year-to-year movement in and out of industries.

Finally, our findings speak to operations and supply-chain governance by highlighting de-scaling as an empirically observable risk-response margin. Rather than viewing geopolitical risk only as a "cost shock," our results imply it can trigger deliberate footprint redesign, exiting riskier industries, limiting entry into exposed markets, and simplifying the set of activities firms maintain. These patterns have direct implications for managers designing risk-sensing systems and for policymakers seeking to understand how geopolitical fragmentation can reshape firm boundaries and market structure.

The remainder of the paper proceeds as follows. Section 2 reviews related literature and positions our arguments at the intersection of geopolitics, firm boundaries, and strategic adaptation. Section 3 develops the theoretical framework and hypotheses. Section 4 describes the data, the construction of our geopolitical exposure measure, and the measurement of firm scope and scope dynamics. Section 5 presents the main empirical results, identification tests, and channel analyses. Section 6 concludes the paper.

2. Literature Review

2.1. Geopolitical tension and risk

A growing literature conceptualizes geopolitical tensions as shocks to the rules, reliability, and enforceability of cross-border exchange. These shocks are broader than news about macro fundamentals. They raise variance in payoffs by increasing the probability of sanctions, conflict escalation, export controls, and abrupt regulatory reordering. A direct implication is that geopolitical risk can create discontinuous frictions in global coordination, including supplier contracting, customer access, data flows, and technology licensing, which can shrink the set of

activities that firms can profitably coordinate across borders (Caldara & Iacoviello, 2022; Meyer et al., 2023; Witt, 2019).

This literature has advanced through measurement innovations that enable systematic tests. The canonical macro geopolitical risk (GPR) index uses newspaper coverage to quantify geopolitical threats and realized acts, allowing researchers to map time variation in geopolitical conditions to economic outcomes (Caldara & Iacoviello, 2022). Complementing aggregate indices, firm-level text-based approaches show that political risk exposure is heterogeneous across firms within the same sector and is economically meaningful for corporate actions (Hassan et al., 2019). In parallel, uncertainty measures such as economic policy uncertainty serve as a benchmark for distinguishing geopolitical uncertainty from broader policy volatility (Baker et al., 2016).

International business and strategy research further emphasizes that contemporary geopolitical tensions increasingly operate through decoupling pressures, techno-nationalism, and sanctions regimes. Recent work highlights techno-geopolitical uncertainty as a distinct constraint on multinational enterprise location choices, supply-chain architecture, and technology strategy (Luo & Van Assche, 2023). Sanctions are particularly salient because they can rapidly change the rules of the game and force firms to reconfigure cross-border relationships, governance structures, and compliance systems (Meyer et al., 2023). Syntheses and new evidence also emphasize that multinational responses depend on political capabilities and flexibility embedded in real options (Moura et al., 2025), and that geopolitical risk can affect both the configuration and intensity of multinational supply-base relationships (Bai et al., 2025).

Management scholarship has recently called for more explicit theorizing about how firms organize in the face of conflict and security threats. Recent work in the management literature has advanced this agenda by developing integrative conceptual frameworks on business, conflict, and

peace, and by positioning war as a central phenomenon for organization and strategy research (Joseph et al., 2025; Lumineau & Keller, 2025). Related evidence on sanctions also underscores that geopolitical instruments can reshape firm behavior in ways that cannot be explained solely by standard demand or cost shocks (Gaur et al., 2023). This stream motivates research designs that connect geopolitics to concrete reconfiguration decisions inside firms, not only to external relocation.

A further implication is that geopolitics is not only an external constraint but also an arena of firm-state interaction. Work on non-market strategy and deglobalization emphasizes that firm responses are conditioned by political capabilities and by historically rooted patterns of firm-state relations, which shape the feasibility of adaptation (Perchard et al., 2025). At the same time, recent research argues that multinational enterprises can influence geopolitical alignments of smaller states, highlighting potential feedback between corporate strategies and geopolitical structure (Matala & Stutz, 2025). This perspective strengthens the case for studying internal boundary adjustments, because geopolitics can simultaneously alter the external environment and the internal governance costs of coordinating exposed activities.

2.2.Firm scope: Theories and measurement

Theories of firm scope focus on how governance and incentives shape the boundary between activities coordinated inside the firm and those coordinated through markets. Property-rights and incomplete-contract frameworks emphasize that ownership and control rights affect investment incentives and the allocation of residual decision authority. This makes optimal scope sensitive to how contracting frictions vary across activities (Grossman & Hart, 1986; Hart & Moore, 1990). Reference-point theories add that the scope decision depends on how governance affects ex post adaptation and performance shading when states of the world change (Hart & Moore, 2008). A

central implication is that the marginal inclusion condition for adding or retaining an activity is state-contingent.

A key refinement from management research is that firm boundaries are multi-dimensional and can move along different margins. The multiple-boundaries view emphasizes that product-market boundaries, organizational boundaries, and relational boundaries need not coincide, and firms can reconfigure these boundaries to change how they coordinate and control activities (Araujo et al., 2003). This is directly relevant under geopolitical fragmentation. Firms may face incentives to narrow the bundle of activities that require intensive cross-border coordination, even when legal ownership does not change immediately. The implication is that scope adjustment can be interpreted as redesigning the internal “bundle” of activities governed under common authority.

A complementary explanation comes from economies of scope and the resource-based view. Firms expand scope when they can share resources and transfer knowledge across lines, and when internal coordination dominates market contracting (Teece, 1980). Building on Penrose’s theory of firm growth, growth and diversification are driven by the evolution of firm-specific productive services, but are constrained by managerial limits and organizational bottlenecks (Kor & Mahoney, 2004; Lockett & Thompson, 2004). These perspectives jointly predict that scope is shaped by the value of resource redeployment, managerial attention constraints, and coordination costs, each of which can become more binding under uncertainty.

Empirically, scope has historically been proxied with segment disclosures and industry codes, often in work studying diversification and valuation (Berger & Ofek, 1995; Lang & Stulz, 1994; Villalonga, 2004). More recent text-based methods use product-description language to infer product-market similarity and network-based industry structure, enabling time-varying measures that are less constrained by reporting thresholds (Hoberg & Phillips, 2010, 2016). Most directly,

Hoberg and Phillips (2025) map firms into a modern product space and develop scope measures that capture economically meaningful product-market activity beyond traditional segment reporting. This measurement approach also enables tractable scope dynamics, including entry into new product markets and exit from existing ones, which are central for studying de-scaling and refocusing.

Scope change is also closely related to retrenchment, divestiture, and turnaround processes. Retrenchment research emphasizes that firms often restore performance by shedding activities, but that the timing and sequencing of these adjustments matter for successful adjustment (Tangpong et al., 2015). This line reinforces a key conceptual point for this study. Scope contraction is an active organizational response margin that can be triggered by shocks that increase the costs of sustaining peripheral activities.

2.3. Corporate consequences of geopolitical risks

A core empirical regularity is that heightened geopolitical risk depresses corporate investment activity. This pattern is consistent with wait-and-see investment under uncertainty and with tightened financing conditions. Evidence in corporate finance shows that higher geopolitical risk is associated with lower capital investment. Political resources and information can moderate these effects, consistent with partial insurance against geopolitical uncertainty (Alam et al., 2023). Cross-country evidence similarly finds a negative association between geopolitical risk and corporate investment (Le & Tran, 2021), and more recent work links geopolitical risk to reduced investment efficiency (Nguyen et al., 2025). These effects are particularly relevant when scope expansion depends on innovation and reconfiguration spending rather than on routine capital expenditures.

Geopolitical risk also flows through financial channels that raise the hurdle rate for marginal expansions. Empirical evidence indicates that geopolitical risk increases the cost of bank loans and tightens nonprice terms, implying higher costs of external finance in geopolitically volatile periods (Nguyen & Thuy, 2023). Related research shows that firms adjust payout and liquidity policies under geopolitical risk, which can further constrain discretionary expansion (Adra, 2023; Alam et al., 2023). These mechanisms naturally connect geopolitical risk to scope because a broader scope often requires sustained fixed investment in organizational coordination and in maintaining optionality across lines.

A further consequence operates through innovation, technology access, and compliance constraints. Techno-geopolitical uncertainty can restrict access to key technologies and inputs, and it can force firms to redesign innovation strategies, cross-border partnerships, and production configurations (Luo & Van Assche, 2023). In parallel, evidence on asset redeployability implies that the ability to shift resources across lines influences how firms adjust when uncertainty rises (Kim & Kung, 2017). Taken together, this research implies that shocks can simultaneously reduce incentives to enter new markets and increase incentives to exit marginal markets, especially when knowledge and capital are not frictionlessly transferable.

Operations and supply-chain research documents that geopolitical and economic uncertainty can amplify disruption risk and encourage consolidation or reconfiguration of supplier networks. Systematic reviews highlight that geopolitical uncertainty affects disruption propagation and planning under uncertainty (López et al., 2025). Recent evidence also links geopolitical risk to supply-chain concentration, suggesting that firms respond by altering sourcing structures and dependence patterns (Zhu et al., 2025). Because supply-chain architectures and product-market

footprints are intertwined, these operational consequences can translate into product-market de-scaling and scope rationalization.

Finally, international business research shows that geopolitical conflict and political instability shape cross-border strategy, including foreign market exit and the fragility of interorganizational cooperation (Arikan & Shenkar, 2013; Dai et al., 2017). Sanctions are a central mechanism in this process, and recent work emphasizes that they reshape constraints and adaptation strategies for globally connected firms (Meyer et al., 2023). Evidence from the Russia-Ukraine context also highlights how sanctions operate as consequential institutional interventions that induce strategic responses (Gaur et al., 2023). Emerging work further shows that firms can respond to deglobalization pressures through strategic adaptation even when resources are constrained (Giacomin & Romagnoli, 2025). Collectively, these studies establish multiple effects of geopolitical risk, but they leave a clear gap on how firms redesign internal product-market boundaries as a systematic adjustment margin.

3. Motivation and Hypothesis Development

Research on firm boundaries emphasizes that scope choices are governance choices made under incomplete contracting. When key coordination and adaptation decisions cannot be fully specified ex ante, ownership and authority reallocate residual control rights, thereby shaping ex post adaptation (Grossman & Hart, 1986; Hart & Moore, 1990). Integration can improve coordination by internalizing cross-unit externalities. However, it can also generate organizational costs because a central decision maker underweights unit-specific private benefits, triggering aggrievement and value-destroying shading when units feel that outcomes fall short of what they are entitled to (Hart & Moore, 2008; Hart & Holmström, 2010).

In international business and strategy research, geopolitical tensions manifest through jurisdictional ruptures, such as armed conflict, sanctions, export controls, and other national security interventions (Dai et al., 2017; Meyer et al., 2023; Henisz et al., 2010). These events can abruptly restrict market access and cross-border collaboration. These tensions also reshape the feasibility of interorganizational cooperation. National animosity and conflict histories reduce alliance formation and cross-border partnering (Arikan & Shenkar, 2013), while techno-geopolitical competition constrains the movement of critical technologies across borders (Luo & Van Assche, 2023).

Consistent with this institutional content, we model geopolitical risk as a state that (i) changes the effective feasibility and payoff structure of cross-border links and (ii) imposes firm-level compliance and technology-transfer constraints that are triggered by the most geopolitically sensitive parts of a firm’s activity portfolio. This structure departs from generic “risk enters cash flows linearly” formulations by making geopolitical risk jurisdictional, discontinuous, and portfolio-interdependent.

3.1. Primitives and the geopolitics-specific state

Let the firm face a finite set of candidate activities \mathcal{J} . An activity $i \in \mathcal{J}$ is a product-geography module: it represents operating a given product capability in, or for, a particular geopolitical jurisdiction. Choosing scope $S \subseteq \mathcal{J}$ yields transferable monetary surplus and non-transferable private benefits tied to the autonomy and local discretion of the unit operating each activity. This interpretation aligns with work showing that multi-market scope can create productive synergies through shared knowledge and capability recombination (Henderson & Cockburn, 1996) and that relatedness in product space is a useful empirical proxy for the transferability of those synergies (Hoberg & Phillips, 2010, 2016). Let $d_i \geq 0$ denote the distance of activity i from the firm’s core

in product space, where larger d_i implies weaker technological fit and greater organizational friction in the spirit of “far-from-core” coordination costs documented in scope research (Hoberg & Phillips, 2016, 2025).

Geopolitical risk is captured by a scalar state $G \geq 0$ that governs the likelihood and severity of jurisdictional fractures. Empirically, G can be proxied by a news-based geopolitical risk index that spikes around major geopolitical events and captures the time-varying intensity of geopolitical tensions (Caldara & Iacoviello, 2022), while heterogeneity in exposure can be inferred from firm communications (Hassan et al., 2019). The critical modeling choice is that geopolitical risk affects scope through two geopolitics-specific channels.

The first channel is a rupture channel. With probability $q(G)$, where $q'(G) > 0$, a geopolitical fracture occurs that raises barriers to cross-border transactions and disrupts cross-jurisdictional supply and demand. Each activity i has a rupture exposure $e_i \geq 0$ that measures the fraction of its value creation that relies on cross-bloc transactions or jurisdictionally fragile links, such as reliance on cross-border suppliers or markets that are plausibly subject to sanctions or conflict-driven disruptions (Dai et al., 2017; Meyer et al., 2023). A fracture imposes a direct expected loss proportional to e_i , but it may also generate activity-specific gains when geopolitical tensions induce security-related demand, subsidies, or reshoring-driven complementarities. We capture this “geopolitical hedge” mechanism with a parameter $h_i \geq 0$ that responds to fracture-induced demand, consistent with the observation that geopolitical tensions can reallocate demand toward defense- and security-related activities rather than simply depressing aggregate activity.

The second channel is a compliance-and-technology channel that is distinctive to geopolitics. In periods of heightened tension, export controls, sanctions screening, and restrictions on sensitive technology flows intensify and apply at the firm level as a regulated entity, not only at the level of

an isolated business unit (Luo & Van Assche, 2023; Meyer et al., 2023). We therefore introduce a firm-level compliance intensity $\chi(G)$ with $\chi'(G) > 0$, and we allow the firm’s compliance burden to be governed by the most geopolitically sensitive activity inside the boundary. Each activity has a sanctions-and-controls sensitivity $s_i \geq 0$, capturing whether it involves controlled technology, sensitive jurisdictions, or other attributes that trigger heightened scrutiny. We define the portfolio sensitivity of a scope set S as $\bar{s}(S) = \max_{j \in S} s_j$. The firm-wide compliance burden is then

$$C(G, S) = \chi(G) \bar{s}(S), \quad (1)$$

so that adding a sufficiently sensitive activity increases compliance costs for the entire portfolio by raising $\bar{s}(S)$. This “weakest-link” externality is precisely what makes the mechanism geopolitics-specific. In many regulatory contexts, the binding constraint and monitoring intensity are determined by the most sensitive exposure, and that sensitivity is tied to jurisdictions, sanctions regimes, and controlled technologies rather than to generic volatility.

3.2. Payoffs, organizational costs, and governance

For each activity i , monetary surplus has four components: a baseline term, an economies-of-scope term, a rupture term, and a redeployment term. We write the expected monetary surplus from i when included in scope S as

$$\mathbb{E}[\pi_i(S, G)] = \mu_i + \Psi_i(S) + q(G) (h_i - \ell_i e_i) + r(G) \rho_i. \quad (2)$$

Here μ_i is baseline profitability, $\Psi_i(S)$ captures economies of scope from combining related activities, and $\ell_i > 0$ maps rupture exposure into expected loss conditional on a fracture. The term h_i captures fracture-induced gains for activities that benefit from geopolitical tensions through security demand or reshoring complementarities. The term $r(G) \rho_i$ captures a redeployment option value. As geopolitical tension rises, the value of holding redeployable assets and capabilities increases because the firm can reconfigure across related activities in response to jurisdictional

disruptions. We assume $r'(G) > 0$, and $\rho_i \geq 0$ measures the redeployability of assets relevant to the activity i , consistent with evidence that uncertainty increases the value of redeployable capital and induces reconfiguration toward activities where assets can be repurposed (Kim & Kung, 2017). The difference from generic uncertainty is that $r(G)$ is interpreted as the value of responding to jurisdictional fractures and compliance constraints, rather than merely to demand volatility.

Organizational costs arise because of operating activity i within a broader scope set reduces unit-level autonomy and creates frictions that are larger for more distant activities. Let the private-benefit loss from including i be $b_i(d_i, G)$, where $\partial b_i / \partial d_i > 0$. We also embed the geopolitics-specific compliance channel into organizational costs by assuming that heightened compliance intensity increases the extent to which autonomy is curtailed in sensitive activities, so that $\partial b_i / \partial G > 0$ and the effect is stronger when s_i is larger. A parsimonious form that makes this explicit is

$$b_i(d_i, G) = b_0(d_i) + b_1(d_i) \chi(G) s_i, \quad (3)$$

with $b'_0(d) > 0$ and $b'_1(d) \geq 0$. This structure formalizes a management intuition: when compliance and export-control constraints tighten, central standard-setting and monitoring become more intrusive, particularly for activities that are far from the core and geopolitically sensitive, amplifying the autonomy costs of scope.

To map these costs into realized surplus, we follow the contracts-as-reference-points logic. When a unit experiences a shortfall relative to its entitlement, it shades and destroys value proportional to its aggrievement (Hart & Moore, 2008; Hart & Holmström, 2010). Let $\theta \in (0,1)$ denote the fraction of the private-benefit loss that is dissipated as deadweight shading under centralized authority. We consider three stylized governance modes that correspond to alternative allocations of authority commonly studied in the boundary-of-the-firm literature. Under

nonintegration with veto, including activity i inside the boundary requires compensating the unit for the full private-benefit loss; under integration, the boss can impose inclusion but incurs deadweight shading proportional to $\theta b_i(d_i, G)$; under integration with credible delegation, decision rights are delegated, but the boss can reverse at a cost that makes aggrievement more severe upon reversal, implying an effective weight on private benefits that lies between integration and veto (Hart & Holmström, 2010). We summarize these governance differences with an organizational-form parameter α_m , where $\alpha_{NI} = 1$, $\alpha_I = \theta$, and $\alpha_D \in (\theta, 1)$.

3.3.A geopolitics-specific inclusion rule

Given an incumbent scope set S , consider the marginal inclusion of activity $i \notin S$. Let $\bar{s}(S) = \max_{j \in S} s_j$. Adding i changes expected surplus by

$$\Delta_i^m(G, S) = \mu_i + \Psi_i(S) + q(G)(h_i - \ell_i e_i) + r(G)\rho_i - \chi(G)\max\{0, s_i - \bar{s}(S)\} - \alpha_m b_i(d_i, G). \quad (4)$$

The term $\chi(G)\max\{0, s_i - \bar{s}(S)\}$ is the incremental firm-wide compliance burden induced by raising the portfolio's maximum sensitivity. This is the central non-generic feature: an otherwise profitable activity can be value-reducing because it increases the binding compliance constraint for the entire portfolio, and this portfolio externality becomes more severe as $\chi(G)$ rises. The firm includes i under governance mode m if and only if $\Delta_i^m(G, S) \geq 0$.

This representation yields three comparative-static properties that discipline hypothesis development. First, for activities that do not increase the portfolio maximum, meaning $s_i \leq \bar{s}(S)$, the effect of geopolitics on marginal inclusion is governed by

$$\frac{\partial \Delta_i^m}{\partial G} = q'(G)(h_i - \ell_i e_i) + r'(G)\rho_i - \alpha_m \frac{\partial b_i(d_i, G)}{\partial G}. \quad (5)$$

For geopolitically exposed activities with $h_i - \ell_i e_i < 0$ and $\partial b_i / \partial G > 0$, the derivative is negative, implying a monotone tightening of the inclusion condition as geopolitical tension rises.

For geopolitical hedge activities with sufficiently large h_i , the derivative can be positive, implying that rising tensions can make some activities more attractive even if they would not be under generic risk.

Second, when adding i raises the portfolio maximum, $s_i > \bar{s}(S)$, the marginal effect of geopolitics includes an additional negative term $-\chi'(G)(s_i - \bar{s}(S))$. Consequently, the scope response to geopolitics is lumpy and portfolio-dependent: a firm can reduce its total compliance burden substantially by exiting the single most sensitive activity, because doing so reduces $\bar{s}(S)$ and thus lowers compliance costs for all remaining activities. This discontinuity is an implication that is specific to geopolitical constraints that apply to the firm as a regulated entity.

Third, distance amplifies the effect of geopolitics. Because $b_i(d_i, G)$ increases in d_i and rises more with G when compliance intensity is higher, the cross-partial $\partial^2 \Delta_i^m / \partial G \partial d_i$ is negative whenever $\partial^2 b_i / \partial G \partial d_i > 0$. This implies that heightened geopolitical tension induces a core-refocusing pattern: marginal activities far from the core fail the inclusion condition earlier than close-to-core activities, even when their baseline profits are similar. In managerial terms, the model links refocusing under tension to a precise mechanism. Geopolitics increases both the expected cash-flow penalty of exposed activities and the governance cost of operating distant and sensitive activities within a hierarchy.

These properties connect to the modern empirical scope literature in two ways. They predict systematic changes in the extensive margin of scope (how many activities are inside the boundary) and systematic changes in the composition of scope (what kinds of activities remain), both of which can be measured in high-dimensional product space using text-based methods (Hoberg & Phillips, 2016, 2025). They also clarify when scope adjustment should occur through rapid reconfiguration (acquisitions, divestitures, and intangible investment) rather than through slow

changes in fixed assets, consistent with evidence that valuation-relevant scope changes often occur via acquisitions and R&D rather than through capital expenditures (Hoberg & Phillips, 2025).

3.4. Hypothesis development

The boundary condition in Section 3.3 implies that firm scope is an endogenous set choice that responds monotonically to geopolitical risk through a tightening of the marginal inclusion rule. Let the firm have a finite opportunity set of activities \mathcal{A} . In each period t , the firm chooses a scope set $\mathcal{S}_t \subseteq \mathcal{A}$. Define firm scope as $N_t = |\mathcal{S}_t|$. Geopolitical conditions are summarized by a scalar state g_t , where higher g_t increases the probability and expected severity of cross-border ruptures and the intensity of compliance and controls that apply to the firm's portfolio of activities.

Consider adding an activity $a \notin \mathcal{S}$ to an incumbent portfolio \mathcal{S} . Let the incremental value of adding a be

$$\Delta(a|\mathcal{S}, g) \equiv V(\mathcal{S} \cup \{a\}, g) - V(\mathcal{S}, g), \quad (6)$$

where $V(\mathcal{S}, g)$ is the value of operating the activity portfolio \mathcal{S} when the geopolitical state is g . The firm includes a if and only if $\Delta(a | \mathcal{S}, g) \geq 0$. To discipline the comparative statics, decompose $\Delta(a | \mathcal{S}, g)$ into expected operating surplus net of organizational and compliance costs:

$$\begin{aligned} \Delta(a|\mathcal{S}, g) = & \underbrace{\Pi(a|\mathcal{S}, g)}_{\text{expected monetary surplus}} - \underbrace{\Omega(a|\mathcal{S}, g)}_{\text{organizational and autonomy costs}} \\ & - \underbrace{\Delta C(a|\mathcal{S}, g)}_{\text{incremental compliance burden}}. \end{aligned} \quad (7)$$

where the term $\Pi(a|\mathcal{S}, g)$ captures the incremental expected monetary surplus of adding a , including synergies with the existing portfolio. The term $\Omega(a|\mathcal{S}, g)$ captures incremental internal coordination and control costs. The term $\Delta C(a|\mathcal{S}, g)$ captures the incremental compliance burden induced by expanding the activity set.

A central feature of geopolitical risk is that it is largely cross-border in nature. Accordingly, write the geopolitical state as a weighted average of foreign and domestic components:

$$g = \omega g^F + (1 - \omega)g^D, \quad (8)$$

where $\omega \in [0,1]$ measures the firm's foreign sales dependence and g^F and g^D are foreign-facing and domestic geopolitical risk states. For an activity a , let $r_a \geq 0$ denote its exposure to cross-border ruptures, such as sanctions, conflict-related disruptions, and sudden market-access restrictions. A parsimonious way to capture the rupture channel is to model expected operating surplus as

$$\Pi(a | \mathcal{S}, g) = \bar{\pi}(a|\mathcal{S}) - r_a \omega g^F - \tilde{r}_a (1 - \omega)g^D, \quad (9)$$

where $\bar{\pi}(a|\mathcal{S})$ is the baseline incremental surplus in the absence of geopolitical frictions, and \tilde{r}_a captures the activity's exposure to domestic geopolitical disruptions. The key comparative static is that, holding the portfolio fixed,

$$\frac{\partial \Pi(a|\mathcal{S}, g)}{\partial g^F} = -r_a \omega \leq 0, \quad \frac{\partial \Pi(a|\mathcal{S}, g)}{\partial g^D} = -\tilde{r}_a (1 - \omega) \leq 0, \quad (10)$$

so that the marginal attractiveness of rupture-exposed activities declines when geopolitical risk rises, and the magnitude of the decline with respect to foreign risk scales with the firm's foreign sales dependence ω .

Compliance and controls generate an additional portfolio externality. Let each activity have a sensitivity index $s_a \geq 0$ that captures its exposure to export controls, sanctions screening, and technology-transfer restrictions. Define the portfolio's binding sensitivity by

$$s(\mathcal{S}) \equiv \max_{j \in \mathcal{S}} s_j. \quad (11)$$

Let $\kappa(g^F)$ denote compliance intensity, with $\kappa'(g^F) > 0$, reflecting that tighter geopolitical conditions raise the level and strictness of monitoring, screening, and controls. Let the

firm-wide compliance burden be $C(\mathcal{S}, g^F) = \kappa(g^F)s(\mathcal{S})$. Then the incremental compliance burden from adding activity a is

$$\Delta C(a | \mathcal{S}, g^F) = C(\mathcal{S} \cup \{a\}, g^F) - C(\mathcal{S}, g^F) = \kappa(g^F)(s(\mathcal{S} \cup \{a\}) - s(\mathcal{S})). \quad (12)$$

If $s_a \leq s(\mathcal{S})$, adding a does not change the binding sensitivity and $\Delta C = 0$. If $s_a > s(\mathcal{S})$, adding a increases $s(\mathcal{S})$ and raises compliance costs for the entire portfolio. Moreover, the marginal tightening of the inclusion condition with respect to foreign geopolitical risk is increasing in this sensitivity gap:

$$\frac{\partial \Delta C(a | \mathcal{S}, g^F)}{\partial g^F} = \kappa'(g^F)(s(\mathcal{S} \cup \{a\}) - s(\mathcal{S})) \geq 0. \quad (13)$$

This property formalizes the idea that export-control intensity generates a discontinuous, portfolio-level externality. Activities that raise the maximum sensitivity impose additional compliance burdens that are amplified as foreign geopolitical risk rises. Putting the rupture and compliance channels together yields

$$\frac{\partial \Delta(a | \mathcal{S}, g)}{\partial g^F} = \frac{\partial \Pi(a | \mathcal{S}, g)}{\partial g^F} - \frac{\partial \Omega(a | \mathcal{S}, g)}{\partial g^F} - \kappa'(g^F)(s(\mathcal{S} \cup \{a\}) - s(\mathcal{S})), \quad (14)$$

so that the incremental value of adding an activity declines with foreign geopolitical risk when the activity has meaningful rupture exposure and when it increases the portfolio's binding sensitivity. Under the single-crossing implication of Section 3.3, this downward shift in $\Delta(\cdot)$ implies that the optimal activity set $\mathcal{S}^*(g)$ is weakly decreasing in g in the set-inclusion order, and therefore $N^*(g) = |\mathcal{S}^*(g)|$ is weakly decreasing in g .

Hypothesis H1 (Scope de-scaling). *Firms' operational scope decreases as their exposure to geopolitical risk increases.*

Scope changes occur through the entry and exit margins. Define

$$\text{Entry}_t = |\mathcal{S}^*(g_t) \setminus \mathcal{S}^*(g_{t-1})|, \quad \text{Exit}_t = |\mathcal{S}^*(g_{t-1}) \setminus \mathcal{S}^*(g_t)|. \quad (15)$$

An increase in geopolitical risk from g_{t-1} to g_t reduces the set of candidate activities with $\Delta(a|\mathcal{S}, g_t) \geq 0$, which lowers entry. The same increase pushes some incumbent activities below their continuation threshold, which increases exit. The compliance structure implies an additional asymmetry. When the portfolio maximum sensitivity binds, dropping the most sensitive activity reduces $s(\mathcal{S})$ and therefore relaxes compliance costs for the remaining activities. This creates complementarity in exit decisions, making scope contraction more pronounced when foreign geopolitical risk rises.

Hypothesis H1a (Reduced scope entry). *Firms undertake fewer scope entries as their exposure to geopolitical risk increases.*

Hypothesis H1b (Increased scope exit). *Firms undertake more scope exits as their exposure to geopolitical risk increases.*

The model yields two distinct sources of heterogeneity in the scope response. First, foreign sales dependence amplifies the rupture channel. From $\partial\Pi/\partial g^F = -r_a\omega$, the same increase in foreign geopolitical risk reduces the marginal value of a rupture-exposed activity by an amount proportional to ω . Thus, for a given activity profile $\{r_a\}$, the set of activities satisfying $\Delta(a|\mathcal{S}, g) \geq 0$ shrinks more quickly in g^F when ω is higher. Equivalently, define the activity-specific cutoff level of foreign geopolitical risk, $\bar{g}_a^F(\omega)$, implicitly by $\Delta(a|\mathcal{S}, \omega g^F + (1 - \omega)g^D) = 0$. Under the comparative statics above, $\partial\bar{g}_a^F(\omega)/\partial\omega < 0$ for rupture-exposed activities, so higher foreign

dependence lowers the risk threshold at which activities become unattractive and therefore produces larger scope contraction.

Hypothesis H2 (Foreign sales dependence). *The negative effect of foreign geopolitical risk on firm scope is stronger for firms with higher foreign sales dependence.*

Second, export-control sensitivity amplifies the compliance channel. The tightening term $\kappa'(g^F)(s(\mathcal{S} \cup \{a\}) - s(\mathcal{S}))$ is larger when the portfolio is closer to, or frequently increases, its binding sensitivity. Let a firm-level export-control sensitivity index be

$$\Sigma(\mathcal{S}) \equiv s(\mathcal{S}) \quad \text{or} \quad \Sigma(\mathcal{S}) \equiv \frac{1}{|\mathcal{S}|} \sum_{j \in \mathcal{S}} \mathbf{1}\{s_j \geq \bar{s}\}, \quad (16)$$

where \bar{s} is a sensitivity threshold. A higher $\Sigma(\mathcal{S})$ implies that a larger share of activities either directly raises the portfolio maximum or sits near the binding constraint so that marginal changes in scope more often change the maximum. In either case, increases in g^F translate into larger downward shifts in $\Delta(\cdot)$ through the compliance channel and into stronger incentives to exit the binding activity in order to lower $s(\mathcal{S})$. Therefore, the scope response to geopolitical risk is expected to be stronger for firms whose activity portfolios are more export-control-sensitive.

Hypothesis H3 (Export-control sensitive scope). *The negative effect of geopolitical risk on firm scope is stronger for firms whose activity portfolios are more sensitive to export controls and related compliance constraints.*

4. Data and Methodology

4.1. Firm-level geopolitical risk measure

We construct a firm-month measure of geopolitical risk (GPR) that combines country-level monthly GPR indices with each issuer’s geographic revenue decomposition from the FactSet dataset. The country-level GPR series, based on the Caldara and Iacoviello (2022) monthly index, is designed to spike around salient geopolitical events; we use it as the canonical country-time signal of geopolitical tensions.

FactSet’s proprietary global segment dataset contains firms’ foreign sales information, including revenue amounts (in U.S. dollars), revenue duration (start and end dates), and destination country names. We average the revenue amount for each firm-year-country combination and denote the amount as $Revenue_{i,c,t}$ for firm i , year t , and country c . The corresponding total foreign revenue amount is the sum of the foreign revenue of the firm in the year, denoted as $Revenue_{i,t}$. We drop observations that do not uniquely map to a sovereign code from Caldara and Iacoviello (2022).

For each firm i , country c , and year t , we form the within-month foreign revenue share:

$$\omega_{i,c,t} = \frac{Revenue_{i,c,t}}{Revenue_{i,t}}, \quad 0 \leq \omega_{i,c,t} \leq 1, \quad \sum_c \omega_{i,c,t} = 1, \quad (17)$$

and set the weight to zero if no foreign revenue is reported in the FactSet data. These weights translate the accounting notion of “where the money is earned” into exposure weights on country risk. Then, we denote the Caldara and Iacoviello (2022) geopolitical risk index by $Foreign\ GPR_{c,t}$ for year t and country c . The firm-year exposure is the foreign revenue-weighted average:

$$Foreign\ GPR_{i,t} = \sum_c \omega_{i,c,t} \times GPR_{c,t}, \quad (18)$$

This construction yields a single measure at the firm-month level that transparently reflects the firm’s global revenue footprint at each time point. This design ensures that variation in

$Foreign\ GPR_{i,t}$ is driven jointly by movements in country-level geopolitical tensions and by firms' shifting revenue geography.

Next, we compute the weighted-average GPR exposure by incorporating the U.S. domestic geopolitical risk level into the aggregated firm-level measure. The weight is the foreign sales ratio, defined as the ratio of total foreign sales to the firm's total sales for the year.

$$\begin{aligned}
 Firm\ GPR_{i,t} = & Foreign\ GPR_{i,t} \times Foreign\ Sales\ Ratio_{i,t} \\
 & + U.S.\ GPR_t \times (1 - Foreign\ Sales\ Ratio_{i,t}).
 \end{aligned}
 \tag{19}$$

In this setup, firms with only domestic sales over the year have only U.S. geopolitical risk exposure. Firms with foreign sales have their geopolitical risk exposure adjusted by the extent to which they rely on foreign sales. In the empirical analysis, we present the effect of firm-level geopolitical risk ($Firm\ GPR_{i,t}$) on the firm scope. The above geopolitical risk construction also allows us to decompose the firm-level geopolitical risk into the foreign ($Foreign\ GPR_{i,t}$) and domestic business and operations.

4.2. Firm scope measure

Our dependent variables quantify firms' product-market scope using the text-based scope measures developed by Hoberg and Phillips (2025). Their approach uses firms' item 1 business descriptions in 10-K filings to recover a firm-year product footprint that is not mechanically tied to managerial segment reporting choices. Specifically, Hoberg and Phillips (2025) embed 10-K business descriptions into a high-dimensional semantic space using `doc2vec` and then construct a fixed set of industries with industry dialects derived from `word2vec`. A firm is linked to multiple industries based on textual similarity to these fixed industry texts, and a firm's scope is measured as the count of industries in which it plausibly operates. This measurement strategy is particularly valuable for studying the boundaries of the firm because the segment reporting can understate

modern scope expansion when firms redeploy assets and blend closely related product lines into unified operating units (Hoberg & Phillips, 2025; Villalonga, 2004).

We adopt Hoberg and Phillips' (2025) doc2vec-based measure as the baseline proxy for firm scope. This firm scope variable measures the number of industries whose product-market text is among the most similar to the firm's 10-K product description, using a fixed granularity threshold to ensure comparability over time. Our baseline dependent variable is the natural logarithm of this count, $\log(\text{Firm Scope})$, which reduces the influence of the right tail while preserving economically meaningful variation in the breadth of firms' product-market activities.

We construct two flow measures that capture the expansion and contraction of the firm's product-market footprint: scope entry and scope exit. We define $Entry_{i,t}$ as the number of industries newly added between $t - 1$ and t , and $Exit_{i,t}$ as the number of industries dropped between $t - 1$ and t . Our empirical dependent variables are $\log(1+Entry)$ and $\log(1+Exit)$.

The firm scope measure captures the breadth of a firm's contemporaneous product-market participation, while $Entry$ and $Exit$ capture the reallocation of the firm's activities across product markets over time. These flows can reflect internal investment and innovation, acquisitions and divestitures, and strategic retrenchment from markets whose expected profitability or feasibility deteriorates. Because the underlying scope assignments are anchored in the firm's 10-K product description and evaluated against fixed industry texts, the resulting measures naturally map to theories in which geopolitical risk affects firms' incentives to expand, maintain, or unwind product-market positions (Hoberg & Phillips, 2025).

Table 1 summarizes annual patterns in firm scope, entry, and exit for U.S. public firms from 1996 to 2021. Over the same period, firms' average scope expands steadily. Specifically, the mean number of industries rises from 6.23 in 1996 to 10.73 in 2021, with a peak at 10.90 in 2019. For

entry activity, roughly 1,400-1,900 firms exhibit entry in a typical year. The average number of entries conditional on entry generally increases over time, from about 1.77 in 1996 to around 2.36 in 2021, with the highest average entry intensity occurring in 2020 (2.41). Exit activity tends to be less intense than entry in most years. About 1,100-1,300 firms exhibit exits in a typical year, with average exits ranging from 0.85 to 1.16. Overall, the table indicates a long-run expansion in average firms' scope, with especially pronounced entry and exit intensity around 2020-2021.

[Insert Table 1 here.]

4.3. Control variables

We control for a set of standard firm characteristics related to the firm's scope. We include the logarithm of the total assets as firm size, the logarithm of (one plus) the firm's appearance in Compustat database, the market-to-book ratio, the return on asset (ROA) as the firm profitability, the firm leverage ratio, the net PP&E over the total assets, the market share of the firm within the 3-digit SIC industry, the foreign sales ratio defined as the total foreign sales (in dollar amount) over the total sales of the year, and the logarithm of the 10-K file size. The variable definition is provided in Table A1.

4.4. Regression specifications

We disentangle the effect of the firm-level geopolitical risk on the firm scope using panel linear regression with a control set ($\mathbf{X}_{i,t}$) specified in Section 4.3. The baseline regression follows the specification below, with firm and time fixed effects.

$$Firm\ Scope_{i,t} = \beta_0 + \beta_1 \cdot Firm\ GPR_{i,t} + \boldsymbol{\theta} \cdot \mathbf{X}_{i,t} + \gamma_i + \gamma_t + \epsilon_{i,t}. \quad (20)$$

The dependent variable includes the number of industries in the firm scope at year t , based on the Hoberg and Phillips (2025) construction. The dependent variables also include the logarithm of (one plus) the number of scope entries and the logarithm of (one plus) the number of scope exits.

The critical independent variable is the firm level geopolitical risk measure. The standard errors are clustered at the firm level. We test Hypothesis H1 using the sign and significance of β_1 in the regression above. If Hypothesis 1 is true, we expect β_1 to be negative and significant when the dependent variable is firm scope and the scope entries. We expect β_1 to be positively significant when the dependent variable is the scope exits.

We investigate the source of the proposed effect by decomposing the firm's geopolitical risk into the foreign and domestic business and operations. We adjust the foreign GPR using the foreign sales ratio (defined as total foreign sales scaled by total sales for the year) and adjust the domestic GPR using the domestic sales ratio (defined as 1 minus the foreign sales ratio). The sign of β_1 and β_2 would provide us with the indication of the risk source of the proposed effect.

$$\begin{aligned}
 \text{Firm Scope}_{i,t} = & \beta_0 + \beta_1 \cdot \text{Foreign GPR}_{i,t} \times \text{Foreign Sales Ratio}_{i,t} + \beta_2 \cdot \\
 & \text{U.S. GPR}_t \times (1 - \text{Foreign Sales Ratio}_{i,t}) + \theta \cdot \mathbf{X}_{i,t} + \gamma_i + \gamma_t + \epsilon_{i,t}.
 \end{aligned} \tag{21}$$

It is likely that a hidden factor was driving both the firm-level geopolitical risk and the firm's scope at the same time. We address this endogeneity concern by treating the U.S.-China trade war as an exogenous shock in a difference-in-differences regression. We define the treated group of firms as those with Mainland China trading relations from 2015 to 2017. The U.S.-China trade war began in early 2018, and we define the post-shock period as 2018 to 2020. We use propensity score matching to pair each treated firm with a control firm. Matching is based on the closest propensity score, using the same control set from the baseline regression and the same 3-digit SIC industry. The treated firm tends to have higher geopolitical risk exposure compared to the control firms after the initiation of the trade war. If the firm's scope is truly affected by the geopolitical risk, we expect the treated firm to have a reduced firm scope after the trade war shock compared to its peer firm.

We identified 251 treated firms, matched 251 control firms, and constructed a 6-year testing window from 2015 to 2020. The DiD regression specification is shown below. We expect β_1 to be negatively significant to reinforce the conclusion from baseline regressions.

$$Firm\ Scope_{i,t} = \beta_0 + \beta_1 \cdot Treated_i \times Post_t + \boldsymbol{\theta} \cdot \mathbf{X}_{i,t} + \gamma_i + \gamma_t + \epsilon_{i,t}. \quad (22)$$

4.5. Descriptive statistics

Table 2 reports summary statistics for the main variables in the firm-year panel of U.S. public firms, with 80,783 observations for each variable. The average $\text{Log}(Firm\ Scope)$ is 2.054, with the standard deviation at 0.702. This implies meaningful heterogeneity in the breadth of firms' industry footprints. Entry and exit measures are highly skewed with many zeros. For example, $\text{Log}(1+Entry)$ has a mean of 0.623 (median 0.693), but the 5th and 25th percentiles are 0, indicating that at least a quarter of firm-years have no new segment entries. Similarly, $\text{Log}(1+Exit)$ has a mean of 0.436 with a median of 0, showing that exits are less frequent than entries and that more than half of firm-years record no exits. The mean of Firm GPR is 1.923, with a median of 1.825 and a standard deviation of 0.873, indicating considerable variation in firms' exposure to geopolitical risk.

The control variables show meaningful dispersion in firm size and characteristics. For instance, the average $\text{Log}(Assets)$ is 6.050 (standard deviation = 2.138), Market-to-Book is 2.304 (standard deviation = 2.106), and ROA is -0.053 on average (standard deviation = 0.293). Leverage (mean = 0.233) and Net PP&E (mean = 0.249) also vary widely across firms. Market Share is small for most firms (mean 0.062 and median 0.005). Foreign Sales Ratio has a mean of 0.185, a median of 0, and a P75 percentile of 0.325, indicating that many firms report no foreign sales while some firms is highly international. Finally, the mean of $\text{log}(\text{File Size})$ is 5.821 with a standard deviation of 0.570, suggesting meaningful variation in disclosure volume.

[Insert Table 2 here.]

5. Empirical Results

5.1. Baseline regression

Table 3 provides baseline evidence consistent with de-scaling in response to geopolitical risk. Overall, Firm GPR is negatively associated with firms' scope. Specifically, the coefficient on Firm GPR in the $\text{Log}(\text{Firm Scope})$ regression is -0.029 ($t\text{-stat} = -2.18$), indicating that when a firm's geopolitical risk exposure rises, its operational scope contracts on average. The estimates are also economically meaningful. Because the dependent variables are in logs, given that the standard deviation of Firm GPR (0.873), a one standard deviation increase in geopolitical risk exposure is associated with a 2.5% ($= e^{-0.029 \times 0.873} - 1$) decrease in firm scope. This result supports Hypothesis H1, suggesting that heightened geopolitical risk is linked to a narrower operational scope.

Further, the entry and exit regressions clarify the mechanisms behind scope contraction. Consistent with Hypothesis H1a, Firm GPR is strongly negatively related to expansion activity. For example, the coefficient in the $\text{Log}(1 + \text{Entry})$ regression is -0.063 ($t\text{-stat} = -4.80$), suggesting that higher geopolitical risk significantly reduces the number of new industry firms entering. At the same time, consistent with H1b, Firm GPR is positively associated with contraction via exit. The coefficient in the $\text{Log}(1 + \text{Exit})$ regression is 0.031 ($t\text{-stat} = 2.80$), indicating that firms exit more existing industry when geopolitical risk increases. Economically, a one-standard-deviation increase in geopolitical risk exposure is associated with a 5.4% ($= e^{-0.063 \times 0.873} - 1$) decrease in scope entry and a 2.7% ($= e^{0.031 \times 0.873} - 1$) increase in scope exit.

Together, these results in Table 3 support Hypotheses H1, H1a, and H1b. Specifically, following a geopolitical shock, firms are less likely to expand into new industries and more likely to withdraw from existing ones, resulting in a net contraction in operational scope.

[Insert Table 3 here.]

5.2. Risk source decomposition

Table 4 decomposes firm-level geopolitical risk into foreign and domestic sources. The result shows that the de-scaling patterns documented in Table 3 are primarily driven by the foreign component rather than the domestic component. The coefficient on *Foreign GPR* \times *Foreign Sales Ratio* is negative and statistically significant for *Log(Firm Scope)* (-0.048, *t*-stat = -2.14) and *Log(1+Entry)* (-0.062, *t*-stat = -2.79), while it is positive for *Log(1+Exit)* (0.047, *t*-stat = 2.41). These estimates indicate that increases in geopolitical risk arising from foreign operations are associated with a smaller operational scope, fewer new industry entries, and more exits. This is consistent with hypotheses H1, H1a, and H1b. In contrast, the domestic component (*Domestic GPR* \times *Domestic Sales Ratio*) is not statistically significant for *Log(Firm Scope)* (-0.022, *t*-stat = -1.63), suggesting that the overall scope contraction in scope is less closely linked to domestic geopolitical exposure.

Overall, the decomposition reinforces the interpretation that scope contraction is largely a response to foreign-facing geopolitical risk. The evidence in Table 4 supports the view that firms de-scale primarily by retrenching from riskier international exposure rather than by reacting to purely domestic geopolitical variation.

[Insert Table 4 here.]

5.3. Addressing endogeneity

A key concern in estimating the effect of geopolitical risk on firm scope is endogeneity. Firms' exposure to geopolitical risk may be correlated with unobserved characteristics that also affect scope, entry, and exit decisions. While our baseline specifications include firm and time fixed effects to absorb time-invariant heterogeneity and common shocks, these concerns motivate the use of a quasi-experimental design. The difference-in-differences analysis in Table 5 helps mitigate these endogeneity concerns by exploiting the U.S.-China trade war as a plausibly exogenous geopolitical shock. Treatment status is defined based on pre-shock (2015-2017) China exposure. By comparing changes in scope, entry, and exit for China-exposed firms relative to a propensity-score-matched control group of non-exposed firms, the DiD framework differences out both firm-specific time-invariant factors and aggregate time trends that could otherwise confound the estimates.

Table 5 leverages the U.S.-China trade war as a shock in a DiD setting. We identified 251 treated firms, matched 251 control firms, and constructed a 6-year testing window from 2015 to 2020. The key coefficient on $Treated \times Post$ is negative and significant for $Log(Firm\ Scope)$ (-0.109, t -stat = -3.73) and $Log(1+Entry)$ (-0.121, t -stat = -2.57), and positive and significant for $Log(1+Exit)$ (0.115, t -stat = 2.17). The magnitudes are economically meaningful. Interpreting the dependent variables in logs, the DiD estimates imply that the trade-war shock is associated with approximately a 10.3% ($= e^{-0.109}-1$) decline in firm scope for treated firms relative to controls. Similarly, treated firms exhibit about an 11.4% ($= e^{-0.121}-1$) reduction in entry activity and about a 12.2% ($= e^{0.115}-1$) increase in exit activity in the post period, relative to the matched control group. These estimates imply that, relative to otherwise similar control firms, China-exposed firms experience a larger contraction in operational scope after 2018, driven by both reduced entry and increased exit. The pattern is consistent with de-scaling behavior in response to geopolitical shock.

That is, treated firms slow down expansion into new industries while simultaneously accelerating withdrawals from existing ones.

Taken together, Table 5 strengthens identification by showing that a plausibly exogenous geopolitical shock leads China revenue exposed firms to de-scale more sharply, with a pronounced shift toward less expansion and more retrenchment, consistent with H1, H1a, and H1b.

[Insert Table 5 here.]

5.4. Heterogeneity effects

5.4.1. Foreign business dependency

In Table 6, the coefficient on *Firm GPR* captures the effect for firms with low foreign business dependency, while the interaction term shows that this effect becomes significantly stronger for firms with high foreign business dependency. The evidence shows that the negative association between geopolitical risk and firms' operational scope is stronger among firms with greater foreign dependence, consistent with H2. Panel A uses a high foreign sales indicator (relative to the annual median within 3-digit SIC). The baseline effect of Firm GPR remains negative for scope and entry and positive for exit, while the interaction *Firm GPR* \times *High Foreign Sales* is statistically significant in all three specifications (-0.009, *t*-stat = -1.96 for *Log(Firm Scope)*; -0.009, *t*-stat = -1.79 for *Log(1+Entry)*; 0.010, *t*-stat = 2.1 for *Log(1+Exit)*). Panel B reaches a similar conclusion using a high-geographic-industries indicator. The interaction *Firm GPR* \times *High Geographic Segment* is negative and significant for scope and entry and positive and significant for exit (-0.005, *t*-stat = -1.97 for *Log(Firm Scope)*; -0.013, *t*-stat = -2.17 for *Log(1+Entry)*; 0.006, *t*-stat = 2.19 for *Log(1+Exit)*). Economically, for firms with low foreign sales, a one standard deviation increase in Firm GPR predicts a 2.7% ($= e^{-0.031 \times 0.873} - 1$) decline in scope, a 5.4% ($= e^{-0.064 \times 0.873} - 1$) decline in entry, and a 2.7% ($= e^{0.031 \times 0.873} - 1$) increase in exit. For firms with high foreign sales, the total semi-

elasticity is larger because the interaction adds to the baseline slope: scope becomes -0.040 ($= -0.031 - 0.009$), entry becomes -0.073 ($= -0.064 - 0.009$), and exit becomes 0.041 ($= 0.031 + 0.010$). This implies that a one-standard-deviation increase in Firm GPR is associated with roughly a 3.4% decline in scope, a 6.2% decline in entry, and a 3.6% increase in exit for high-foreign-sales firms. Overall, the gap between high- and low-foreign-sales firms is meaningful. The interaction alone corresponds to an additional 0.8 percentage-point decline in scope and entry intensity and an additional 0.9 percentage-point increase in exit intensity for a one-standard-deviation rise in geopolitical risk.

Taken together, Table 6 supports Hypothesis H2. That is, the geopolitical risk induces sharper scope contraction through both reduced entry and increased exit, when a larger share of the firm's operations is exposed to cross-border frictions.

[Insert Table 6 here.]

5.4.2. Sensitive industry to geopolitical risk

We further sharpen the mechanism by distinguishing firms whose scopes are more sensitive to geopolitical risk (e.g., industries tied to export controls, sanctions, cross-border logistics, and globally priced commodities or inputs). As predicted in H3, when geopolitical risk increases, firms whose portfolios are more exposed to export-control and compliance frictions respond with fewer entries and more exits, resulting in a larger net decline in scope than other firms. We identify the industry set that is most plausibly sensitive to foreign geopolitical risk, based on the industry labels and export-control or sanctions exposure criteria. The identification is on scope that is tightly linked to (i) national security and export-control regimes, (ii) cross-border logistics and mobility, and (iii) globally priced and sanction-exposed commodities and critical inputs. The set itself is time-invariant (it is a subset of the fixed industry taxonomy), but a firm's membership is time-

varying because its scope portfolio changes over time (Hoberg & Phillips, 2025). We provide the list of highly sensitive industry scopes in Table A2.

Foreign geopolitical risk primarily shifts firms' expected cash flows and operating constraints through mechanisms that are inherently cross-border. Sanctions and export controls (especially for dual-use technologies), disruptions to trade routes and mobility (shipping, air travel, logistics), and shocks to globally traded inputs (energy and critical minerals). The scopes listed above are the ones whose product-market dialects are explicitly anchored in these channels-defense/security and space-related activities (government and strategic demand; security screening), semiconductor/electronics/encryption/telecom infrastructure (frontier technologies at the center of export-control policy and techno-geopolitical rivalry), and energy/resources plus transport/logistics (commodities and routes whose prices and feasibility are tightly linked to conflict and sanctions). In contrast, many other industries are primarily non-tradable or domestically oriented and therefore have weaker direct exposure to foreign geopolitical shocks.

The scope identification is grounded in the Hoberg-Phillips text-based industry taxonomy (and its industry labels/dialects), which is designed to map firms' 10-K product descriptions into economically meaningful product-market footprints (Hoberg & Phillips, 2016, 2025). The economic rationale for heightened sensitivity follows the international business and political economy literatures emphasizing sanctions, security risk, and fragmentation/decoupling as central channels of geopolitical tension (Caldara & Iacoviello, 2022; Henisz et al., 2010; Luo & Van Assche, 2023; Meyer et al., 2023; Witt, 2019).

The results in Table 7 imply that the de-scaling response to geopolitical risk is especially pronounced when firms have a scope of operations that is sensitive to it. For example, the interaction $Firm\ GPR \times High\ Foreign\ Sensitive$ is statistically significant across all three columns

(-0.015, t -stat = -2.27 for $\text{Log}(\text{Firm Scope})$; -0.010, t -stat = -2.13 for $\text{Log}(1+\text{Entry})$; 0.019, t -stat = 4.17 for $\text{Log}(1+\text{Exit})$). Economically, firms in less sensitive activities, a one standard deviation increase in *Firm GPR* is associated with about a 2.2% decline in scope, a 5.4% decline in entry, and a 3.3% increase in exit. For firms in high-sensitivity activities, the total effect is larger because the interaction adds to the baseline slope. Specifically, scope becomes -0.040 (= -0.025 - 0.015), entry becomes -0.074 (= -0.064 - 0.010), and exit becomes 0.056 (= 0.037 + 0.019). This implies that a one-standard-deviation increase in Firm GPR corresponds to approximately a 3.4% decline in scope, a 6.3% decline in entry, and a 5.0% increase in exit for high-sensitivity firms. Overall, the heterogeneity results in Table 7 support Hypothesis H3, suggesting firms with high foreign business sensitivity experience a stronger scope contraction when firm-level geopolitical risk rises.

[Insert Table 7 here.]

Putting these together, Tables 6 and 7 reinforce Hypotheses H2 and H3. The de-scaling effect of geopolitical risk is not uniform. It is strongest for firms that are more internationally exposed (by foreign sales and geographic complexity) and for firms whose business lines are intrinsically more affected by geopolitical risk. This pattern is consistent with the idea that geopolitical risk amplifies firms' incentives to rationalize scope by curbing entry and accelerating exit in more exposed and more sensitive industries.

6. Conclusions

Using U.S. public firms from 1996 to 2021, we propose a firm-level geopolitical risk measure, constructed by combining country-level geopolitical risk (GPR) with each firm's time-varying foreign revenue footprint (Caldara & Iacoviello, 2022). We show that firm-specific exposure to

geopolitical risk is a first-order determinant of corporate scope as measured by the text-based product-market scope metrics in Hoberg and Phillips (2025). Across firm and time fixed-effects specifications, higher geopolitical risk is associated with a statistically and economically meaningful contraction in firm scope, driven by both reduced scope entry and elevated scope exit. For example, a one standard deviation increase in Firm GPR exposure corresponds to approximately 2.5% lower scope, 5.4% fewer entries, and 2.7% more exits.

Risk-source decompositions further indicate that the scope-level contraction is primarily linked to the foreign component of geopolitical risk exposure, consistent with cross-border frictions and compliance/rupture concerns shaping the boundary decision. Identification is reinforced by difference-in-differences evidence from the 2018-2020 U.S.-China trade war. Firms with pre-war China links exhibit an additional contraction in scope and entry (roughly 10-12%) and an increase in exit relative to matched controls. Finally, the effects are stronger among firms with greater foreign business dependence (high foreign sales or broader geographic segmentation) and among firms operating in geopolitically sensitive scopes.

The results carry important practical implications. For managers, the findings suggest that managing geopolitical risk is an important organizational design problem. Firms can manage exposure not only by relocating, reshoring, or changing suppliers, but also by simplifying and refocusing the set of activities they coordinate internally. For policymakers, the evidence implies that geopolitical fragmentation may reshape market structure through systematic de-scaling. It potentially reduces diversification of activities within firms and increases concentration in less sensitive industries.

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Table 1. Firm scope, entry and exit.

The table reports the number of unique firms, the average number of scope industries, the number of firms with scope entry, the average number of entries, the number of firms with scope exit, and the average number of scope exits. The sample spans from 1996 to 2021, containing U.S. public firms over the years.

Year	# Firms	Avg. # Scope	# Firm with Entry	Avg. # Entry	# Firm with Exit	Avg. # Exit
1996	3,743	6.231	1,784	1.765	1,640	1.155
1997	3,858	6.094	1,625	1.280	1,506	0.845
1998	3,739	6.373	1,741	1.326	1,195	0.655
1999	3,582	6.582	1,784	1.550	1,186	0.735
2000	3,443	6.898	1,816	1.597	1,158	0.744
2001	3,262	7.128	1,640	1.290	1,222	0.861
2002	3,204	7.502	1,740	1.405	1,231	0.874
2003	3,082	7.827	1,607	1.362	1,200	0.855
2004	3,092	8.256	1,683	1.617	1,114	0.791
2005	3,099	8.283	1,621	1.565	1,379	1.080
2006	3,045	8.404	1,517	1.434	1,291	0.970
2007	2,981	8.665	1,668	1.608	1,158	0.907
2008	2,810	8.977	1,482	1.358	1,164	0.940
2009	2,743	9.205	1,418	1.324	1,105	0.957
2010	2,737	9.555	1,437	1.539	1,085	0.860
2011	2,712	9.694	1,419	1.458	1,086	0.919
2012	2,739	9.846	1,413	1.595	1,101	0.961
2013	2,818	10.195	1,551	1.964	1,122	0.980
2014	2,867	10.311	1,547	1.913	1,206	1.018
2015	2,924	10.320	1,588	1.766	1,330	1.136
2016	2,918	10.414	1,560	1.653	1,216	1.111
2017	2,933	10.560	1,596	1.769	1,271	1.049
2018	2,948	10.739	1,604	1.908	1,304	1.157
2019	3,018	10.899	1,724	2.092	1,288	1.131
2020	3,125	10.636	1,834	2.411	1,723	1.614
2021	3,361	10.726	1,907	2.355	1,623	1.241

Table 2. Summary statistics.

The table reports the main variables with summary statistics, including the number of observations, the mean, the standard deviation, and the 5th, 25th, 50th, 75th, and 95th quantiles. The sample spans from 1996 to 2021 and includes U.S. public firms.

	N	Mean	SD	P5	P25	P50	P75	P95
log(Firm Scope)	80,783	2.054	0.702	0.693	1.609	2.197	2.565	3.091
log(1+Entry)	80,783	0.623	0.737	0.000	0.000	0.693	1.099	2.079
log(1+Exit)	80,783	0.436	0.613	0.000	0.000	0.000	0.693	1.609
Firm GPR	80,783	1.923	0.873	0.708	1.445	1.825	2.295	3.857
log(Assets)	80,783	6.050	2.138	2.578	4.545	6.009	7.539	9.728
log(1+Firm Age)	80,783	2.644	0.879	1.099	1.946	2.639	3.332	4.007
Market-to-Book	80,783	2.304	2.106	0.805	1.132	1.570	2.541	6.548
ROA	80,783	-0.053	0.293	-0.603	-0.045	0.029	0.073	0.169
Leverage	80,783	0.233	0.231	0.000	0.016	0.187	0.368	0.678
Net PP&E	80,783	0.249	0.240	0.008	0.063	0.160	0.366	0.778
Market Share	80,783	0.062	0.153	0.000	0.000	0.005	0.040	0.348
Foreign Sales Ratio	80,783	0.185	0.265	0.000	0.000	0.000	0.325	0.767
log(File Size)	80,783	5.821	0.570	4.848	5.455	5.836	6.192	6.761

Table 3. Effect of firm-level geopolitical risk on firm scope.

This table presents estimates regarding the effect of firm-level geopolitical risk on firm scope. The dependent variables are the logarithm of the firm scope, the logarithm of (one plus) the number of scope entries, and the logarithm of (one plus) the number of scope exits. The independent variables include the firm-level geopolitical risk exposure and the control set of variables. The regressions include firm fixed effects and time fixed effects. The *t*-statistics reported in parentheses are based on standard errors clustered at the firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable	log(Firm Scope)	log(1+Entry)	log(1+Exit)
Firm GPR	-0.029** [-2.18]	-0.063*** [-4.80]	0.031*** [2.80]
log(Assets)	0.095*** [14.70]	0.044*** [7.54]	0.044*** [8.76]
log(1+Firm Age)	-0.000 [-0.00]	-0.594*** [-41.90]	0.134*** [12.47]
Market-to-Book	0.004** [2.00]	0.015*** [6.53]	-0.008*** [-4.76]
ROA	-0.091*** [-7.11]	0.035** [2.20]	-0.147*** [-10.32]
Leverage	-0.052** [-2.49]	-0.014 [-0.64]	0.057*** [3.16]
Net PP&E	0.018 [0.44]	-0.209*** [-5.26]	-0.102*** [-3.24]
Market Share	-0.006 [-0.09]	-0.016 [-0.27]	-0.055 [-1.15]
Foreign Sales Ratio	-0.090** [-2.46]	-0.123*** [-3.45]	0.071** [2.40]
log(File Size)	0.193*** [27.39]	0.188*** [21.86]	0.010 [1.47]
Intercept	0.439*** [6.13]	1.003*** [13.16]	-0.298*** [-5.17]
<i>N</i>	80,783	80,783	80,783
Adj. <i>R</i> ²	0.7696	0.2941	0.2083
Firm FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Cluster SE	Firm	Firm	Firm

Table 4. Effect of firm-level geopolitical risk on firm scope: Risk source decomposition.

This table presents estimates of the effect of firm-level geopolitical risk on firm scope, with the geopolitical risk source decomposed into foreign and domestic business components. The dependent variables are the logarithm of the firm scope, the logarithm of (one plus) the number of scope entries, and the logarithm of (one plus) the number of scope exits. The independent variables include the firm-level foreign geopolitical risk exposure, the firm-level domestic geopolitical risk exposure, and the control set of variables. The regressions include firm fixed effects and time fixed effects. The *t*-statistics reported in parentheses are based on standard errors clustered at the firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable	log(Firm Scope)	log(1+Entry)	log(1+Exit)
Foreign GPR × Foreign Sales Ratio	-0.048** [-2.14]	-0.062*** [-2.79]	0.047** [2.41]
Domestic GPR × Domestic Sales Ratio	-0.022 [-1.63]	-0.063*** [-4.50]	0.025** [2.02]
log(Assets)	0.096*** [14.74]	0.044*** [7.53]	0.043*** [8.72]
log(1+Firm Age)	-0.001 [-0.04]	-0.594*** [-41.90]	0.135*** [12.51]
Market-to-Book	0.004** [1.99]	0.015*** [6.53]	-0.008*** [-4.74]
ROA	-0.091*** [-7.15]	0.035** [2.20]	-0.147*** [-10.30]
Leverage	-0.052** [-2.48]	-0.014 [-0.64]	0.057*** [3.15]
Net PP&E	0.017 [0.43]	-0.209*** [-5.26]	-0.101*** [-3.23]
Market Share	-0.005 [-0.08]	-0.016 [-0.27]	-0.056 [-1.16]
Foreign Sales Ratio	-0.064* [-1.67]	-0.124*** [-3.02]	0.049 [1.41]
log(File Size)	0.193*** [27.39]	0.188*** [21.86]	0.010 [1.47]
Intercept	0.424*** [5.96]	1.003*** [13.04]	-0.285*** [-4.89]
<i>N</i>	80,783	80,783	80,783
Adj. <i>R</i> ²	0.7696	0.2941	0.2083
Firm FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Cluster SE	Firm	Firm	Firm

Table 5. Effect of firm-level geopolitical risk on firm scope: Difference-in-differences analysis. This table presents estimates regarding the effect of firm-level geopolitical risk on firm scope, using a DiD specification. The dependent variables are the logarithm of the firm scope, the logarithm of (one plus) the number of scope entries, and the logarithm of (one plus) the number of scope exits. The independent variables include the product of the *Treated* and *Post* dummy variables, along with the control set of variables. *Treated* is defined as the firm indicator where the value is 1 when the firm has foreign business with Mainland China in the before trade war period (2015-2017) and zero otherwise. *Post* has a value of 1 for the years 2018 to 2020. The sample contains the treated group, and the propensity score matched control group from 2015 to 2020. The regressions include firm fixed effects and time fixed effects. The *t*-statistics reported in parentheses are based on standard errors clustered at the firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable	log(Firm Scope)	log(1+Entry)	log(1+Exit)
Treated × Post	-0.109*** [-3.73]	-0.121** [-2.57]	0.115** [2.17]
log(Assets)	0.166*** [3.89]	0.035 [0.72]	0.078 [1.51]
log(1+Firm Age)	0.094 [1.16]	-0.817*** [-5.08]	0.149 [1.26]
Market-to-Book	-0.009 [-0.98]	-0.007 [-0.55]	-0.009 [-0.53]
ROA	-0.124*** [-2.86]	-0.008 [-0.09]	-0.092 [-0.81]
Leverage	-0.151 [-1.52]	-0.094 [-0.68]	0.206 [1.28]
Net PP&E	0.068 [0.34]	-0.685** [-2.38]	-0.144 [-0.51]
Market Share	0.057 [0.15]	-0.754 [-1.31]	0.889* [1.69]
Foreign Sales Ratio	0.048 [0.55]	-0.102 [-0.64]	-0.170 [-1.37]
log(File Size)	0.083*** [2.97]	0.086 [1.54]	0.038 [0.77]
Intercept	0.266 [0.61]	2.594*** [3.77]	-0.717 [-1.19]
<i>N</i>	2,994	2,994	2,994
Adj. <i>R</i> ²	0.8956	0.3872	0.3381
Firm FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Cluster SE	Firm	Firm	Firm

Table 6. Effect of firm-level geopolitical risk on firm scope: Heterogeneity effect from foreign business dependency.

This table presents estimates regarding the effect of firm-level geopolitical risk on firm scope, conditioned on the foreign business dependency. The dependent variables are the logarithm of the firm scope, the logarithm of (one plus) the number of scope entries, and the logarithm of (one plus) the number of scope exits. The independent variables include the firm-level geopolitical risk exposure, the interaction term between the firm-level geopolitical risk and the high foreign business dependency indicator, and the control set of variables. The high foreign business dependency indicator is the high foreign sales ratio (defined as the indicator on whether the firm's foreign sales ratio is higher than the median 3-digit SIC industry level of the year) in Panel A and the high number of geographical industries (defined as the indicator on whether the firm's number of geographical industries is higher than the median 3-digit SIC industry level of the year) in Panel B. The regressions include firm fixed effects and time fixed effects. The *t*-statistics reported in parentheses are based on standard errors clustered at the firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A:

Dependent Variable	log(Firm Scope)	log(1+Entry)	log(1+Exit)
Firm GPR	-0.031** [-2.32]	-0.064*** [-4.94]	0.031*** [2.79]
Firm GPR × High Foreign Sales	-0.009** [-1.96]	-0.009* [-1.79]	0.010** [2.10]
Controls	Yes	Yes	Yes
N	80,783	80,783	80,783
Adj. R2	0.7696	0.2941	0.2083
Firm FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Cluster SE	Firm	Firm	Firm

Panel B:

Dependent Variable	log(Firm Scope)	log(1+Entry)	log(1+Exit)
Firm GPR	-0.029** [-2.16]	-0.063*** [-4.84]	0.031*** [2.81]
Firm GPR × High Geographic Segment	-0.005** [-1.97]	-0.013** [-2.17]	0.006** [2.19]
Controls	Yes	Yes	Yes
N	80,783	80,783	80,783
Adj. R ²	0.7696	0.2941	0.2083
Firm FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Cluster SE	Firm	Firm	Firm

Table 7. Effect of firm-level geopolitical risk on firm scope: Heterogeneity effect from foreign business sensitivity.

This table presents estimates regarding the effect of firm-level geopolitical risk on firm scope, conditioned on the foreign business sensitivity. The dependent variables are the logarithm of the firm scope, the logarithm of (one plus) the number of scope entries, and the logarithm of (one plus) the number of scope exits. The independent variables include the firm-level geopolitical risk exposure, the interaction term between the firm-level geopolitical risk and the high foreign business sensitivity indicator, and the control set of variables. The high foreign business sensitivity indicator equals 1 if the firm's scope involves a business or industry sensitive to geopolitical risk, and 0 otherwise. The regressions include firm fixed effects and time fixed effects. The *t*-statistics reported in parentheses are based on standard errors clustered at the firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable	log(Firm Scope)	log(1+Entry)	log(1+Exit)
Firm GPR	-0.025*** [-5.79]	-0.064*** [-7.20]	0.037*** [3.30]
Firm GPR × High Foreign Sensitive	-0.015** [2.27]	-0.010** [-2.13]	0.019*** [4.17]
log(Assets)	0.092*** [14.87]	0.042*** [7.14]	0.044*** [8.81]
log(1+Firm Age)	0.009 [0.68]	-0.588*** [-41.56]	0.133*** [12.33]
Market-to-Book	0.003* [1.95]	0.015*** [6.50]	-0.008*** [-4.72]
ROA	-0.085*** [-7.00]	0.039** [2.46]	-0.148*** [-10.36]
Leverage	-0.048** [-2.40]	-0.012 [-0.52]	0.057*** [3.12]
Net PP&E	0.012 [0.31]	-0.213*** [-5.37]	-0.101*** [-3.21]
Market Share	-0.006 [-0.10]	-0.016 [-0.27]	-0.055 [-1.14]
Foreign Sales Ratio	-0.03 [-0.84]	-0.082** [-2.29]	0.063** [2.13]
log(File Size)	0.180*** [26.53]	0.179*** [20.84]	0.012* [1.71]
Intercept	0.472*** [6.88]	1.025*** [13.56]	-0.302*** [-5.23]
<i>N</i>	80,783	80,783	80,783
Adj. <i>R</i> ²	0.7826	0.2995	0.2085
Firm FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Cluster SE	Firm	Firm	Firm

Table A1. Variable definition.

Variable	Definition
<i>Firm GPR</i>	The firm-level GPR measure that is constructed from geopolitical risk exposure arising from foreign revenues. First, we compute the foreign revenue weighted average geopolitical risk index from Caldara and Iacoviello (2022). Second, we adjust the foreign GPR and domestic U.S. GPR using the foreign sales ratio and the domestic sales ratio.
<i>U.S. GPR</i>	The monthly U.S. GPR index developed by Caldara and Iacoviello (2022).
<i>Firm Scope</i>	The number of industries in the firm's scope based on the textual analysis from Hoberg and Phillips (2025).
<i>Log(1+Entry)</i>	The logarithm of one plus the number of scope entries of the firm in the year. The scope entry is the newly added firm scope industry that appears in year t but not in $t - 1$.
<i>Log(1+Exit)</i>	The logarithm of one plus the number of scope exits of the firm in the year. The scope exit is the removed firm scope industry that appears in year $t - 1$ but not in t .
<i>Log(Assets)</i>	Natural logarithm of total assets (in millions of USD).
<i>Log(1+Firm Age)</i>	The logarithm of one plus the number of years of the firm since the initiation in Compustat.
<i>Market-to-Book</i>	Market capitalization divided by book value of equity at fiscal year-end.
<i>ROA</i>	Return on assets, calculated as income before extraordinary items divided by total assets at fiscal year-end.
<i>Leverage</i>	Total debt (debt in current liabilities + long-term debt) divided by the market value of assets.
<i>Net PP&E</i>	Net Property, plant, and equipment scaled by the total assets.
<i>Market Share</i>	The proportion of sales of the firm over the total sales in the same 3-digit SIC industry in the year.
<i>Foreign Sales Ratio</i>	The firm's foreign sales ratio (foreign sales scaled by the sum of domestic and foreign sales) for the year is from Compustat's geographic segment files.
<i>Log(File Size)</i>	The logarithm of the 10-K file size.
<i>High Foreign Business Dependency Indicator</i>	Dummy variable equals 1 if the firm's foreign sales ratio is higher than the median 3-digit SIC industry level of the year, and 0 otherwise.
<i>High Number of Geographical Industries Indicator</i>	Dummy variable equals 1 if the firm's number of geographical industries is higher than the median 3-digit SIC industry level of the year, and 0 otherwise.

High Foreign Business Sensitivity Indicator Dummy variable equals 1 if the firm's scope involves a business or industry sensitive to geopolitical risk, and 0 otherwise.

Table A2. High geopolitical risk sensitive industries.

A. Defense, military, and intelligence-linked production
43: Defense/navy/weapons/missile contracting
73: Defense/military missiles; aerospace/spacecraft; radar
167: Military radar/sensors/reconnaissance systems
203: Reconnaissance/defense/military assemblies & procurement
277: Military navigation/radar/jamming/avionics (dual-use guidance)
280: Pyrotechnic/initiator components with defense/missile linkage
Interpretation note: these scopes are “sensitive” in the sense that foreign geopolitical events can shift demand, regulation, contracting, and supply chains; the direction of the effect on scope need not be negative (e.g., defense spending can rise in conflicts).

B. Space and aerospace supply chains
25: Satellites and orbital/space systems
101: Aircraft overhaul/airframe maintenance & spares
151: Helicopters/VTOL airframe structures
177: Aerospace actuators/servo/sensors/precision components

C. Strategic ICT, semiconductors, and cybersecurity
Semiconductors & electronics
148: Semiconductor wafers/fabs/lithography/photomasks
134: Chipsets/motherboards (core computing hardware)
86: Semiconductor discrettes (transistors/diodes/thyristors)
47: Microcircuits/optoelectronics/electronic components
Telecom/network infrastructure (often export-control and supply-chain exposed)
269: Networking/ethernet/routers/connectivity
279: Wireless infrastructure (CDMA/TDMA amplifiers/transceivers)
288: Wireless spectrum/broadband multipoint (LMDS/MMDS etc.)
50: Interexchange switching/billing/long-distance telecom backbone
291: ILEC/CLEC interconnection/unbundled telecom (carrier layer)
276: Cellular markets/roaming (wireless services layer)
61: Wireless handsets/telephones (device layer)
78: RF/microwave comms hardware (amplifiers/transmitters/transceivers)
209: Connectors/transceivers/IEEE-type comms hardware
Cybersecurity / encryption
162: Encryption/authentication/firewalls
224: Encryption/authentication/tokens/firewalls

D. Energy, extraction, and petrochemical supply chains
Midstream / infrastructure

1: Pipelines (gas transmission/distribution language)
232: Pipelines/gathering/NGLs/crude (midstream)

Upstream exploration and drilling

92: Exploration/drilling/wells (incl. basin/coalbed language)
124: Exploration/drilled wells/hydrocarbons
199: Oil & gas E&P (crude/condensate/hydrocarbons)
196: Offshore drilling rigs/deepwater/subsea
135: Seismic/geophysical exploration (streamers/airguns)

Downstream / services

104: Refining/refineries/feedstocks/crude
143: Downhole/oilfield services (cementing, blowout preventers, etc.)
59: Propane/liquefied fuels distribution
138: Gasoline retail/storage/tanks/truck stops
265: Petrochemical/process equipment (filtration/exchangers)

Resource extraction / related

27: Mining/mineral exploration (lode/placer language)
281: Coal/mining/petrochemical remediation/cleanup

E. Transportation and cross-border logistics / mobility

68: Freight forwarding/logistics (airfreight/steamship/intermodal)
182: Railroads/intermodal rail transport
188: Truckload trucking/freight linehaul
91: Maritime/cruise/ships/tankers
298: Airlines/flights/passengers

F. Strategic commodities and critical inputs (trade-, sanction-, and resource-nationalism sensitive)

39: Steelmaking/rolled steel
77: Alloys/forgings/castings/ingots (metals)
129: Fertilizer inputs (urea, ammonia, potash, phosphates)
13: Lithium batteries (critical mineral supply chains)
251: Ceramics/tungsten powders/hard materials (strategic materials)
297: Solar PV/inverters/renewables (trade-war and supply-chain exposed)
